SOLVING THE CLIMATE CRISIS: BUILDING A VIBRANT AND JUST CLEAN ENERGY ENVIRONMENT

HEARING

BEFORE THE

SELECT COMMITTEE ON THE CLIMATE CRISIS HOUSE OF REPRESENTATIVES

ONE HUNDRED SIXTEENTH CONGRESS

SECOND SESSION

HEARING HELD
JULY 28, 2020

Serial No. 116–18

www.govinfo
Printed for the use of the Select Committee on the Climate Crisis

U.S. GOVERNMENT PUBLISHING OFFICE
41–340 WASHINGTON : 2020

SELECT COMMITTEE ON THE CLIMATE CRISIS

ONE HUNDRED SIXTEENTH CONGRESS

KATHY CASTOR, Florida, *Chair*

BEN RAY LUJÁN, New Mexico
SUZANNE BONAMICI, Oregon
JULIA BROWNLEY, California
JARED HUFFMAN, California
A. DONALD MCEACHIN, Virginia
MIKE LEVIN, California
SEAN CASTEN, Illinois
JOE NEGUSE, Colorado

GARRET GRAVES, Louisiana,
Ranking Member
MORGAN GRIFFITH, Virginia
GARY PALMER, Alabama
BUDDY CARTER, Georgia
CAROL MILLER, West Virginia
KELLY ARMSTRONG, North Dakota

ANA UNRUH COHEN, *Majority Staff Director*
MARTY HALL, *Minority Staff Director*
climatecrisis.house.gov

CONTENTS

STATEMENTS OF MEMBERS OF CONGRESS

WITNESSES

SUBMISSIONS FOR THE RECORD

APPENDIX

SOLVING THE CLIMATE CRISIS: BUILDING A VIBRANT AND JUST CLEAN ENERGY ECONOMY

TUESDAY, JULY 28, 2020

HOUSE OF REPRESENTATIVES,
SELECT COMMITTEE ON THE CLIMATE CRISIS,
Washington, DC.

The committee met, pursuant to call, at 2:02 p.m., via Webex, Hon. Kathy Castor [chairwoman of the committee] presiding.

Present: Representatives Castor, Luján, Bonamici, Brownley, Huffman, McEachin, Levin, Casten, Graves, Carter, and Miller.

Ms. CASTOR. The committee will come to order. Good afternoon, everyone.

Without objection, the chair is authorized to declare a recess of the committee at any time.

Welcome to our hearing, entitled "Solving the Climate Crisis: Building a Vibrant and Just Clean Energy Economy."

As a reminder, members participating in this remote hearing should be visible on camera throughout the hearing. As with in-person meetings, members control their microphones. Members can be muted by staff only to avoid inadvertent background noise.

In addition, statements, documents, and motions must be submitted to the electronic repository at sccc.repository@mail.house.gov.

Finally, members or witnesses experiencing technical problems should inform the committee staff immediately.

So thanks again for participating during this somber time, as our colleague and friend, Representative John Lewis, is lying in state here in the U.S. Capitol after a lifetime of standing up for justice for all, even if that meant sitting down where some would deny him a seat.

His leadership in the civil rights movement was legendary, but he worked on every issue when there was a need to encourage Americans and Congress to do more. That included climate change and environmental justice.

Last year, he said, "Each and every one of us must cherish this planet, for it is likely the only home we will ever know. Combating climate change is not a Democratic or a Republican issue. It is a question of preserving this little piece of real estate that we call Earth for generations to come, for generations yet unborn. Together, we can solve this problem, but time is of the essence. Congress cannot stand on the sidelines. We have a moral responsibility to lead, and the time to act is now."

So, before I ask the committee to observe a moment of silence to remember Representative Lewis, I wonder if Ranking Member Graves has made it over from his meeting so that he can provide his thoughts or if any of the Republican members would like to do so instead.

Mr. GRAVES. Hey, Chair Castor, this is Garret. Thank you very much for the opportunity for the certainly appropriate honoring of John Lewis.

It has been an incredible experience to be able to serve with someone who has played such an amazing role in the Civil Rights Act. You read about these iconic figures, but to be able to serve alongside of him has just been an awing experience.

And it was amazing being in the Rotunda yesterday as his body lied in state. And just seeing all of the incredible history and little anecdotes and stories that folks have shared over the past few days in remembering his courageous leadership and, again, just the progress that he has made in regard to advancing the civil rights of particularly the African-American community, it has been amazing.

So I appreciate you raising the issue and certainly giving a tribute of respect to him.

Ms. CASTOR. Thank you, Ranking Member Graves.

So, at this time, I would like to ask everyone participating here to take a moment to remember the life and legacy of Representative John Lewis.

[Moment of silence.]

Ms. CASTOR. Thank you all.

I now recognize myself for 5 minutes to give an opening statement.

Members, America is reeling from a number of interrelated and severe crises that I believe can be solved through transformational action and leadership.

First, the coronavirus pandemic, which has tragically taken the lives of nearly 150,000 Americans, is crying out for a coordinated plan of action to control the virus and save lives. It is a sad day for me and Floridians because we set another record today for the number of deaths reported, 186 Floridians, the largest one-day increase so far.

The pandemic has also sparked an economic crisis. Millions of Americans are out of a job as businesses shut down in response to the health emergency.

And, in the middle of all this, we witnessed the brutal murder of George Floyd at the hands of police officers in Minneapolis. It was a tragic reminder that systemic racism still plagues our communities, and the urgent need for racial justice.

Plus, the ongoing climate crisis continues to fuel extreme events like floods, intense storms, and wildfires, and it is increasing the costs on families and businesses alike.

So Congress must rise to the occasion. We must tackle the climate crisis while heeding the calls for racial justice, protecting the health of our families, and helping our neighbors get back to work. And we can rebuild our economy in a resilient way that reduces greenhouse gas pollution and protects the air that we breathe. We

have a moral obligation to solve the climate crisis and build back better for decades to come.

Solving the climate crisis is hard work, but it is within our reach. Investing in clean energy gives us an opportunity to create millions of good-paying jobs, family-sustaining jobs that will get Americans back to work and strengthen our middle class. It can also help make communities healthier as we deploy innovative technologies to reduce pollution. And it can repair injustices of the past as we commit to invest in Black and Brown communities disproportionately harmed by the climate crisis.

Today, we will discuss how to build a vibrant clean energy economy, one that centers environmental justice at its core. We will hear about ways to grow our manufacturing base and create well-paying jobs by modernizing our grid. And we will discuss initiatives to revive our economy while reducing pollution and creating more resilient communities.

This is our first hearing since Select Committee Democrats released our majority staff report, "Solving the Climate Crisis,"a comprehensive framework to cut carbon pollution in line with what science dictates and create the clean energy economy that we desperately need.

I would like to thank the thousands of stakeholders who informed our action plan—the scientists, the farmers, young people, EJ leaders, workers, indigenous people, and our outstanding professional staff.

According to an independent analysis by Energy Innovation, our plan would save over 60,000 lives every year by 2050 while also providing at least $8 trillion in climate and health benefits alone. It would also create economic opportunity by investing in America's workers and communities, including establishing a national economic transition office to help with the transition to a net-zero emission economy.

I know our Republican colleagues have been reviewing the majority staff report. I look forward to hearing their recommendations to help solve the climate crisis. Democrats have put forward our ideas, and I hope our Republican colleagues will do the same so the committee can discuss potential bipartisan recommendations in the coming months, especially since previous staff attempts to start the discussions have not progressed.

Workers are at the center of our action plan. Between March and May, more than 620,000 clean energy workers, nearly a fifth of the industry's workforce, filed for unemployment. While the U.S. economy added jobs in June, only about 106,000 of those jobs were in clean energy, leaving more than a half a million clean energy workers unemployed.

As you will hear from our witnesses, climate solutions are economic solutions, and they have helped develop platforms to put workers and families first, addressing injustices in vulnerable communities with an eye toward building a recovery on a stronger and more equitable foundation.

As we rebound from our current crises, let's power America's recovery through investments in clean energy, energy efficiency and conservation, and put money back into families' pockets at a time when they really could use it. We can expand our manufacturing

base and build the technologies the world will need to solve the climate crisis. We can invest in a 21st-century infrastructure that can help cut carbon pollution and withstand climate impacts. And we can create good-paying jobs that move us towards net-zero emissions by 2050. I know we can do this.

At this time, I would like to recognize Ranking Member Graves for an opening statement.

You are recognized for 5 minutes.

[The statement of Ms. Castor follows:]

Opening Statement of Chair Kathy Castor

Hearing on "Solving the Climate Crisis: Building a Vibrant and Just Clean Energy Economy"

Select Committee on the Climate Crisis

July 28, 2020

As Prepared for Delivery

America is reeling from a number of interrelated and severe crises that I believe can be solved through transformational action and leadership. First, the coronavirus pandemic, which has tragically taken the lives of nearly 150,000 Americans, is crying out for a coordinated plan of action to control the virus and save lives. (Florida posted 186 deaths today—the largest one-day increase so far.) The pandemic also sparked an economic crisis, leaving millions of Americans without jobs as businesses shut down in response to the health emergency. In the middle of all this, we also witnessed the brutal murder of George Floyd at the hands of police officers in Minneapolis, which was a tragic reminder of the systemic racism that still plagues our communities—and the urgent need for racial justice in the United States. Plus, the ongoing climate crisis continues to fuel extreme events like floods, intense storms and wildfires, and increase costs on families and businesses.

Congress must rise to the occasion. We must heed the calls for racial justice, protect the health of our families, help our neighbors get back to work and rebuild our economy in a resilient way that reduces greenhouse gas pollution and protects the air we breathe. We have a moral obligation to solve the climate crisis and build back better for decades to come.

Solving the climate crisis is hard work, but it is within our reach. And it gives us a chance to build an America that is stronger and more resilient to these serious challenges. Investing in clean energy gives us an opportunity to create millions of good-paying, family sustaining jobs—that will get Americans back to work and strengthen our middle class. It can also make our communities healthier, as we deploy innovative technologies that will reduce pollution. And it can help us repair the injustices of the past—as we commit to invest in the Black and brown communities disproportionately harmed by the climate crisis.

Today we'll discuss how to build a vibrant clean energy economy, one that centers environmental justice at its core. We'll hear about ways to grow our manufacturing base and create well-paying American jobs by modernizing our grid. And we'll discuss initiatives to revive our economy, while reducing pollution and creating more resilient communities.

This is our first hearing since Select Committee Democrats released the majority staff report **'Solving the Climate Crisis'**, a comprehensive framework to cut carbon pollution in line with climate science and create the clean energy economy that we desperately need. I'd like to thank the thousands of stakeholders who informed our action plan—scientists, farmers, entrepreneurs, young people, EJ leaders, workers, indigenous people and our outstanding professional staff. According to independent analysis, our plan would save over 60,000 lives every year by 2050, while also providing at least $8 trillion in climate and health benefits alone. It would also create economic opportunities by investing in America's workers and communities, including establishing a National Economic Transition Office to help with the transition to a net-zero emission economy.

I know our Republican colleagues have been reviewing the majority staff recommendations. I look forward to hearing their recommendations to help solve the climate crisis. Since the Democrats have put forward ideas, I hope that our Republican colleagues will do the same so we can discuss potential bipartisan rec-

ommendations since previous staff attempts to start discussions have not progressed.

Workers are at the center of our climate action plan. Between March and May, more than 620,000 clean energy workers, nearly a fifth of the industry's workforce, filed for unemployment benefits. As many states began to reopen, the U.S. economy added jobs in June, but only 106,000 of those jobs were in clean energy, leaving more than half a million clean energy workers still unemployed.

As you'll hear from our witnesses, climate solutions are economic solutions. Which is why they've helped develop platforms to put workers and families first, addressing injustices in vulnerable communities, with an eye to building a recovery on a stronger and more equitable foundation.

As you'll hear from our witnesses, climate solutions are economic solutions. Which is why they've helped develop platforms to put workers and families first, addressing injustices in vulnerable communities, with an eye to building a recovery on a stronger and more equitable foundation.

As we rebound from our current economic crisis, let's power America's recovery through investments in clean energy, energy efficiency, and conservation—and put money back into families' pockets when they need it. We can expand our manufacturing base and build the technologies the world will need to solve the climate crisis. We can invest in a 21st century infrastructure that can help cut carbon pollution and withstand climate impacts. And we can create jobs, jobs, jobs—good-paying jobs that move us toward net-zero emissions by 2050.

With that, I look forward to hearing from our witnesses.

Mr. GRAVES. Thank you, Madam Chair. Again, I want to thank you and the committee for putting this hearing together.

As we have discussed on many occasions, I share a lot of the same objectives—and I know many members of the committee do—the same objectives that you communicated just a few minutes ago, objectives like improving the resilience of our communities, particularly those coastal communities that you represent, that we represent. And I also know that Congressman Buddy Carter has been very vocal about us being more deliberate in building upon some of the successes we had in 2018, really extraordinary successes in 2018, in improving the resiliency of our coastal communities.

We share the objectives of building upon some of the extraordinary efforts we have had over the past several years in reducing emissions in the United States, to the point where we have reduced them more than any other country in the world, and actually bringing even more science to the table to ensure that we are building upon the successes and the very tactics that allowed us to be the global leader in emissions reduction, rather than shutting that out, and ensuring that economic science is part of the equation.

You mentioned that the majority staff report would save $8 trillion. And, certainly, we do need to consider cost savings as part of the overall calculation to inform the decisions that we make, the recommendations that we make in regard to energy policy moving forward. But with an estimate that the implementation report would cost $20 trillion, that doesn't seem to provide a positive cost-to-benefit ratio.

And, of course, as you mentioned, Congressman John Lewis—and you mentioned our efforts to try to continue to make progress and build upon the success of Congressman Lewis in addressing the inequality issues. We cannot allow there to be a disproportionate impact on those that are impoverished or those communities of color, a significant percentage of which I represent in our south Louisiana district.

The committee report largely reflects a lot of the recommendations that have been implemented in California, and California is

one of the worst states in the nation in regard to actually reducing emissions. And, also, there is a lawsuit by a community of color against the State of California because of the disproportionate cost imposed on them as a result of those recommendations. So here you have disproportionate costs on communities of color and actually one of the worst performing emissions reduction strategies in the nation.

So I want to say it again: We must, we must, introduce more science into this equation—that includes environmental science, of course chemical science, physical science, and economic science—to make sure that we are employing the best strategies.

Last thing, Madam Chair, I just want to make note in regard to your comment about the staff unable to work together to come up with a report, and all I can derive from that is that perhaps you were talking about the majority staff unable to work together, because our staff was not engaged on any type of bipartisan report.

But, certainly, as I mentioned at the opening, we share a lot of the same objectives: resiliency of our coastal communities and other communities, reducing emissions, conservation of energy, and ensuring that the United States continues to be a leader but that we don't lead in job losses and we don't lead in providing jobs to China and other countries, where employing a lot of the strategies included in the report would actually achieve those goals, sending jobs to China and giving leverage to China and other nations as opposed to the United States.

So, looking forward to working together, and I yield back.

Ms. CASTOR. All right.

Without objection, members who wish to enter statements into the record may have 5 business days to do so.

Ms. CASTOR. Now I want to welcome our witnesses.

First, Dr. Ana Baptista is an assistant professor and the Associate Director of the Tishman Environment and Design Center at The New School. She is a member of the board of the New Jersey Environmental Justice Alliance and a member of the Equitable and Just Climate Forum.

Mr. Jason Walsh is the Executive Director of the BlueGreen Alliance. He previously served in the Obama Administration as the Director of the Office of Strategic Programs at the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy and as a Senior Policy Advisor in the White House for the Domestic Policy Council, where he led the Obama Administration's efforts to align and scale up Federal investments in support of workers and communities impacted by the shift away from coal in the power sector.

Mr. Michael Shellenberger is the Founder and President of Environmental Progress. He was the co-founder of The Breakthrough Institute and served as its president until 2015.

Ms. Beth Soholt is the Executive Director of the Clean Grid Alliance. Ms. Soholt has more than 15 years of experience working with the electric industry, with a focus on helping overcome the barriers to bringing wind power to market. She holds a seat on the Midwest Independent System Operator Advisory Committee, representing the environmental sector.

Without objection, the witnesses' written statements will be made part of the record.

With that, Dr. Baptista, you are now recognized to give a 5-minute presentation of your testimony.

STATEMENTS OF ANA BAPTISTA, ASSISTANT PROFESSOR AND ASSOCIATE DIRECTOR, TISHMAN ENVIRONMENT AND DESIGN CENTER, THE NEW SCHOOL; JASON WALSH, EXECUTIVE DIRECTOR, BLUEGREEN ALLIANCE; MICHAEL SHELLENBERGER, FOUNDER AND PRESIDENT, ENVIRONMENTAL PROGRESS; AND BETH SOHOLT, EXECUTIVE DIRECTOR, CLEAN GRID ALLIANCE

STATEMENT OF ANA BAPTISTA

Dr. BAPTISTA. Thank you. Thank you, Chair Castor, Ranking Member Graves, and distinguished members of the committee, for the opportunity to testify before the House Select Committee on the Climate Crisis.

The ongoing and intersecting public health, economic, and racial justice crises have put into sharp focus the systemic changes needed to address longstanding inequalities in our country. At the same time, we are in a global climate crisis.

Each of these crises disproportionately impacts communities of color and low-wealth communities around the country. As policymakers address these multiple intersecting crises, they must also enact solutions that address them holistically and are centered in equity and justice.

Events in 2020 have shone a bright light on longstanding racial disparities that have contributed to disproportionate health and environmental impacts on communities of color and low-wealth communities.

A recent Harvard study linked long-term exposure to air pollution, like particulate matter, to higher death rates from coronavirus. These findings were supported by the Rhodium Group, which found that Black, Latino, and indigenous communities in high-environmental-risk areas experience death rates from COVID-19 more than four times higher than those in counties with fewer environmental risks and that these same communities of color experience higher rates of unemployment and slower economic rebound.

Systemic racism has contributed to these disparities, and transformative policies that center justice and equity are essential to moving forward. Climate policy can and should be designed in a manner that reduces greenhouse gas emissions and also other harmful air pollutants while creating long-term economic sustainability for all communities. But we need an intentional focus on equity and justice; otherwise, we will replicate the same disparities in the transition to a sustainable economy.

The House Select Committee on the Climate Crisis majority's "Climate Crisis Action Plan" details the processes and policies that, if enacted, will address these crises and build a more equitable, just future.

Similarly, the "Equitable and Just National Climate Platform" also identifies the need to advance economic, racial, environmental,

and climate justice as part of a national climate agenda, and, as a co-author of the platform, I am pleased to see many of these ideas reflected in the Select Committee's report.

We need actions that will end environmental racism and the historic concentration of pollution in environmental justice communities and that will rebuild the economy so that it works for all people.

And, meeting the goals and priorities outlined in the plan, we encourage Congress to support some of the following specific examples of investments that could have multiple benefits.

For example: investing in equitable and just, collaborative projects, such as the EPA's Environmental Justice Small Grants Program.

Expanding environmental investments in vulnerable communities, such as climate resilient water infrastructure needed to deliver safe drinking water or prevent climate related flooding.

Expanding low-income solar access, community solar initiatives, cooperative nonprofit energy organizations' energy efficiency programs, all which spur job creation and economic opportunities in areas that have historically faced barriers.

Making strategic investments in the transportation sector, such as zero-emission school buses, heavy- and medium-duty diesel trucks, can have short-term public health benefits in EJ communities while also supporting economic and climate goals.

Increasing investments for worker training programs, like the NIEHS's Environmental Career Worker Training Program, which can provide job and safety training to millions of Americans.

Vastly increasing funding for the Energy Efficiency and Conservation Block Grants, the Low-Income Home Energy Assistance Program, Community Development Block Grants, and the Weatherization Assistance Program. These investments are not only going to ensure greater climate resiliency but can address historic inequalities, energy insecurity, and climate change.

We could mobilize new investments in safe and healthy communities, such as the creation of a national climate bank that Representative Dingell introduced, and carve out 60 percent of the bank capital for economically disadvantaged areas and communities of color.

These are just some examples of the kinds of investments we need in these difficult times. We need strategic investments that can deliver multiple benefits, particularly to those communities hardest hit by COVID, racial and economic inequality, and environmental injustice.

We hope that these recommendations embodied in the committee's plan will put us on the path to ensuring a healthy and sustainable future for all Americans.

Thank you.

[The statement of Dr. Baptista follows:]

Select Committee on the Climate Crisis

Testimony of Ana Isabel Baptista, PhD

Tishman Environment & Design Center at The New School & the New Jersey Environmental Justice Alliance

Member of the Equitable and Just Climate Forum

July 27, 2020

Thank you for the opportunity to testify before the House Select Committee on the Climate Crisis. I am an Assistant Professor of Professional Practice at The New School University where I serve as the Associate Director of the Tishman Environment and Design Center. I also serve as a Trustee of the New Jersey Environmental Justice Alliance and as such, serve as a member of the Equitable and Just Climate Forum.

Introduction

The ongoing and intersecting public health, economic, and racial justice crises our country is in has put into sharp focus the systemic change needed to address long standing inequities. At the same time, we're in a climate crisis. Each of these crises disproportionately impacts Indigenous, Black, Latinx, Asian Pacific Island and other communities of color. As policymakers address each crisis, they must also look at solutions that address them holistically and are centered in equity and justice.

The House Select Committee on the Climate Crisis' majority Climate Crisis Action Plan[1] details both processes and policies that, if enacted, will address these crises and build a more equitable and just future. The Equitable and Just National Climate Platform[2] also identifies the need to advance economic, racial, environmental and climate justice as part of a national climate agenda, and as a co-author of the Platform, I am pleased to see our ideas acknowledged in the Select Committee report.

Events in 2020 have shone a bright light on longstanding racial disparities that have contributed to disproportionate health impacts on communities of color and low income communities. A Harvard study[3] released in April linked long-term exposure to air pollution to higher death rates from coronavirus—demonstrating the devastating health impacts caused by decades of environmental racism. These findings were supported by the Rhodium group,[4] which found that Black, Latino, and Indigenous communities in high environmental risk areas experience death rates from COVID-19 more than four times higher than those in counties with fewer environmental risks (See Appendix). The Rhodium Group also found that Indigenous, Black, and Latino communities experienced higher rates of unemployment and a slower economic rebound than whites.

Systemic racism has contributed to these disparities, and transformative, intersectional policy that centers justice and equity in the solutions are essential going forward. Climate policy can and should be designed in a manner that reduces greenhouse gas emissions and other pollution, while creating long-term economic sustainability for all communities. Without an intentional focus on equity and justice, we will replicate the same disparities in the transition to an environmentally sustainable economy.

Equitable and Just National Climate Platform

One year ago, environmental justice organizations from across the country along with six national environmental groups co-created and co-signed the Equitable and Just National Climate Platform (Platform). The Platform identifies the need to advance innovative, equitable policy solutions to address climate change and environmental justice. Central to the Platform is the recognition that in order to address the climate crisis, we must advance policy that addresses climate while advancing environmental justice, economic, and racial justice.

The Platform details a bold vision of a just, inclusive agenda that advances ambitious environmental justice and climate policy while addressing racial and economic justice. As it states, "Our vision is that all people and all communities have the right to breathe clean air, live free of dangerous levels of toxic pollution, access healthy food, and enjoy the benefits of a prosperous and vibrant clean economy."

---

[1] https://climatecrisis.house.gov/report

[2] https://ajustclimate.org/index.html

[3] https://www.hsph.harvard.edu/news/hsph-in-the-news/air-pollution-linked-with-higher-covid-19-death-rates/

[4] https://rhg.com/research/a-just-green-recovery/

In order to achieve these goals and vision, the Platform recognizes the need to mobilize all assets—communities, government, science, research, business and industry—to develop long-term comprehensive solutions. These solutions must "meaningfully involve and value the voices and positions of environmental justice, frontline and fenceline communities." These strategies must also "acknowledge and repair the legacy of environmental harms on communities inflicted by fossil fuel and other industrial pollution."

Organizations who co-signed the Platform agreed that in order to address climate change, we must reduce legacy pollution in a way that creates jobs and contributes to the health and well-being of all communities.

Policies in the Platform will contribute both to short-term economic recovery in response to the pandemic and recession, as well as long-term economic growth, building towards an inclusive, pollution-free economy, all while reducing greenhouse gas and other emissions. We are pleased to see the core premise of the Platform in the Climate Crisis Action Plan.

HEROES Act and Representative McEachin and Chairman Grijalva's environmental justice stimulus letter

A number of existing programs, if robustly funded, would contribute to the just and equitable future envisioned in the Platform. The HEROES Act, as passed by the House, included funding for programs that will have both short and long-term economic impacts while reducing emissions and creating and sustaining jobs. These include nearly $2 billion to provide potable water to communities affected by the pandemic, specifically making funds available to assist Tribal and low-income families with water and wastewater services, in addition to a moratorium on dangerous water service shut-offs; and $1.5 billion for the Low Income Home Energy Assistance Program (LIHEAP) to reduce energy burdens for low income families. The bill also included $50 million for environmental justice grants to study and address the disproportionate impacts of coronavirus on environmental justice communities.

Representative McEachin and Chairman Grijalva sent a letter to House and Senate leadership in March that also identified key short-term spending that would reduce emissions and improve public health while also stimulating economic growth. Rhodium's jobs analysis of the programs outlined in the letter found that if funded, these investments would create up to 300,000 new jobs per year for five years. For example, Rhodium estimates that a $30 billion investment in the Community Development Block Grant program, which provides grants to states for community development and affordable housing, would create 92,000 jobs per year for five years.

Both the letter and the Climate Crisis Action Plan discussed the importance of expanding funding for the Weatherization Assistance Program (WAP). By investing in energy efficiency and home updates, individuals can lower their energy burdens and reduce electricity usage. As the Climate Crisis Action Plan notes, "Investments in weatherization have economic multiplier effects because workers develop skills through construction-related jobs that are readily transferable to other economic sectors" (p. 166). They both discuss the Low Income Home Energy Assistance Program (LIHEAP), and the essential utility bill assistance it provides. The Climate Crisis Action Plan also envisions expanding LIHEAP and using these funds to increase solar access in low income communities (p. 77, 167). Both also recommend increasing funding to "clean up and reuse contaminated properties (brownfields)" (p. 398).

As Rhodium concluded, "As Congress turns their attention from near-term relief to investing in a sustainable economic recovery, investments in the kinds of programs outlined in the Grijalva-McEachin letter can both make a meaningful contribution to national job creation and serve as a down payment on creating a more environmentally just future."

Prioritize Climate Action Spending in EJ communities

As the pandemic and economic challenges continue, the health and economic wellbeing of Indigenous, Black, and Latino communities have been disproportionately impacted. Rhodium found that "Between February and May, the number of Black and Latino people employed in the US fell by 16% and 18%, respectively, compared to 11% for white people." And, as employment showed beginning signs of recovery in May, the same note found that Black and Latinx employment did not recover as quickly as white employment.

With a backdrop of the current economic crisis, these statistics reveal the devastating effects of environmental racism during a global pandemic. It is clear that environmental regulation does not equate to healthy environments for all. As policymakers take action to reduce greenhouse gas emissions, it is essential for these policies to also reduce legacy environmental and economic impacts and ensure that poli-

cies do not contribute to further harm placed on these communities. Criteria and mechanisms to prioritize investment in disproportionately impacted communities to address these harms should be included in climate policy. As the Equitable and Just Climate Platform states, "Strategies to address climate change must not disproportionately benefit some communities while imposing costs on others. In fact, the national climate policy agenda should be used to reduce the disproportionate amount of pollution that is often found in EJ communities and that is associated with cumulative impacts, public health risks, and other persistent challenges." We strongly recommend pursuing local economic development and building economic diversity that will also reduce the vulnerability of overburdened communities to pollution. Climate action must "create and support strategies that shift away from high pollution products and production processes toward those that are low-emission and sustainable. This also includes investments in innovative and worker-supported economic organizations such as cooperatives and other community wealth-building strategies."

Research investments are also necessary to address equity and justice in climate policy. As detailed in the Platform, research focused on environmental justice and climate equity is a critical component of building a climate-sustainable future that addresses inequities instead of reinforcing inequities.

How to Invest and Prioritize spending in EJ communities

Underpinning all of these policy proposals, is the necessity of crafting policy inclusively and ensuring benefits are distributed equitably. We support the goal of creating an inclusive, just, and pollution-free energy economy. In the Equitable and Just Climate Platform, we call for "investing in the development of innovative decentralized models of energy provision; community governance and ownership; incorporation of social and health benefits into energy systems planning; incentivizing the inclusion of equity into future energy investment through public programs; and supporting public and private research and development to include equity considerations in new technology development."

One key recommendation made in the Climate Crisis Action Plan is that "Congress should direct EPA to create a plan to (1) develop a methodology to assess the cumulative and disproportionate impacts of pollution on environmental justice communities, and (2) integrate that methodology into agency decision-making" (p. 304). This critical first step is necessary to ensure that policy to address climate reduces pollution in overburdened communities.

Both the Platform and the Climate Crisis Action Plan recognize the importance of environmental justice community participation in policymaking. The Climate Crisis Action Plan's recommendation to increase funding for EPA existing programs that provide technical assistance and build capacity of stakeholders engaged in policy is equally important. Throughout the Plan, the Committee majority recommends developing policy in partnership with communities. This model of policymaking will ensure that community expertise is taken into account, and that policies are responsive to community priorities.

Creating an equitable, just and climate-sustainable economy will drive job growth and sustained investments by government as well as private entities. The Platform details the need for policies to be shaped by communities and must lead to benefits at the local and community level. It also recognized the need to realign government spending in order to accomplish these goals. It envisions working at multiple levels of government using a variety of policy tools. Specifically, the Platform favors "policy tools that help achieve both local and national emissions reductions of carbon and other forms of pollution." This shift will "require substantial new forms of capital investment by both the public and private sectors to build a new national infrastructure as well as democratic community participation to help set infrastructure investment priorities." Without proper investment and engagement, we will repeat mistakes of the past.

The Climate Crisis Action Plan recommends significant federal investments to update infrastructure and housing to reduce emissions and build climate resilience. It follows with a recommendation to "direct a significant percentage of this spending to environmental justice communities and communities most affected by the economic transition away from fossil fuel consumption" (p. 304). This prioritization is necessary and we strongly support this recommendation.

The Climate Crisis Action Plan includes recommendations of a number of policies that can meet dual goals of reducing pollution and driving local economies. One of its building blocks is expanding low-income solar access and community solar initiatives. The recommendations to achieve this building block include funding and expanding programs to bolster solar access. It also encourages creation of a solar workforce program, with a focus on "individuals who have historically faced barriers

to employment" (p. 76–77). The Platform and the Climate Crisis Action Plan both identify transportation and goods movements as a key sector where strategic investments can reduce air pollution while creating jobs. The Climate Crisis Action Plan includes recommendations like investing in zero emissions school buses (p. 118) and transit buses (p. 119), increasing electrification infrastructure access (p. 93, 126), and supporting research and development to drive new transportation technology (p. 126–127), among others.

In addition to investments informed by communities, as employment opportunities arise from these investments and new policies, the Platform recommends that workforce and job training programs be prioritized "especially in communities with disproportionately high underemployed and unemployed populations and in communities that have been historically reliant on fossil field extraction and energy production." The Climate Crisis Action Plan makes a similar recommendation. As it says, "This report makes several recommendations for new federal investment and incentives for clean and resilient infrastructure. Congress should direct a significant percentage of this spending to communities most affected by the economic transition away from fossil fuel consumption and environmental justice communities. These communities should receive federal spending and investment first, most often, and in larger amounts" (p. 291).

The intersecting crises our nation currently faces are dire—and the policy solutions to address these crises are interconnected. With meaningful action to address racial, economic, environmental and climate justice, Congress can use policy to reduce disparities and begin to build the just and equitable future envisioned in the Platform and the Climate Crisis Action Plan.

NO COMMUNITY WILL BE LEFT BEHIND.

All communities have a right to resources to withstand and cope with unanticipated natural and man-made threats and to live free from exposure to dangerous toxic pollution. Yet persistent racial and economic inequalities—and the forces that cause them to have created disproportionately high public health and environmental risks. Federal climate policy must address these injustices head-on by developing and implementing solutions at the scale needed to significantly improve their public health and quality of life. We need actions that will end environmental racism and the historic concentration of pollution in environmental justice communities, and that will rebuild the economy so that it works for all people and all communities. In meeting the goals and priorities outlined by the Plan, we encourage Congress to support the following, in line with the Select Committee's Climate Crisis Action Plan[5]:

Invest in equitable and just research and innovation. The EPA's Office of Research and Development provides the scientific and technical foundation to address our nation's environmental and public health problems. This environmental research and development infrastructure must invest and support data collection and tools development that provides robust, scientific analysis on environmental, health and socioeconomic conditions that will assess community burden and vulnerability to pollution.

Invest in equitable and just community collaborative projects. The EPA can enhance its commitment to addressing community priorities and needs through investment in collaborative projects that will yield innovation in program development, and data/information collection. EPA's Environmental Justice Small Grants (EJSG) Program provides small grants to communities to address environmental risks associated with high concentrations of pollution, prepare for climate change effects, and improve public health. Significantly expanding this EJSG and similar grants programs will support pioneering community-based projects that can support and catalyze innovation in the federal family.

Expand environmental investments in vulnerable communities. Significant new investment in climate resilient water infrastructure is needed to address unsafe drinking water and climate-related flooding, sea level rise, and drought. To ensure that vulnerable communities receive these investments and technologies, it is imperative to engage workers and firms from vulnerable communities in the design, construction, operations and maintenance of these water infrastructure systems.

Investments in environmental worker training through NIEHS. The Institute of Environmental Health Science (NIEHS) Environmental Career Worker Training (ECWTP) provides job and safety training to secure jobs in environmental restoration, construction, handling hazardous materials and waste, and emergency response. A 2015 report assessing the program found that "an annual federal investment of $3.5 million in the ECWTP generates a $100 million return" due to in-

[5] https://climatecrisis.house.gov/report

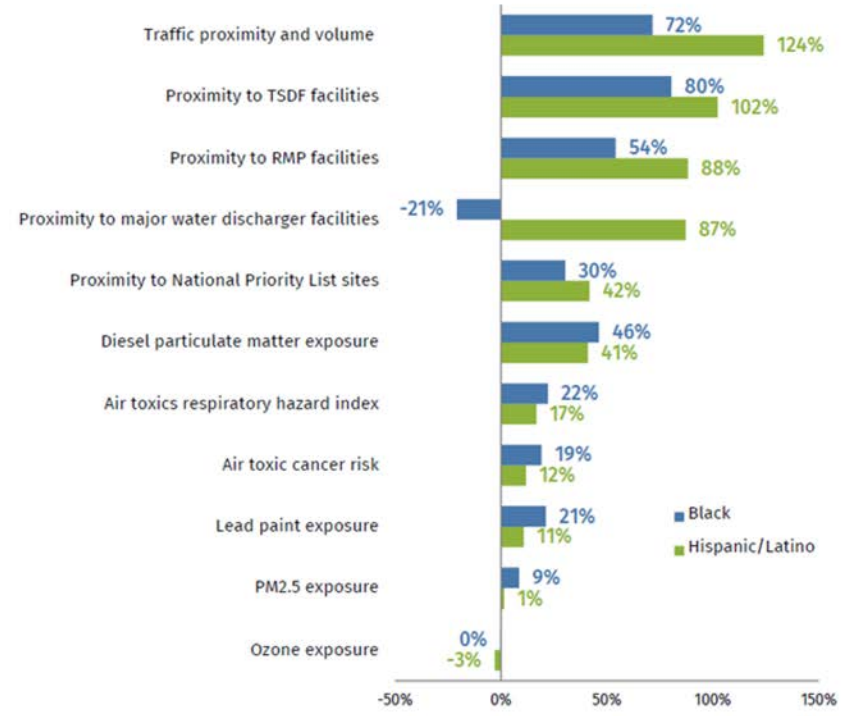
creased wage-earning potential, tax revenue, and reduced workplace injury and hiring costs. Increasing this investment to disadvantaged and underrepresented members of communities of color and low-income communities will contribute to reduction in economic and employment inequalities.

Vastly increase funding for the Energy Efficiency and Conservation Block Grant (EECBG) Program, LIHEAP, and WAP. The EECBG program should prioritize spending in communities left behind by past and ongoing energy efficiency programs. Expanding LIHEAP and WAP not only prepares us for the new reality of climate change, it can address historic investment inequalities.

Mobilize new investment in safe and healthy communities through the creation of a National Climate Bank. Such investments include clean and affordable energy and transportation options and climate-ready infrastructure projects. Consistent with the National Climate Bank Act introduced by Debbie Dingell (D-MI) in December 2019, the National Climate Bank should prioritize investments in economically disadvantaged areas, tribal communities and communities of color. Specifically, at least 60 percent of the Bank capital should be invested in tribal communities, low-income communities and communities of color.

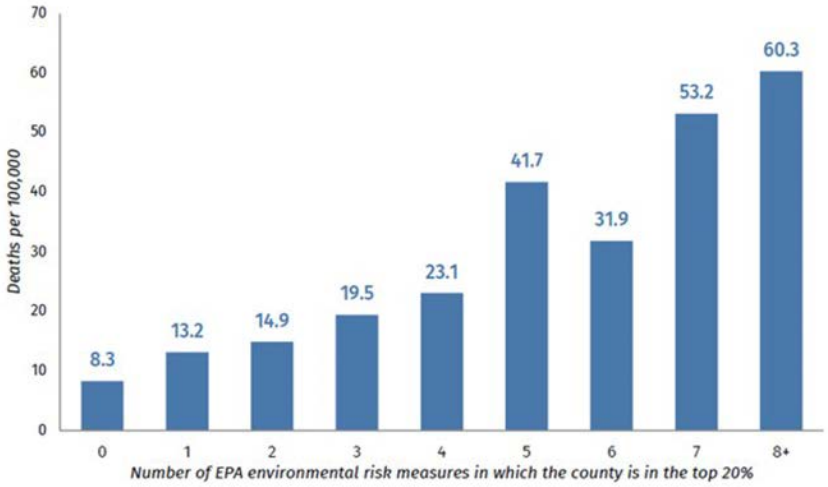
Appendix

FIGURE 3
Difference in environmental risk exposure compared to white Americans
Percent, 2019



Source: EPA, Census and Rhodium Group estimates

FIGURE 4
COVID-19 death rates by county based on level of environmental risk
Environmental risk data from 2019, COVID-19 death rate data through June 23, 2020



Source: EPA, Census, CDC and Rhodium Group estimates

Ms. CASTOR. Thank you very much.

Mr. Walsh, you are recognized for 5 minutes. Welcome.

STATEMENT OF JASON WALSH

Mr. WALSH. Thank you, Chair Castor, Ranking Member Graves, distinguished members of the committee.

My name is Jason Walsh. I am the Executive Director of the BlueGreen Alliance, a national partnership of labor unions and environmental organizations. Thank you for the opportunity to testify today.

We are convening in the midst of a global pandemic. As Chair Castor noted, we are approaching 150,000 deaths from COVID-19 in the U.S., and the 10-week total for unemployment claims has surpassed 40 million. The pandemic has taken an enormous toll, and it is nowhere close to done.

At the same time, the pandemic has cast a harsh spotlight on the parts of our society that already weren't working. We went into this pandemic with two ongoing and closely related crises: economic and racial inequality and climate change.

Our nation has been struggling with deep inequality for decades. As unionization rates have fallen, workers have seen their pay shrink and bargaining power eroded. The deck has been stacked even further against people of color, as we are seeing in the context of COVID-19. Black Americans make up 12.5 percent of the U.S. population but represent 22.4 percent of COVID deaths.

At the same time, we are facing a climate crisis. Climate change is a dire and urgent threat, and the longer we delay, the stronger the action required.

We see these issues as fundamentally linked. That is why, this past summer, we released with our partners "Solidarity for Climate Action," a concrete platform to address these crises simultaneously.

We have seen how dangerous the status quo is. We need to move urgently towards economic recovery, but we know that returning to normal is not good enough. We have to do better.

As we think about climate change and economic recovery, we believe we can accomplish multiple things at the same time. We can tackle the health and economic crises we are in, invest to protect and support good jobs that are badly needed, deliver public health and climate benefits, and create a stronger, cleaner, and more equitable economy for all. We can achieve this by investing at scale in solutions that deliver climate benefits while creating and retaining quality jobs and spurring economic recovery.

This should start with rebuilding America's infrastructure. Investing now to repair our failing roads and bridges and water systems, and to modernize our buildings, electric grid, transportation systems, will boost our economy and create millions of jobs, while also reducing pollution and combating climate change.

At the same time, we must reinvest in strengthening and transforming U.S. manufacturing to build more of the products, materials, and technologies of the future here. In line with achieving net-zero emissions economy-wide by 2050, we have the opportunity to modernize and transform our industrial base to make it the cleanest and most advanced in the world.

This industrial transformation can bring dynamic industries back to communities that have been left behind and secure domestic supply chains while spurring the creation of a new generation of good manufacturing jobs.

We also have to ensure that our investment tackles income inequality and delivers family-sustaining jobs. We have examples of good union jobs being created in the clean energy economy: construction workers building wind projects and retrofitting buildings, auto workers making cleaner cars and trucks. However, not all the new jobs created or promised in the clean energy economy are high-quality. There are differences across sectors when it comes to union density, wages, and benefits. Therefore, in addition to investments in infrastructure and manufacturing, we need to link those investments to strong labor and Buy American standards, and protect workers' rights to organize across all sectors of the economy.

Lastly, we must recognize that, even if we are successful in creating and retaining jobs, communities impacted by the ongoing energy transition will still be hurt. That is why we joined with partners and allies from coal communities across the country to develop the "National Economic Transition Platform," which outlines a policy framework and priorities to invest in communities and workers hit hard by the decline of the coal industry.

Working people should not have to suffer economically due to the shift to cleaner, cheaper forms of energy. But a transition that is fair to workers and communities isn't something that will happen organically. It needs to be a deliberate choice and baked into our climate solutions.

In conclusion, we believe tackling climate change, inequality, and economic recovery can go hand-in-hand and ensure that the U.S.

emerges from this crisis stronger and more globally competitive with a cleaner and more equitable economy.

We appreciate the work of this committee and the ambition and breadth and detail of the report produced by committee staff. We look forward to continuing to work with you moving ahead.

Thank you for the opportunity to speak today.

[The statement of Mr. Walsh follows:]

WRITTEN TESTIMONY

Jason Walsh
Executive Director, BlueGreen Alliance

Before the 116th United States Congress,
House Select Committee on the Climate Crisis

Solving the Climate Crisis:
Building a Vibrant and Just Clean Energy Economy

Tuesday, July 28, 2020

Thank you Chair Castor, Ranking Member Graves, and distinguished members of the committee. My name is Jason Walsh, and I am the Executive Director of the BlueGreen Alliance, a national partnership of labor unions and environmental organizations. On behalf of my organization, our partners, and the millions of members and supporters they represent, I want to thank you for convening this hearing on how we can build a vibrant and just clean economy while solving the climate crisis.

The BlueGreen Alliance unites America's largest and most influential labor unions and environmental organizations to solve today's environmental challenges in ways that create and maintain quality jobs and build a stronger, fairer economy. Our partnership is firm in its belief that Americans don't have to choose between a good job and a clean environment—we can and must have both.

The world's leading scientific organizations have been unambiguous that climate change is a dire and urgent threat and that the longer we delay, the stronger the action required. Over the last decade, we have witnessed the worsening impacts climate change is having on our communities.

At the same time, our nation is struggling with deep and crippling economic and racial inequality. According to the Economic Policy Institute, "the bottom 90% of the American workforce has seen their pay shrink radically as a share of total income," from 58% in 1979 to 47% in 2015.[i] That is almost $11,000 per household, or $1.35 trillion in additional labor income. There is a direct correlation with the decrease of worker power over this time, as the share of workers in a union fell from 24% in 1979 to under 11% now.[ii]

The deck has been stacked even further against people of color. Data point after data point illustrates exactly how unequal our economy is. For example, regardless of education level, Black workers are far more likely to be unemployed than white workers.[iii] In fact, historically, unemployment rates are twice as high for Black workers. That disparity carries into the workplace as well, with Black workers paid on average 73 cents to the dollar compared to white workers.[iv] The wage gap persists regardless of education, and even with advanced degrees Black workers make far less than white workers at the same level. So, it's no surprise that while the poverty rate for white Americans sits at about 8.1%, for Black households it's 20.7%.[v]

Of course, we are now in the midst of a third devastating and deadly crisis: the COVID-19 pandemic, which has taken its toll and is nowhere close to done. America has surpassed 4 million cases and 140,000 deaths due to the coronavirus.[vi] The ten-week total for unemployment claims has surpassed 40 million, suggesting about a quarter of our workforce has lost jobs during the pandemic and projections suggest that even if we start to recover, the unemployment rate will still be around 9.3% by the end of the year.[vii] And months into this pandemic, workers continue to struggle to stay safe and healthy on the job, particularly as states begin to reopen parts of the economy and state and local government budgets are ravaged, and the Occupational Safety and Health Administration and Mine Safety and Health Administration under President Trump have refused to do their job and issue enforceable emergency standards for workplace safety.

This pandemic has cast a spotlight on and exacerbated all the parts of our society that already weren't working for the American people. With unemployment sky-

rocketing, those still at work being exposed to unacceptable health risks on the job, and families immediately unable to pay rent and mortgages, we're vividly seeing the impact of workers living paycheck to paycheck and diminished workers' rights on the job. And we're seeing clearly how systemic racism has stacked the deck against people of color, who, historically and persistently fare worse in our existing economy, having lower wages, less savings to fall back on, and significantly higher poverty rates.[viii] Not only are people of color more economically vulnerable in this crisis, but disproportionately their lives are being put at greater risk. For example, Black Americans represent 22.4% of COVID-19 deaths while making up just 12.5% of the U.S. population.[ix] And among those aged 45-54, Black and Hispanic/Latino death rates are at least six times higher than for whites. While whites comprise 62% of people in the U.S. in that age group, 1,013 white people have died from COVID-19 (22% of the total) compared to 1,448 Black people and 1,698 Hispanic/Latino people.[x]

We've seen clearly just how dangerous the status quo is. We need to move urgently towards economic recovery. At the same time, we know that returning to "normal" is not good enough. We have to do better.

Last summer, the BlueGreen Alliance alongside our labor and environmental partners released *Solidarity for Climate Action* a first of its kind platform recognizing that the solutions to economic inequality, racial injustice, and climate change have to be addressed simultaneously. We have to fight climate change, reduce pollution, and create and maintain good-paying, union jobs across the nation all at the same time. With COVID-19 worsening these crises, the vision of *Solidarity for Climate Action* is more important now than ever.

We believe our *Solidarity for Climate Action* Platform and the work of this committee lay out a roadmap to get us there. We can tackle climate change in a way that achieves multiple goals at the same time—we can avoid the worst impacts of climate change, deliver public health and environmental benefits to communities, create and maintain good, unions jobs, address economic and racial injustice head on, and create a cleaner, stronger, and more equitable economy for all.

How do we do this?

Invest in infrastructure and support and retool America's manufacturing sector

First, we need to invest in common-sense "win-win" solutions that deliver climate benefits while creating and retaining quality jobs and spurring economic recovery.

We cannot address climate change or build a thriving economy with derelict infrastructure. We must move forward with an ambitious plan to rebuild and transform America's infrastructure. Investing now to repair our failing roads and bridges, water systems, and natural gas distribution pipelines, as well as to modernize our buildings and electric grid, transform our transportation systems, and support our urban and rural communities, will boost our economy and create millions of jobs, while also reducing pollution and combating climate change—paving the pathway to a strong and equitable recovery.

BlueGreen Alliance research has found that investing an estimated $2.2 trillion in key sectors of America's infrastructure to improve them from a "D+" grade overall to a "B" grade has the potential to support or create an additional 14.5 million job-years across the U.S. economy, add a cumulative $1.66 trillion to Gross Domestic Product (GDP) over 10 years, and reduce greenhouse gas pollution and boost climate resilience—versus a business as-usual approach.[xi]

Making these smart investments will also pay dividends for our environment by reducing air and water pollution and tackling the emissions driving climate change. Take transit: supporting transit ridership increases commensurate with population growth could save nearly 4.4 billion gallons of fuel and avert the carbon dioxide (CO_2) equivalent of 39 million metric tons per year through 2025.[xii] Currently, transit ridership levels save the equivalent energy of the gasoline used by more than 7.7 million cars a year—nearly as many cars as are registered in Florida, the fourth largest state.[xiii] Public transit investments can help reduce harmful emissions, which tend to disproportionately impact communities of color and low-income communities. At the same time, transit systems support thousands of high quality jobs directly and provide essential and daily access to jobs and opportunity for millions. Expanding and modernizing our transit systems can boost jobs and cut emissions immediately, and be a key piece of rebuilding clean, livable, equitable, and prosperous communities.

And the return on investment we see from infrastructure spending is far greater than other types of potential policy interventions, like tax cuts for example. Increased federal infrastructure spending has an output multiplier of 1.57 compared to only 1.03 for an across the board tax cut, 1.01 for a nonrefundable lump-sum tax

rebate, and only 0.32 for cutting the corporate tax rate.[xiv] The average rate of return (ROR) on infrastructure investment across dozens of studies examined in a 2017 report was an impressive 16.7%.[xv]

At the same time, we must reinvest in fortifying and transforming heavy industry and retooling to build more of the products, materials, and technologies of the future here. Manufacturing must be an integral part of any strategy to address the climate emergency. In line with achieving net zero emissions economy-wide by 2050, we have the opportunity to modernize and transform our industrial base to make it the cleanest and most advanced in the world. This industrial transformation can bring dynamic industries back to communities that have been left behind by deindustrialization and under-investment and secure domestic supply chains while spurring the creation of a new generation of good, safe jobs manufacturing clean technology.

This must begin by ensuring that our climate and clean energy goals go hand in hand with policies to support and create good union jobs in the clean economy and secure and bring back manufacturing supply chains. And it means ensuring that all public investments are coupled with high labor standards and robust Buy America/n standards to ensure that these investments support domestic manufacturing. We can also utilize "Buy Clean" and other federal procurement standards that require the federal government to consider the carbon footprint of goods they're purchasing, and to prioritize manufacturing firms that uphold strong labor standards and create good jobs in low-income communities.

Establishing robust, high-road, domestic production of clean technology can capture the economic benefits of the clean economy in the United States. Last month, the BlueGreen Alliance released a manufacturing platform that lays out a national blueprint for how we do this.[xvi]

Invest at the scale this crisis demands, and do it right

This should begin with prioritizing equitable rebuilding and investments in those workers and communities that need it most, especially low-income communities, communities of color, and deindustrialized communities. Low income communities and communities of color are hit the hardest and are less able to deal with the impacts of both COVID-19 and climate change. For example, these communities are more likely to be in neighborhoods with more air pollution. A 2019 report found that Black and Hispanic Americans live in neighborhoods with more pollution but produce less, whereas white communities are less polluted but white people produce more pollution.[xvii] The Fourth National Climate Assessment states that exposure to pollution "results in adverse respiratory and cardiovascular effects, including premature deaths, hospital and emergency room visits, aggravated asthma, and shortness of breath,"[xviii] conditions which in turn increase the risk of COVID-19 infection.

Generations of economic and racial inequality have disproportionately exposed communities of color to low wages, toxic pollution, and climate threats. We must inject justice into our nation's economy by ensuring that solutions support the hardest hit workers and communities. We must also ensure that our investments tackle economic inequality and deliver family-sustaining jobs. Manufacturing, infrastructure, environmental restoration, and clean energy are significant drivers of job creation and economic growth, but our investment won't be effective unless we ensure it supports and creates local jobs with fair wages and benefits and safe working conditions, creates economic opportunity for all people in the communities in which they reside, and meets forward-thinking environmental standards to ensure resiliency.

We have examples of good jobs being created in the clean energy economy—whether that is the tradespeople that built the Block Island offshore wind project off the coast of Rhode Island, autoworkers building cleaner cars and trucks, or high-skilled jobs in energy efficiency retrofitting. These are all good, union jobs building a clean energy and climate-resilient economy today.

However, not enough new jobs created or promised in the clean energy economy are high-quality, family-sustaining jobs. There are differences across sectors when it comes to union density, wages, and benefits. In addition, these new jobs are not always in the same communities that have seen the loss of good-paying, union jobs, and if there are new clean energy projects, they are often less labor intensive.

We can't afford to invest in ways that double down on the crises we're facing and further exacerbate inequality. We have to ensure that this investment supports and creates good jobs.

That means a commitment to:

• Increase union density across the country through strong support of the right to organize throughout the economy—including in the clean technology sectors;

• Apply mandatory labor standards that include prevailing wages, safety and health protections, project labor agreements, community benefit agreements, local

hire, and other provisions and practices that prioritize improving training, working conditions, and project benefits;

• Raise labor standards in the non-construction sectors through improved wages and benefits and the prioritization of full-time work that eliminates the misclassification of employees and misuse of temporary labor;

• Invest in training, equipment, preparedness, plan development, and other tools including through registered apprenticeship programs to ensure a robust, skilled, and well-prepared workforce to address extreme weather events and other impacts caused by climate change; and

• Utilize community benefit, workforce, and other similar agreements that improve access to jobs and career paths, and identify and implement mechanisms to mitigate and improve local economic and environmental impacts.

Ensure fairness for workers and communities

We must also recognize that even if we are successful in retaining jobs while creating new, good jobs, communities impacted by the ongoing energy transition will still be hurting. Since 2014, U.S. power generators retired nearly 62,000 MW of coal-fired generation capacity, 13,703 MW, of coal capacity retired in 2019. Another 26,947 MW of retirements are expected through 2025.[xix] America is already in the middle of an energy transition. We need to have a conversation about getting ahead of this transition, and we need to do this now.

That's why—alongside partners and allies from coal communities across the country—the BlueGreen Alliance participated in the development of the National Economic Transition platform.[xx] The platform is the product of a year-long collaboration, bringing together local, tribal, and labor leaders with public, private, and nonprofit partners to develop a policy framework and priorities to invest in communities and workers hit hard by the decline of the coal industry. It calls for "the creation of an inclusive national transition task force, tasked to create a national action plan, and the development of a new federal Office of Economic Transition, guided by an advisory board reflective of affected stakeholder groups and communities" and recommends these new entities address economic transition through seven pillars:[xxi]

1. Invest in local leaders and long-term economic development planning. Building the capacity of community-based leaders and organizations provides communities with the resources and incentives to plan early for and respond to coal facility closures. These investments ensure communities are prepared for a transition that protects workers and is responsive to local needs.
2. Expand investments in entrepreneurship and small-businesses in new sectors to help communities diversify and strengthen their economies. Investing in small businesses in diverse sectors of the economy—like health care, renewable energy, sustainable agriculture, and remote work opportunities—grows not just resilience, but stronger, healthier communities.
3. Provide bridge support and pathways to quality in-demand, family-sustaining jobs for workers. By providing a bridge of support for workers affected by closures, comprehensive workforce development efforts, and skills training for in-demand jobs, leaders can create a pathway to effective and equitable access to high-quality jobs in the public and private sectors.
4. Reclaim and remediate coal sites to create jobs while cleaning up the environment. Initiatives to reclaim, remediate, and reuse coal sites and clean up coal ash requires a sizable workforce and immediately creates jobs for workers while curbing public health and environmental risks.
5. Improve inadequate physical and social infrastructure. Investing in critical infrastructure, like improved connectivity, stimulates economic development and builds community resiliency. Infrastructure projects create jobs, reduce inequities, and help boost investment in healthy, livable communities.
6. Address the impact of coal company bankruptcies on workers, communities, and the environment. Holding companies accountable to financial regulations and bankruptcy laws when closing operations helps protect worker pay and benefits, while also ensuring polluted sites are reclaimed for new development.
7. Coordinate across programs to ensure communities have access to the resources they need. Launching an interagency grants program helps ensure affected stakeholders have a voice and empowers local communities with federal resources.

The state of Colorado has advanced legislation that provides a model for achieving these goals. It passed landmark legislation, House Bill 1314, during the 2019 state legislative session. The legislation, which was envisioned and championed by the BlueGreen Alliance and our partners, created the first State Office of Just Transition, and mandated creation of a statewide Just Transition plan for coal workers and communities. A 19-member advisory board will present their draft plan on Au-

gust 1st along with staff of the new office, partners like the BlueGreen Alliance, and state agencies.

The Colorado Just Transition plan recommends structural improvements to how the state supports rural communities where coal mining or power plants are likely to close. Key to Colorado's plan will be developing worker support programs that assist impacted workers in transition to new work. The plan will also recommend state policies that reduce the impact of tax loss on communities, enhance economic development, develop entrepreneurial talent, dedicate capital to improve community infrastructure and ensure coal site cleanup, and secure financing for expanding businesses in coal transition communities. Several states are watching Colorado's implementation of House Bill 1314, and considering similar initiatives.

Any plan advanced by forward-looking states will have to be supported and supplemented by additional Federal resources. Federal funding, especially as the COVID-19 pandemic stretches already thin state and local budgets, will be vital to giving coal communities the resources and tools they need to diversify their economies and support their workers through transition.

Working people should not have to suffer economically due to the shift to cleaner, cheaper forms of energy, but a transition that is fair for workers and communities isn't something that will happen organically. Prioritizing workers and fossil fuel-impacted communities needs to be a deliberate choice. A fair and equitable transition and the creation of good-paying, union jobs need to be baked into our solutions on climate change.

Rebuild the public sector and provide long term support and protections for workers to ensure we are prepared for crises

Lastly, we need to rebuild the capacity of the public sector, the health care system, public health agencies, education, and community-based services to prepare for and respond to disasters like COVID-19 today, and to keep our communities safe and stable for the future. Workers and communities cannot deal with crises alone, whether they are global pandemics or extreme weather events caused by climate change. We also must rebuild and expand the social safety net—including pensions, healthcare, and retirement security—and ensure and enforce worker and community health and safety.

Conclusion

The solutions to the crises we're facing—climate change, and economic and racial inequality—are as interconnected as their causes and we are happy to see that many of those solutions are included in the staff report released by the House Select Committee on the Climate Crisis. The report is far-reaching and we look forward to working with you on a climate plan that launches an economic recovery that provides solutions to create a stronger, cleaner, and more equitable economy that works for all Americans.

Thank you again for the opportunity to speak today.

[i] Environmental Policy Institute (EPI), "What labor market changes have generated inequality and wage suppression?" December 12, 2019. Available online: https://www.epi.org/publication/what-labor-market-changes-have-generated-inequality-and-wage-suppression-employer-power-is-significant-but-largely-constant-whereas-workers-power-has-been-eroded-by-policy-actions/

[ii] Ibid.

[iii] EPI, "Black workers face two of the most lethal preexisting conditions for coronavirus—racism and economic inequality." June 1, 2020. Available online: https://www.epi.org/publication/black-workers-covid/

[iv] Ibid.

[v] Ibid.

[vi] Google News, COVID-19 Dashboard. 2020, Available online: https://news.google.com/covid19/map?hl=en-US&gl=US&ceid=US:en

[vii] Washington Post, "Federal Reserve predicts slow recovery with unemployment at 9.3 percent by end of 2020." June 10, 2020. Available online: https://www.washingtonpost.com/business/2020/06/10/fed-forecasts-economy/

[viii] EPI, "Black workers face two of the most lethal preexisting conditions for coronavirus—racism and economic inequality." June 1, 2020. Available online: https://www.epi.org/publication/black-workers-covid/

[ix] Ibid.

[x] Brookings, "Race gaps in COVID-19 deaths are even bigger than they appear." June 16, 2020. Available online: https://www.brookings.edu/blog/up-front/2020/06/16/race-gaps-in-covid-19-deaths-are-even-bigger-than-they-appear/

[xi] BlueGreen Alliance, Making the Grade 2.0 Investing in America's Infrastructure to Create High-Quality Jobs and Protect the Environment. 2017. Available online: https://www.bluegreenalliance.org/wp-content/uploads/2017/09/MakingTheGrade-2.pdf

[xii] Ibid.

[xiii] Ibid.

[xiv] EPI, The potential macroeconomic benefits from increasing infrastructure investment. July 18, 2017. Available online: https://www.epi.org/publication/the-potential-macroeconomic-benefits-from-increasing-infrastructure-investment/
[xv] Ibid.
[xvi] BlueGreen Alliance, Manufacturing Agenda: A National Blueprint for Clean Technology Manufacturing Leadership and Industrial Transformation. June 2020. Available online: https://www.bluegreenalliance.org/resources/manufacturing-agenda-a-national-blueprint-for-clean-technology-manufacturing-leadership-and-industrial-transformation/
[xvii] Proceedings of the National Academy of Sciences Inequity in consumption of goods and services adds to racial-ethnic disparities in air pollution exposure March 2019. Available online: https://www.pnas.org/content/116/13/6001#:~:text=The%20total%20disparity%20is%20caused,pollution%20inequity%20has%20remained%20high.
[xviii] U.S. Global Change Research Program, Fourth National Climate Assessment, Chapter 13: Air Quality. November 2018. Available online: https://nca2018.globalchange.gov/chapter/13/
[xix] S&P Global Market Intelligence, "US power generators set for another big year in coal plant closures in 2020." January 13, 2020. Available online: https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/us-power-generators-set-for-another-big-year-in-coal-plant-closures-in-2020-56496107
[xx] Just Transition Fund. National Economic Transition Platform. June 2020. Available online: https://nationaleconomictransition.org/
[xxi] Ibid.

Ms. CASTOR. Thank you, Mr. Walsh.

Mr. Shellenberger, you are recognized for 5 minutes.

STATEMENT OF MICHAEL SHELLENBERGER

Mr. SHELLENBERGER. Thank you, Chairperson Castor, Ranking Member Graves, and members of the committee.

During the first decade of this century, I advocated a very similar suite of policies on renewables, transmission lines, energy efficiency, mass trans, electric vehicles that are currently being proposed by the Democrats' proposed climate plan, and they failed to create the new manufacturing capacity, the radical decarbonization, the good jobs with high pay, or higher economic growth.

A former Obama Administration economist at the University of Chicago found last year that consumers in states with renewable-energy mandates paid $125 billion more for electricity in the 7 years after their passage than they would have otherwise.

Renewables contributed to electricity prices rising six times more in California than in the rest of the United States since 2011. And we have seen renewables have that same impact around the world. They caused electricity prices to rise 50 percent in Germany since 2007.

And the problem underlying it all is physics. Solar and wind make electricity expensive because they are unreliable, they require 100-percent backup, and they are energy-dilute, requiring extensive land, transmission lines, and mining.

Opposition to wind and solar projects has grown so much that even renewable energy advocates today admit that the environmental impact of renewables is the greatest obstacle to their deployment. Solar and wind farms around the world require, on average, 300 to 400 times more land than a natural gas or a nuclear plant to provide the same quantity of energy, albeit unreliably.

The renewable energy industry claims technical innovations will improve solar and wind, but nothing can change the low power density of sunlight and wind. Even a 10-percent improvement in the efficiency of solar panels would only reduce the staggering amount of land required to produce the same amount of energy, from 400 times more to 360 times more.

The dilute nature of sunlight and wind means that solar and wind projects require large amounts of land that come within significant environmental impacts. The respected energy scholar Vaclav Smil estimates that achieving 100 percent renewables would require dedicating 25 to 50 percent of all the land in the United States to energy production, up from a half a percent. Vaclav Smil, by the way, is referred to by Bill Gates as the person whose books he most looks forward to reading.

So this raises significant environmental justice concerns. It is notable that the advocacy for industrial wind comes from mostly affluent people who live on the coasts, not near wind turbines. Communities most able to resist industrial wind projects, such as people on Cape Cod or people in places like Marin County of California or northern California, are able to resist wind energy projects and seek to place them in poorer communities in the Midwest.

A report released earlier this month documented 200 cases of renewable energy companies and their proxies violating human rights around the world, including through murder, dangerous working conditions, and theft.

And yet, in the plan, House Democrats propose as a high priority the creation of a super grid consisting of transmission lines like the one proposed for the largely pristine Sandhills of Nebraska, which would have a 3.5-mile buffer and cross 600 individual wetlands. It is notable that the single greatest threat to whooping cranes is considered transmission lines, and the leading opponent of that project is from the Oglala Sioux Tribe.

I think we have misdescribed climate change as a crisis or an emergency. I say this as an environmental activist for 30 years, as a climate activist for 20 years. No credible scientific body has ever claimed that climate change threatens the collapse of civilization, much less the extinction of the human species.

There is a lot of good news we should pay attention to here and build upon. Deaths from natural disasters have declined 90 percent over 100 years. We produce 25 percent more food than we consume today, and most experts believe that, as we continue to expand fertilizer, irrigation, and modern agriculture to poor countries, those food surpluses will rise.

All else being equal, it would be best to have no change to global temperature, but, obviously, not all else is equal. Those big gains in resilience are a consequence of the availability of cheap energy.

So the good news is that carbon emissions have been declining in the United States for a decade and a half. They peaked in Britain, France, and Germany in the mid-1970s. Economic growth brings significant reductions of carbon emissions. I would question why, if we think that solar and wind are so cheap, they would require $2 trillion in subsidies to be scaled up.

I think a more significant challenge for this committee to consider is the decline of nuclear energy. Only nuclear has proven capable of replacing fossil fuels on a one-to-one basis, and yet the American nuclear industry is in decline. And while there are some interesting initiatives aimed at reviving it, we do not have a national nuclear strategy to compete with the Russians and Chinese.

Every time a nation does a nuclear power project, it is an extension of soft power. They are basically going into the sphere of influ-

ence of that country. And as we have all kind of witnessed in horror how the Chinese Government is engaged in a genocide against its ethnic Muslim minority, I think the United States needs to step up its game and be competitive with the Russians and Chinese in building new power plants abroad. And that is going to require building more nuclear power plants at home.

So I will just end by urging the committee to consider the need for a green nuclear deal so that we can achieve both environmental, climate, and also our national security objectives at the same time.

Thank you very much.

[The statement of Mr. Shellenberger follows:]

Testimony of Michael D. Shellenberger,
Founder and President, Environmental Progress
For the House Select Committee On the Climate Crisis

July 28, 2020

Good morning Chairperson Castor, Ranking Member Graves, and members of the committee.

My name is Michael Shellenberger, and I am Founder and President of Environmental Progress, an independent and nonprofit research organization.[1] I am an invited expert reviewer of the next assessment report by the Intergovernmental Panel on Climate Change (IPCC), a regular contributor to the *New York Times, Washington Post, Forbes,* and other publications, and a *Time Magazine* "Hero of the Environment."[2] In the early 2000s I advocated for the predecessor to the Green New Deal, the New Apollo Project, which President Barack Obama implemented as his $90 billion green stimulus. I am honored to address the Committee.

I. THE HIGH COST OF RENEWABLES

House Democrats propose spending hundreds of billions of public and ratepayer money on renewable energy, new transmission lines, energy efficiency, mass transit, electric vehicles, carbon capture and storage, and advanced nuclear energy. They argue that these federal investments will result in millions of good jobs with high pay, and also pay for themselves through higher economic growth.[3]

But similar programs over the last decade did not result in the benefits being promised. During the first decade of this century I advocated a suite of policies nearly identical to the ones currently being proposed and watched them fail to create a new manufacturing capacity, good jobs with high pay, or higher economic growth. Rather, they resulted in low-wage service sector jobs, greater dependence on imported Chinese technologies, and higher energy costs. And they resulted in higher electricity prices and the net transfer of wealth from lower to upper income citizens.

A former Obama administration economist at the University of Chicago found last year that consumers in states with renewable energy mandates paid $125 billion more for electricity in the seven years after passage than they would have otherwise.[4]

Renewables contributed to electricity prices rising six times more in California than in the rest of the US since 2011, the state's "take-off" year for rapid growth in wind and solar, a price rise that occurred despite the state's reliance during the same years on persistently-low-priced natural gas.[5]

---

[1] Environmental Progress is an independent non-profit research organization funded by charitable philanthropies and individuals with no financial interest in our findings. We disclose our donors on our website: http://environmentalprogress.org/mission.

[2] Michael Shellenberger, "Founder and President," Environmental Progress, 2020, accessed December 8, 2020, http://environmentalprogress.org/founder-president.

[3] Majority Staff Report, "Solving the Climate Crisis," June 2020, https://climatecrisis.house.gov/sites/climatecrisis.house.gov/files/Climate%20Crisis%20Action%20Plan.pdf.

[4] Michael Greenstone and Ishan Nath, "Do Renewable Portfolio Standards Deliver?" *Energy Policy Institute at the University of Chicago* 62 (May 2019): 1–45, https://epic.uchicago.edu/wp-content/uploads/2019/07/Do-Renewable-Portfolio-Standards-Deliver.pdf.

[5] "California," Environmental Progress, accessed July 25, 2020, https://environmentalprogress.org/california. Calculations based on data from "Electricity Data

Renewables have the same impact everywhere in the world. They have caused electricity prices to rise 50 percent in Germany since 2007, the first year it got more than 10 percent of its power from subsidized wind, solar, and biomass. By 2019, German household electricity prices were 45 percent higher than the European average.[6]

Despite investing nearly a half-trillion dollars, Germany still generated just 42 percent of its electricity from non-hydro renewables last year, as compared to the 72 percent France generated from nuclear.[7]

If Germany didn't count emissions-producing and land-intensive fuels like biomass and biofuels as renewable, which most environmental groups, even Greenpeace, believe it shouldn't, the share of its electricity from non-emitting, non-hydro renewables is just 34 percent.[8]

Solar and wind make electricity more expensive because they are unreliable, requiring 100 percent backup, and energy-dilute, requiring extensive land, transmission lines, and mining. Solar and wind developers do not pay for the costs they create but rather pass them on to electricity consumers and other producers.[9]

Ten years ago, growing opposition by conservationists, community groups, and environmental justice activists to industrial wind and solar projects led me to rethink my support for renewables. Today, opposition to wind and solar projects has grown so much that even renewable energy advocates today admit that the environmental impact of renewables is the greatest obstacle to their deployment.[10] Consider the following recent events:

- In June, environmentalists in Hawaii urged the state's Supreme Court to overturn a decision by the state to approve an industrial wind project that threatened seven endangered native bird species;[11]
- One week later, a federal judge blocked a transmission line, called the R-Line, proposed to be built straight through whooping crane habitat in Nebraska. Transmission lines are the number one cause of mortality among whooping cranes. Industrial wind developers need the transmission line to expand their turbines across the fragile Sand Hills ecosystem;[12]
- In May of this year, Ohio regulators demanded wildlife protections for endangered migratory bird species, including the Kirtland's warbler, for an industrial wind project proposed for Lake Erie. Such protections, which stop blades from spinning when birds are in the area, undermine the already poor economics of wind energy, and may ultimately kill the project. The lake is a critical habitat for birds migrating between their nesting grounds in Canada to South America for the winter;[13]
- Last December, environmentalists on California's northern coast successfully blocked industrial wind turbines that they said would have killed an endan-

---

Browser: Retail Sales of Electricity Annual," United States Energy Information Administration, accessed January 10, 2020, https://www.eia.gov/electricity/data/browser.

[6] Eurostat, **"Electricity prices for household consumers—bi-annual data (from 2007 onwards)"** December 1, 2019, accessed January 20, 2020, https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_pc_204&lang=en.

[7] Germany spent 32 billion euros on renewables subsidy every year between 2014 and 2018, or about one percent of its GDP a year, which if adjusted for economy size would be like the United States spending $200 billion annually but only increasing its share of electricity from solar and wind by 11 percentage points. German spending from Frank Dohmen, "German Failure on the road to a renewable future," *Spiegel*, May 13, 2019, https://www.spiegel.de/international/germany/german-failure-on-the-road-to-a-renewable-future-a-1266586.html; Conversions made using OECD data for Purchasing Power Parity. Increase in German wind and solar percentages from "Annual Electricity Generation in Germany," Fraunhofer ISE, January 10, 2020, accessed January 10, 2020, https://www.energy-charts.de/energy.htm.

[8] "Annual Electricity Generation in Germany," Fraunhofer ISE, January 10, 2020, accessed January 10, 2020, https://www.energy-charts.de/energy.htm.

[9] Steven M. Grodsky, "Reduced ecosystem services of desert plants from ground-mounted solar energy development," *Nature*, July 20, 2020.

[10] Oliver Milman, "Biden plots $2tn green revolution but faces wind and solar backlash," *Guardian*, July 25, 2020.

[11] The birds are the nene, pueo, a'o, koloa maoli, ae'o, 'alae ke'oke'o, and 'alae 'ula. "Hawaii Supreme Court asked to block opening of controversial wind project," KHON2 News, June 17, 2020, https://www.khon2.com.

[12] Thomas V. Stehn, "Whooping Crane Collisions with Power Lines: an issue paper," *Geography*, 2008.

[13] Karl-Erik Stromsta, "'This Could Be the Final Nail in Coffin' for Icebreaker Offshore Wind Project," *Green Tech Media*, May 22, 2020, https://www.greentechmedia.com.

gered sea bird, the marbled murrelet, which nests in nearby ancient redwood trees;[14]

- And just yesterday, environmental and community groups from around the world announced the formation of the Energy and Wildlife Coalition, to support, organize, and make more effective opposition to industrial renewable energy projects in the US and around the world.[15]

By occupying large areas of migratory habitat, wind turbines have also emerged as one of the greatest threats to large, threatened, and high-conservation-value birds. Solar and wind farms around the world require at least 300–400 times more land on average than a natural gas or nuclear plant to produce the same quantity of energy, albeit unreliably.

The rapidly spinning blades of wind turbines act like an apex predator that big birds never evolved to deal with. The wind industry claims that house cats kill more birds than wind turbines. But cats mainly kill small, common birds like sparrows, robins, and jays, whereas wind turbines kill big, threatened, slow-to-reproduce species like hawks, eagles, owls, and condors.

And because big birds have much lower reproductive rates than small birds, their deaths have a far greater impact on the overall population of the species. For example, golden eagles will have just one or two chicks in a brood, and usually less than once a year, whereas a songbird like a robin could have up to two broods of three to seven chicks each year.

The renewable industry claims technical innovations will improve solar and wind, but nothing can change the lower power density of sunlight and wind. Even a 10 percent improvement in the efficiency of solar panels would only slightly reduce the staggering amount of land required to produce the same amount of energy: from 400 times more land than nuclear to 360 times more. And over the last decade, the technology used in the vast majority of installed solar panels has only become 2-3 percent more efficient.[16]

The problem with renewables is physical. The dilute nature of sunlight means that solar projects require large amounts of land and thus come with significant environmental impacts. This is true even for the world's sunniest places. California's most famous solar farm, Ivanpah, requires 450 times more land than its last operating nuclear plant, Diablo Canyon.[17]

These quantities are supported by the best available scholarship. Vaclav Smil, a widely-respected energy scholar, has shown that it would take 25–50 percent of all land in the US to go 100 percent renewable. Today, the US uses just 0.5 percent of its land for energy.[18] In 2009, Cambridge physicist David MacKay showed that providing energy to the UK with 100 percent renewables would require a greater area than the landmass of the entire country.[19]

The expansion of industrial renewables raises environmental justice concerns. It is notable that the advocacy for industrial wind energy comes from people who don't live near the turbines, which are almost invariably loud and disturb the peace and quiet. Those communities that have proven most able to resist the introduction of a wind farm tend to be more affluent. In 2017, the upper-class residents of Cape Cod, for example, defeated an effort by a wind developer to build a 130-turbine farm, despite the developer having spent $100 million on the project.

There is something called the "Starbucks Rule" for siting industrial wind projects. Wind developers "plot where Starbucks are in the general area and then make sure their project is at least thirty miles away. Any closer and there'd be too many NIMBYs who'd object to having their views spoiled by a cluster of 265-foot-tall wind towers," reported *Business Week*.[20]

Renewable energy projects raise serious environmental justice issues. The state legislator in Nebraska seeking to protect the Sandhills, a traditionally sacred area, from industrial wind and its required transmission line, is a citizen of the Oglala Sioux Tribe. A report released earlier this month documents nearly 200 cases of renewable energy companies and their proxies allegedly violating human rights around the world, including through murder, dangerous working conditions, and

---

[14] "Board of Supes Sinks Terra-Gen Wind Farm on 4-1 Vote, Following Days of Hearings," *Lost Coast Outpost*, December 17, 2019, https://lostcoastoutpost.com.

[15] Energy and Wildlife Coalition, https://www.energywildlife.org.

[16] National Renewable Energy Laboratory, "Best Research-Cell Efficiency," accessed July 27, 2020, https://www.nrel.gov/pv/cell-efficiency.html.

[17] "California," Environmental Progress, accessed 25 July 2020, http://environmentalprogress.org/california.

[18] Vaclav Smil, *Power Density*, MIT Press, 2016.

[19] David MacKay, *Sustainable Energy Without the Hot Air*, UIT Cambridge, Ltd., 2009.

[20] John Laumer, "US Wind Industry Follows "Starbucks Rule" for Turbine Siting," *Treehugger*, October 15, 2009, https://www.treehugger.com.

theft. And in Hawaii, Tēvita O. Ka'ili, a Hawaiian professor of cultural anthropology, testified that "Killing these manu [birds] would deprive current and future generations of a necessary part of their natural environment and, for native Hawaiians, a vital resource for traditional and customary practices."[21]

And yet, in their plan, House Democrats identify as a high priority the creation of a "supergrid" consisting of transmission lines like the one proposed for the largely pristine Sand Hills of Nebraska, which would have a 3.5 mile buffer and cross 600 individual wetlands.[22]

Despite their substantial negative environmental impact, the federal government has repeatedly given the wind industry special rights. The federal government rarely stops wind projects or requires changes in wind turbine locations or operations. Wind developers are allowed to self-report violations of the Migratory Bird Treaty Act, the Endangered Species Act, and the Bald and Golden Eagle Protection Act. Only Hawaii requires bird and bat mortality data to be gathered by an independent third party and to be made available to the public on request.[23]

These special rights include the right to kill endangered species. In 2013, the Obama administration gave the wind industry permission to kill condors, an endangered species. No other industry is allowed to kill condors.[24] Recently, the "US Fish and Wildlife Service has encouraged wind developers to avoid prosecution for killing eagles," reported the *New York Times*, "by applying for licenses to cover the number of birds who might be struck by wind turbines."[25]

In the rare circumstances when governments require the wind industry to mitigate its impact, such as by setting aside land elsewhere, there is often little to no enforcement, scientists say. In other circumstances, wind developers do not follow through on their promises and in some cases lie. Apex Clean Energy, based in Virginia, claimed on its 2017 application to the New York Electric Generation Siting Board that there were no known bald eagle nests where it planned to build. But, later, Apex flew a helicopter over an eagle's nest, destroying it.[26]

Curtailment, the intentional halting of turbine blades, can reduce the killing of birds, bats, and insects, but few wind farm developers are willing to curtail because it means losing money. A US National Renewable Energy Laboratory study found that curtailment levels are lower than 5 percent of the total wind energy generation. And curtailment often isn't enough to stop the killings. "In fact, red-tailed hawk fatalities peaked at the 50 percent of turbines that never operated during the three years of monitoring," reported a scientist. He calls the most-studied wind farm in California, Altamont Pass, a "population sink for golden eagles as well as burrowing owls."[27]

II. GOOD NEWS ON CLIMATE CHANGE

Many defend the high environmental and economic cost of renewables by claiming that they are necessary to address the existential threat of climate change. But no credible scientific body has ever claimed that climate change threatens the collapse of civilization, much less the extinction of the human species, which is what "existential" threat means. And yet policymakers, scientists, and journalists make these

---

[21] "Renewable Energy and Human Rights Benchmark," Business and Human Rights Resource Centre, https://www.business-humanrights.org/sites/default/files/Renewable%20Energy%20Benchmark%20Key%20Findings%20Report.pdf "Hawaii Supreme Court asked to block opening of controversial wind project," KHON2 News, June 17, 2020, https://www.khon2.com.

[22] Majority Staff Report, "Solving the Climate Crisis," June 2020, https://climatecrisis.house.gov/sites/climatecrisis.house.gov/files/Climate%20Crisis%20Action%20Plan.pdf.

[23] Michael Shellenberger, *Apocalypse Never*, HarperCollins, 2020, 194; Michael Hutchins, "To Protect Birds from Wind Turbines, Look to Hawai'i's Approach," American Bird Conservancy, June 21, 2016, https://abcbirds.org/to-protect-birds-and-bats-from-wind-turbines-adopt-hawaiis-approach.

[24] Louis Sahagun, "Companies won't face charges in condor deaths," *Los Angeles Times*, May 10, 2013.

[25] Joseph Goldstein, "A Climate Conundrum: the Wind Farm vs. the Eagle's Nest," *New York Times*, June 25, 2019, https://www.nytimes.com.

[26] Michael Shellenberger, *Apocalypse Never*, HarperCollins, 2020, 194; Clifford P. Schneider, *pro se*, "Motion for Dismissal for Fraud upon the Siting Board," *Application of Galloo Island Wind LLC for a Certificate of Environmental Compatibility and Public Need Pursuant to Article 10 to Construct a Wind Energy Project*, Case No. 15–F–0327, September 13, 2018, 2; Joseph Goldstein, "A Climate Conundrum: the Wind Farm vs. the Eagle's Nest," *New York Times*, June 25, 2019, https://www.nytimes.com.

[27] Michael Shellenberger, *Apocalypse Never*, HarperCollins, 2020, 195; Shawn Smallwood, "Estimating Wind Turbine-Caused Bird Mortality," *Journal of Wildlife Management* 71, no. 8 (2007): 2781–91, doi:10.2193/2007–006.

claims, which have contributed to rising levels of anxiety and depression, including among adolescents.[28]

In reality there is a growing amount of good news about climate change. Deaths from natural disasters have declined over 90 percent over the last 100 years, and neither the IPCC nor any other reputable scientific body predicts that trend will reverse itself. We produce 25 percent more food than we consume and experts agree surpluses will continue to rise so long as poor nations gain access to fertilizer, irrigation, roads, and other key elements of modern agriculture.[29]

All else being equal, it would be best for global temperatures to remain stable. We should not want them to either rise or decline. The reason is because we have built civilization and protected natural areas based on current temperatures. But all else isn't equal. The cause of climate change is energy consumption, and energy consumption has been a critical part of rising resilience to disasters, greater food production, and the protection of the natural environment. As such, there has long been a debate over how much *more* we should pay for energy to reduce climate change.

The good news is that recent and historical events show that economic growth can actually *lower* carbon emissions. Carbon emissions have been declining in the US for nearly a decade and a half thanks to the cheap natural gas, which made electricity cheaper than it otherwise would have been. In fact, experts have long recognized that while the early stages of a nation's industrialization can increase air pollution, later stages can lower it through cleaner-burning coal, natural gas, and nuclear energy. Those technologies and others allowed conventional air pollutants to peak in developed nations the 1960s and 1970s. Among some nations, including Britain, France, and Germany, even carbon emissions peaked in the mid-1970s.[30]

A new report by the International Energy Agency (IEA) forecasts carbon emissions in 2040 to be lower than in almost all of the IPCC scenarios.[31] Part of the reason for lower anticipated future emissions and warming is the far greater abundance, and lower prices, of natural gas, which produces half the carbon emissions of coal.

It is thus misleading to describe climate change as either a "crisis" or "emergency." When the US and Soviet Union nearly went to nuclear war over Cuba; when there was nearly a run on the banks in 2008; when the coronavirus forced radical action to prevent millions of deaths earlier this year; each of those events, I believe, can be fairly described as crisis, a time of intense danger, or an emergency, which is not just serious but also unexpected. Climate change is real and we should continue reducing emissions through the use of natural gas and nuclear. But it is neither a crisis nor an emergency.

Nor is climate change one of our most important environmental problems. The continued use of wood as fuel by two billion people; air pollution that shortens the lives of roughly seven million people per year; the decline of wild animal populations; and the loss of habitat for endangered species, are all more important and urgent environmental problems than climate change.

I fear climate change has become a distraction from far more significant problems including the hollowing out of the middle-class by globalization and automation; our overdependence on China for pharmaceuticals, medical supplies, drones, and other manufactured products; the lack of sufficient housing in our major coastal cities; the intertwined drug addiction and mental health crises which increased annual overdose deaths from 17,000 to 70,000 since 2000; the extreme political polarization tearing our nation apart; and the active destruction of the US nuclear industry.

III. WHY NUCLEAR ENERGY IS MORE IMPORTANT THAN CLIMATE CHANGE

Anyone genuinely concerned about climate change, air pollution, or the impact of renewables on wildlife should advocate nuclear energy. Only nuclear can substitute for fossil fuels while maintaining and increasing levels of energy consumption required for universal human prosperity. Nuclear-heavy French electricity produces one-tenth the carbon emissions as renewables-heavy German electricity at nearly

---

[28] Michael Shellenberger, *Apocalypse Never*, HarperCollins, 2020, 269; Rachel N. Lipari and Eunice Park-Lee, *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health*, Substance Abuse and Mental Health Services Administration, US Department of Health and Human Services, 2019; "Adolescent Mental Health in the European Union," World Health Organization Regional Office for Europe, Copenhagen, Denmark.

[29] Michael Shellenberger, *Apocalypse Never*, HarperCollins, 2020, 91; FAO, *The future of food and agriculture—Alternative pathways to 2050* (Rome: Food and Agriculture Organization of the United Nations, 2018), 76–77.

[30] Michael Shellenberger, *Apocalypse Never*, HarperCollins, 2020, 26.

[31] "World Energy Outlook 2019" (Paris: International Energy Agency, 2019), https://www.iea.org/reports/world-energy-outlook-2019.

half the price. Nuclear is not only the safest way to make electricity, it has actually saved two million lives, according to the best available research. And nuclear requires less than one percent of the land required by solar and wind projects.[32]

The US has for much of the past 60 years been the global leader in the development and building of nuclear plants around the world. In 1953, President Dwight D. Eisenhower gave his famous "atoms for peace" speech at the United Nations where he pledged that the US would help nations use nuclear energy to lift themselves out of poverty. Today, nine out of every ten gigawatts of global nuclear capacity today is descended from designs invented and commercialized by the United States. American nuclear reactor designs today operate in leading nuclear countries like China, France, South Korea, Japan, and the United Kingdom. American reactors operated in the US are the best in the world, operating 93 percent of the time.

Because of the inherently dual military-civilian nature of nuclear energy, Congress and most presidential administrations have long viewed America's nuclear power plants, and our involvement in the nuclear energy programs of other nations, as top national security priorities. Thanks to American leadership, nuclear energy has proven to be the safest and cleanest way to make electricity. And, for 75 years, nuclear energy has been used solely for peaceful purposes.

But now, the US is building just one nuclear plant at home and none abroad, allowing China and Russia to dominate the market for nuclear power plant construction. Nations seeking nuclear energy today include Argentina, Bangladesh, Belarus, Bolivia, Brazil, Bulgaria, the Czech Republic, Egypt, Finland, Ghana, Hungary, India, Jordan, Kazakhstan, Kenya, Mexico, Nigeria, Pakistan, Poland, Saudi Arabia, Slovakia, South Africa, Sudan, Turkey, the UAE, the UK, Uzbekistan, and Zambia, among others.

In the seven months that have passed since the last time I testified before Congress, China has stepped up its genocide of its Muslim minority and Russia has modified its constitution to allow its president to serve for decades longer. I greatly admire the Russian and Chinese nuclear energy programs, and indeed believe they represent the standard against which the US must compete. But their rejection of liberal democracy and human rights are profoundly troubling for the future of nuclear energy and the world.

Nations that decide to work with China and Russia rather than the United States or other liberal Western democracy will effectively become part of their sphere of influence. Nuclear power plants are enormous construction projects, and thus marry large construction firms, financial institutions, and governments, in the way that only large projects can do.

But beyond those economic ties are national security ones. The line between soft power and hard power runs through nuclear energy. The creation of a scientific and technical workforce capable of creating nuclear energy brings nations closer to being able to one day create nuclear weapons. It is thus logical that nations gain a national security benefit simply from having nuclear plants.[33] If nations are in partnership with Russia or China in building nuclear plants, they could one day be in partnership with those countries in other ways.

For the US to compete in building nuclear plants abroad we must build them at home. While the nuclear industry deserves great credit for the continuous improvement of power plant safety and efficiency, many utility executives are either resigned to the technology's decline or engaged in wishful thinking about inventing new families of reactor technology.

The reason nations and utilities opt for large light-water reactors is because they produce the cheapest electricity. What makes nuclear cheaper are larger reactors, since they do not require correspondingly larger workforces, and extensive experi-

---

[32] A selection of the literature on public health benefits of nuclear energy, and the consequences of its closure: Anil Markandya and Paul Wilkinson, "Electricity Generation and Health," *Lancet* 370, no. 9591 (September 2007): 979–990, https://doi.org/10.1016/S0140-6736(07)61253-7; Anthony J. McMichael, Rosalie E. Woodruff, and Simon Hales, "Climate change and human health: present and future risks," *Lancet* 367, no. 9513 (March 2006): 859–869, https://doi.org/10.1016/S0140-6736(06)68079-3; "Ambient Air Pollution: a global assessment of exposure and burden of disease," World Health Organization, 2016, https://apps.who.int/iris/handle/10665/250141; "Nuclear Waste State-of-the-Art Report 2016: Risks, uncertainties and future challenges," *Swedish National Council for Nuclear Waste*, 2016, https://www.government.se/49bbd2/contentassets/ecdecd2ee26c498c95aaea073d6bc095/sou-2016_16_eng_webb.pdf; Pushker Kharecha and James E. Hansen, "Prevented Mortality and Greenhouse Gas Emissions from Historical and Projected Nuclear Power," *Environmental Science and Technology* 47, no. 9 (March 2013): 4889–4895, https://doi.org/10.1021/es3051197; Edson R. Severnini, "Impacts of nuclear plant shutdown on coal-fired power generation and infant health in the Tennessee Valley in the 1980s," *Nature Energy* **2** (April 2017), doi:10.1038/nenergy.2017.51.

[33] Matthew Fuhrmann et al, "Almost Nuclear: Introducing the Nuclear Latency Dataset," *Conflict Management and Peace Science*, January 8, 2015.

ence building and operating them. But even if nations were to eventually opt for smaller reactors, they would likely purchase them from the nations that offer the most favorable financial terms while having the most experience building reactors, which today are China and Russia.

If the US were to decide to compete with China and Russia, it should consider deepening partnerships with other members of the Western Alliance, and ending imports of uranium from Russia. It might have made sense 20 years ago for the US to ensure the stability of the Russian nuclear industry through purchases of its uranium. But with Russia out-competing the US on new nuclear plant construction, and engaging in cyber attacks on our electrical grid, it is not clear how it any longer makes sense for the U.S. to import uranium from Russia. I thus applaud steps by the Department of Energy to end reliance on imported Russian uranium.[34]

Given all of that, I would like to pose three questions. First, is it in the interest of American taxpayers to subsidize US electric utilities to operate nuclear plants in the absence of any commitment to build new ones? Second, does Congress believe the US can compete with China and Russia while shutting down half to two-thirds of its nuclear plants? Third, is Congress really comfortable standing by and watching dozens of nations partner with China and Russia to expand their use of nuclear technology over the next century?

If the answer to the latter question is yes, Congress should inform the American people that it has decided to cede America's historic role as creator, promotor, and steward of the world's most sensitive dual-use technology to our main geopolitical rivals.

In the face of nuclear energy's leadership vacuum in the U.S., I urge Congress to consider creating a Green Nuclear Deal as a revision to the Atomic Energy Act that would restore America's nuclear leadership at a global level. The goal should be nuclear energy dominance. The U.S. government should encourage the building of large, standardized nuclear plants at home, and export its natural gas abroad. Doing this would require identifying a national champion company to compete with the state-owned companies of Russia and China, and the president working to sell U.S. nuclear plants abroad, just as the leaders of China and Russia do.

In the 1950s, members of Congress who understood the sensitive and special nature of the technology urged the White House to make America's dominance of nuclear energy a top national security priority. I hope all of you would consider doing so again today.

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

Ms. CASTOR. Ms. Soholt, you are recognized for 5 minutes.

STATEMENT OF BETH SOHOLT

Ms. SOHOLT. Thank you, Madam Chairwoman Castor, Ranking Member Graves, and distinguished committee members.

My name is Beth Soholt, and I am the Executive Director of the Clean Grid Alliance. I am here today to offer some thoughts from America's heartland, the renewable-energy stronghold of the country, where we are seeing renewable energy deployed cost-effectively and reliably.

I am here testifying today in support of the Macro Grid Initiative. MGI is a national effort led by the American Council on Renewable Energy and Americans for a Clean Energy Grid, in partnership with organizations including the American Wind Energy Association and the Solar Energy Industries Association.

The Macro Grid Initiative advocates expanding and upgrading the nation's transmission network to deliver job growth and economic development, a cleaner environment, and lower cost for consumers.

The pursuit of a macro grid, an interregionally connected backbone for the nation's transmission grid, is essential for the United States to achieve its climate goals and charge up the economy.

[34] John Funk, "DOE targets end to US reliance on Russian nuclear fuel, revived domestic capability," *Utility Dive*, July 20, 2020.

Over the last 20 years, I have seen firsthand the multiple benefits new grid infrastructure brings to a region. Communities that host renewable projects receive new and needed revenue; engineers, electricians, and local labor folks are put to work in good-paying jobs; customers get clean, affordable power; and electric utilities get investment opportunities.

So let's talk about the Macro Grid. The Macro Grid vision includes expanding the interregional high-voltage transmission system, tightening up the seams that exist between the various transmission operators, and adding a network of high-voltage direct current lines that could deliver significant carbon reduction.

A Macro Grid enables carbon emissions reductions of nearly 80 percent while saving consumers up to $47 billion annually and returning more than $2.50 for every dollar invested.

Most importantly, the Macro Grid vision builds upon the success that we have seen expanding and updating the grid in certain regions of the country. But the Macro Grid vision will require a modernized policy and regulatory environment to recognize the substantial nationwide benefits of new regional and interregional transmission.

So what are the benefits to expanding the high-voltage transmission system?

First, job creation. Constructing transmission lines brings a lot of good-paying jobs. Transmission is generally built using organized labor, project labor agreements, and prevailing wage standards. I have an example in my testimony of the jobs, both direct, indirect, and induced, that would be created from a substantial build-out of 100 gigawatts' worth of transmission. But these jobs are in addition to the jobs that are created from wind and solar project development, manufacturing wind turbines and component parts, and supply chain jobs.

Second, economic growth and development. Constructing new transmission lines provides an economic engine for the nation's economy. There is an example of Midwest utilities working together through the CapX2020 initiative. The major build-out of 5 new transmission lines, 800 miles of new transmission, was a $2 billion project that resulted in $4 billion worth of economic impact in the region, $150 million paid in State and Federal taxes, 8,000 jobs at the peak of construction, and returned $1.93 worth of benefit to electric utility customers for every dollar invested. So, you see, developing transmission is truly an economic engine that drives business here in the United States.

Finally, I want to talk about competitiveness. Mr. Shellenberger mentioned China and other countries. In the United States, and around the world, manufacturers and energy-intensive technology industries, such as data centers, can locate their operations anywhere. What they are asking for is low-cost, carbon free electricity. A number of utilities have put in place ambitious carbon reduction goals. Renewable energy with transmission enables the demands of these corporate energy users and utilities to be met.

In addition, the U.S. is competing globally with countries like China. China has recently jumped past the American grid build-out success with their own much higher voltage DC superhighway.

And so, as the committee and your colleagues craft legislation, I urge you to make electric grid infrastructure policies a bipartisan priority.

I commend the Select Committee's majority report for its recommendations to create a national policy on transmission, encourage FERC to develop an infrastructure strategy, improve transmission planning, and remove barriers to transmission permitting.

As I have seen firsthand in my work in the Midwest, transmission enables electric utilities, businesses, customers, workers, communities, and the environment to not only survive but thrive. Most importantly, building a Macro Grid can help the nation address the climate crisis and bring the multiple benefits I have outlined in my testimony.

Thank you, and I look forward to questions.

[The statement of Ms. Soholt follows:]

A Macro Grid Vision to Achieve the Nation's Climate Goals and "Charge Up" the Economy

Beth Soholt, Executive Director, Clean Grid Alliance (CGA)

For CGA, the American Council on Renewable Energy, and Americans for a Clean Energy Grid

Testimony to the House Select Committee on the Climate Crisis

July 28, 2020

Good afternoon and thank you for the opportunity to testify on this extremely important topic. I am honored to appear before the Select Committee to bring thoughts and ideas from the Midwest—America's renewable energy heartland.

My name is Beth Soholt. I'm the Executive Director of the Clean Grid Alliance, and I am testifying today in support of the Macro Grid Initiative (MGI), a national effort led by the American Council on Renewable Energy and Americans for a Clean Energy Grid committed to expanding and upgrading the nation's transmission network to deliver job growth and economic development, a cleaner environment, and lower costs for consumers.

The pursuit and achievement of a Macro Grid—an interregionally connected backbone for the nation's transmission grid—is essential for the United States to achieve its climate goals and "charge up" the economy. A Macro Grid can deliver renewable energy from the resource to load, enhance grid resiliency, and dramatically reduce carbon emissions by spurring a large amount of renewable energy development.

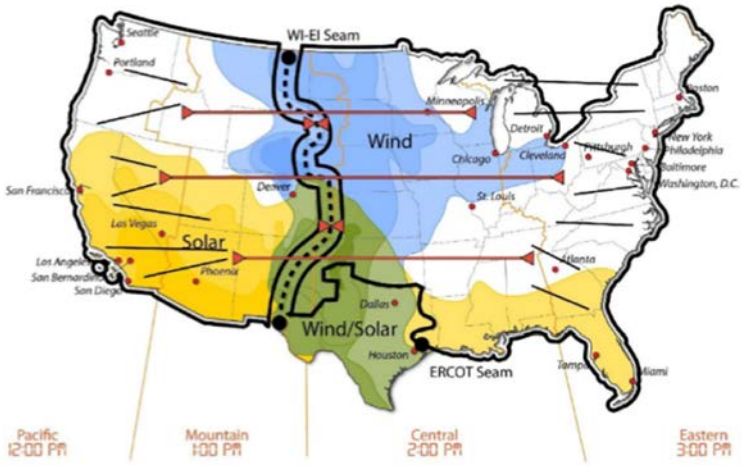
Over the last 20 years, I have seen firsthand the multiple benefits new grid infrastructure—like high voltage transmission lines—brings to a region rich in renewable energy resources. Communities that host wind and solar farms receive new and needed revenue in their counties and townships; engineers, electricians, and local labor folks are put to work in good-paying jobs; customers get clean, affordable power in their homes, businesses, farms and factories; and electric utility companies have infrastructure investment opportunities and a variety of renewable energy projects to choose from.

I will cover three points in my testimony and take them in order:

1. The Macro Grid vision
2. Benefits of an expanded, upgraded transmission system
3. How Congress can advance policies for grid infrastructure to meet climate goals and stimulate the economy

First, the Macro Grid vision.[1] The Macro Grid endeavors to take advantage of the vast renewable energy resources across the country and deliver the clean energy to locations where it is needed.

[1] https://acore.org/macro-grid-initiative/?mc_cid=f0936965a0&mc_eid=%5BUNIQID%5D



Source: NREL, Interconnections Seam Study, Scenario 2b

Stitching together the major regions of the U.S. power system, represented here conceptually, would allow the nation to harness its abundant renewable resources and balance electric demand across the country.

The Macro Grid vision includes expanding interregional high voltage transmission, tightening up the "seams" that exist between the various transmission operators, and adding a network of High Voltage Direct Current (HVDC) lines that could deliver significant carbon emissions reductions. A Macro Grid enables carbon emissions reductions of nearly 80[2] percent while saving consumers up to $47 billion annually[3] and returning more than $2.50 for every dollar invested.[4] The Macro Grid vision builds upon the success we have had expanding and updating the grid in certain US regions including MISO,[5] [6] SPP,[7] CAISO, and ERCOT.[8]

Achieving the Macro Grid vision will require a modernized policy and regulatory environment at the federal, regional, and state levels that recognizes the substantial nationwide benefits of new regional and interregional transmission. We urge the Select Committee to make achieving the Macro Grid vision a priority as you craft climate change and stimulus legislation.

Second, what are the benefits to expanding the high voltage transmission system? In addition to spurring robust renewable energy development that would yield significant carbon reductions, there are major economic benefits to grid expansion.

> ***Job Creation***—Constructing transmission lines creates a lot of good paying jobs. Transmission is generally built using organized labor, Project Labor Agreements and prevailing wage standards. As an example, to build 100 GW worth of transmission delivery capacity, about $75 billion in transmission infrastructure would be needed. That would create **around 600,000 direct jobs and 1.5 million direct, indirect and induced jobs.[9]** These jobs are in addition to jobs created from wind and solar project development, manufac-

---

[2] MacDonald, Clack, et al. *Future cost-competitive electricity systems and their impact on US CO_2 emissions*, https://www.nature.com/articles/nclimate2921

[3] MacDonald, Clack, et al. *Future cost-competitive electricity systems and their impact on US CO_2 emissions*, https://www.nature.com/articles/nclimate2921

[4] National Renewable Energy Laboratory, *Interconnection Seam Study*, https://www.nrel.gov/analysis/seams.html

[5] https://cdn.misoenergy.org/2011%20MVP%20Portfolio%20Analysis%20Full%20Report117059.pdf

[6] https://cdn.misoenergy.org/2011%20MVP%20Portfolio%20Detailed%20Business%20Case117056.pdf

[7] https://www.spp.org/engineering/transmission-planning/priority-projects/

[8] http://www.ettexas.com/Projects/TexasCrez

[9] https://gridstrategiesllc.com/2020/07/27/transmission-and-jobs/

turing wind turbines and component parts, and supply chain for wind and solar projects.

Economic Growth and Development—Constructing new transmission lines provides an economic engine for the nation's economy. For example, the 11 Midwestern electric utilities that were part of the CapX2020 [10] initiative built 5 major 345kV transmission lines located in North and South Dakota, Minnesota, and Wisconsin with the last line just finished a few years ago. Altogether, the 800 miles of new transmission was a $2 billion project that resulted in $4 billion of economic impact in the region, $150 million paid in state and federal taxes, 8,000 jobs at the peak of construction, and returned $1.93 worth of benefit to electric utility customers for every dollar invested.[11] Developing transmission is truly an economic engine that drives business here in the United States.

Competitiveness—Manufacturers and energy-intensive technology industries such as data centers can locate their operations anywhere in the world. The technology firms have been telling utilities and policymakers across the Midwest that they want a low-cost, carbon-free electricity supply. Responding to their customers and state policy, a number of utilities have put in place ambitious 80 to 100 percent de-carbonization goals. Renewable energy with transmission enables the demands of these corporate energy users and utilities to be met. In addition, the U.S. is competing globally with countries who have also figured out that building big infrastructure to tap domestic resources is a path to economic growth and security. China, for example, recently jumped past the American grid buildout successes with their own much higher voltage DC superhighways connecting their resource areas to major population centers.

Finally, as this Committee and your colleagues discuss and debate upcoming legislation, I urge you to make electric grid infrastructure policies a bipartisan priority. In that regard, I commend the Select Committee Majority Report for its recommendations to create a national policy on transmission and an "American Supergrid," encourage FERC to develop an infrastructure strategy and improve regional and interregional planning, remove barriers to transmission development in the current state-by-state permitting regime, support federal financial resources to help right-size lines for the long term, and provide DOE funding and technical assistance for transmission planning.

As I've seen firsthand in my work in the Midwest, transmission enables electric utilities, businesses, manufacturers, residential customers, workers, rural and urban communities and the environment to not only survive but thrive. Most importantly, building a Macro Grid can help the nation address the climate crisis **AND** bring the multiple benefits I've outlined in my testimony.

Thank you and I look forward to answering any questions you may have.

Ms. CASTOR. As a reminder to all of the members and to witnesses, please keep your video cameras on. If your camera is not on at the time we come to you, we will have to skip over you in the order of questions.

So I will recognize myself for 5 minutes.

I think American families and businesses are eager to move to the clean energy economy. And the "Solving the Climate Crisis" majority staff report calls for achieving a net-zero electricity grid by no later than 2040. To achieve that, we are going to need to rapidly deploy more renewables. We are going to have to modernize the grid and expand transmission capacity to get more renewables to the market. Fortunately, as Ms. Soholt testified, transmission construction creates a lot of good-paying, union jobs.

Ms. Soholt, why is a Macro Grid, as you call it, a better approach for renewables and clean-energy deployment than the way we move electricity now?

Ms. SOHOLT. Thank you, Chairwoman Castor, for the first question.

---

[10] http://www.capx2020.com/

[11] http://www.capx2020.com/Gallery/movies/economic-benefits.html

We have a lot of work to do to modernize our electricity grid. And so achieving the Macro Grid vision will not only enable the benefits that I talked about, but it really enables the good resources to be able to get to the load. It is as simple as that. We need to connect the high wind and solar resource areas to the large load centers that need the power.

And so we have reform of the way we go about paying for, planning, permitting infrastructure to be able to achieve the timeframes that the committee report talks about. So 2040 is an aggressive goal, given that there is so much work to be done. And so the Macro Grid provides a vision and the implementation of achieving that vision.

Ms. CASTOR. And, Mr. Walsh, what is going to be key to having the workers to build this Macro Grid?

I know in your testimony you state, we must reinvest in fortifying and transforming heavy industry and retooling to build more of the products, materials, and technologies of the future here and that manufacturing must be an integral part of any strategy.

So why is that? Talk to us about what you see in the Macro Grid, the types of jobs that will be available, and what else in innovative, clean technologies for American workers.

Mr. WALSH. Thank you, Chair Castor, for the question.

I mean, first, let's start by just recognizing the industrial sector represents a pretty significant source of U.S. emissions. And, actually, if you distribute electricity to its economic end use, the industrial sector is the largest source of emissions in the United States. And it is also the fastest growing over time, both domestically and globally. So, from a climate perspective, we have to focus on how we reduce emissions from this sector.

At the same time, these industries are essential to produce the materials and components for the Macro Grid and other technologies for our infrastructure, and they are absolutely essential for producing the goods that constitute modern life. They are enormously important economically. Manufacturing directly employs about 1 in 11 American workers, and contributes $2 trillion a year to the gross domestic product.

This is also an issue of global economic competitiveness, as you have touched on. Global investments in clean energy, transportation infrastructure technologies, are forecast to reach into the tens of trillions of dollars over the next three decades, representing both a powerful opportunity for job creation and economic growth. It is also a serious risk if American workers and companies get left behind.

So the bottom line, from our perspective, is, prioritizing investments in U.S. manufacturing will not only reduce greenhouse-gas emissions, but it will also create and retain good jobs, for two primary reasons.

One, a significant proportion of emission reductions can be realized simply by reducing energy waste, which saves money that manufacturers can otherwise use for workforce and capital investments and which also supports jobs through the installation of energy efficiency technologies.

And, second, the U.S. manufacturers' ability to produce clean technologies and to use cleaner products and processes will make

them more competitive in a global economy in which market demand is shifting inexorably in that direction.

And it is our sense that if we manufacture clean products and manufacture all products cleaner, we position U.S. manufacturers to be in the pole position for the most important economic development race globally over the next few decades.

I will make one more point, which is that, when we reduce the industrial sector greenhouse-gas emissions, we can also reduce other sources of pollution that disproportionately impact fenceline communities. So a clean manufacturing agenda will also directly combat environmental injustice.

Ms. CASTOR. Thank you, Mr. Walsh.

Next, Ranking Member Graves, you are recognized for 5 minutes.

Mr. GRAVES. Thank you, Madam Chair.

I appreciate all of your testimony and consider it helpful.

Mr. Shellenberger, you, I believe, are in California. The model that the committee report is based upon largely appears to be the California model.

I mentioned in my opening statement that the State of California, I believe, is the 44th greatest emissions-reducing state, or near the bottom. And yet I know, for example, the gas prices are 52 percent higher this month in California than they are in Louisiana. I know that their electricity costs are more than double the cost that we pay in my home state. And, for the record, I think I paid $1.52 a gallon when I gassed up a few weeks ago, and so very, very low gas prices.

If you were in charge, you are a dictator, you are in charge of putting forth, proffering an energy strategy, an emissions reduction strategy, what do you think is missing or how would you do things differently based upon more science and your experience with different technologies, again, if you were in charge, with an energy policy that achieved emissions reductions?

Mr. SHELLENBERGER. Yeah, I live in California, and our electricity prices rose six times more than in the rest of the United States since 2011 because of the expansion of renewables and transmission lines. Between 2011 and 2018, our industrial electricity prices rose 32 percent.

So I share Mr. Walsh's view that America needs a new industrial capacity, but we are not going to be able to compete with China or our rival with expensive energy. And as a reminder, that is what killed cap and trade in 2010 in the Senate, was concern from Midwest Democrats that higher electricity prices would undermine global competitiveness. Of course it would.

California is not even a leader on climate change. Our carbon emissions rose 3.5 percent between 2011 and 2016 even as they declined 5 percent in the rest of the United States. So the pure reason is because we are doing what Germany has done. We are shutting down our nuclear plants, scaling up renewables.

If you want just two real world comparisons, Germany spends almost——

Mr. GRAVES. I can't see the time.

Mr. SHELLENBERGER [continuing]. As much for electricity as France, and its electricity is 10 times more carbon-intensive.

So, I mean, this is not that complicated. If you want to replace fossil fuels, you need to replace them with a reliable source of electricity. The only scalable form of zero-carbon electricity is nuclear power, and it is being killed off mostly in Democratic States. They are just shutting down Indian Point in New York—a perfectly fine, safe, wonderful nuclear plant in New York. We are shutting down Diablo Canyon in California.

I appreciate the efforts to do R&D on nuclear, but the Chinese and Russians are selling nuclear to literally two or three dozen countries around the world. Every country that worked with China and Russia will be in China and Russia's sphere of influence. The United States is hoping to leapfrog to some radically different nuclear technology, but China and Russia are helping those countries build the equivalent of large, light-water reactors that we are building in Georgia.

So what I would do is I would say, look, we need to compete properly. That means that we need to compete with Chinese and Russian state-owned nuclear companies. We need a national champion. We do it differently in the United States; we have private companies. That would probably be something like Bechtel, which is involved in building two nuclear reactors in Georgia. After those workers get done building those two reactors, they could move up the road to South Carolina, complete construction of two reactors there in summer.

And then, after that, we have construction crews—I mean, anybody that is apocalyptic about climate change should view the construction managers and workers at the Georgian nuclear plants as a national treasure, as an international treasure. Because it is these men and women who have the experience building our most complex form of energy and have the experience to compete with experienced Russian and Chinese crews all over the world.

This should be a serious national priority. I think we are just sleepwalking into a disastrous situation where our economic rivals, but also our global security rivals, are pursuing nuclear aggressively while we are withdrawing from it, not just globally but also domestically.

And then I would just say one final thing, Congressman, is that, clearly, the winning combination for energy dominance is to do what the Russians and the United Arab Emirates are planning on doing, which is to build nuclear plants to replace natural gas and fossil fuel usage at home, and then you export your natural gas abroad. That gives additional geopolitical power and significant revenue for American businesses and workers.

Mr. GRAVES. And reduces global emissions.

Mr. SHELLENBERGER. And significantly reduces global emissions. I mean, the great news is that there is so much abundant natural gas there is no reason that we are going to need to see any significant increase in coal burning over the next century.

Mr. GRAVES. Thank you.

And a last quick question—thank you very much, Mr. Shellenberger—for Mr. Walsh. I, too, share a lot of the objectives that Mr. Walsh communicated. But, in looking at the strategy—Mr. Walsh, you largely represent labor.

Number one, the Biden climate plan, which largely reflects the one the committee put forth, it didn't include any labor representatives, any business representatives in the team that was devising that plan, putting it together.

Secondly, right now, we are 100—I want to remind folks—if you can go on mute, that would be great. I want to remind folks, in China, we are dependent upon China for 17 critical minerals today. Eighty percent of the rare earths we are dependent upon China for.

Do you believe that labor should have been represented on the Biden task force?

And, number two, do you believe that we should increase our domestic production of these critical and rare earths here in the United States to ensure that we are creating jobs right here in America?

Mr. WALSH. Thank you for the two-part question, Representative Graves. Let me attempt to address the first one, and hopefully I will have time for the second.

So I believe you are referring to the Biden Unity Task Force. I am trying to remember now who was on that task force, but, if I remember correctly, a task force that includes Representative McEachin, Chair Castor, Representative Lamb of Pennsylvania, and Representative Ocasio-Cortez represents a pretty good diversity of viewpoints within the Democratic Party.

I think that the breadth of perspective is reflected in their recommendations, which, again, I am trying to remember off the top of my head, but they include protecting clean air and clean water in our public lands, strengthening environmental justice, rebuilding our infrastructure, dramatically expanding clean-energy deployment, ensuring job quality in clean energy sectors. These are broadly popular positions with the American public, and not just——

Mr. GRAVES. Sure. And just to clarify the record, there were four environmentalists that were on the task force in addition to folks you mentioned, yet no labor or business representatives. But please continue.

Mr. WALSH [continuing]. With——

Ms. CASTOR. The time has expired. But it gives me an opportunity to thank Ranking Member Graves for his concern over the Democratic platform. We usually don't talk politics on these calls. But don't worry. Yesterday, the platform committee passed the platform, and it was rife with labor representatives. I will send you over the list.

And this also gives me an opportunity—I was going to hold this unanimous consent request until later, but I think it is important to do now to make sure it is on the record, in response to claims that renewables increase energy costs.

The International Renewable Energy Agency recently reported that electricity costs from renewables, such as solar and wind, have decreased dramatically over the last decade, resulting in renewable power generation technologies becoming the least cost new technology, new capacity options in almost every part of the world.

Moreover, on average, building new solar voltaic and on-shore wind power costs less than operating many existing coal plants.

So, without objection, I would like to enter into the record the IRENA report titled "Renewable Power Generation Costs in 2019."

Mr. GRAVES. Madam Chair, reserving the right to object, as I recall, at our last hearing, there was an objection on our unanimous consent requests in order to review those documents. And so I would like to allow the minority the same right for these documents, if you don't mind.

And if those are the most cost-competitive, then perhaps we could remove the PTC and ITC.

Ms. CASTOR. I think it would be very helpful if you would read the report.

So, at this time, I will recognize Mr. Luján for 5 minutes.

Mr. LUJÁN. Thank you so much, Madam Chair.

Mr. Walsh, do Americans have to choose between creating good jobs and protecting the environment?

Mr. WALSH. Thank you for the question, Congressman Luján.

No, they do not. That is, in fact, a false choice. We can and we must have both.

There are numerous instances in the committee's report that I think show this powerfully. I think it is particularly interesting to look at some of the job creation estimates associated with reaching a 90-percent or 100-percent carbon-free grid by 2040, right, where we look at job estimates that are in the neighborhood of half a million annually. Those are significant.

We also have to pay attention to job quality. We have to protect the rights of workers to organize. We need to include very clear prevailing wage and Buy America standards. We don't do that well enough to date, and we need to do it better, particularly in our use of tax credit policy.

But we can most certainly create good jobs, sustain good jobs, and protect our climate and create a living environment for everybody.

Mr. LUJÁN. Mr. Walsh, can you share some examples of good, union jobs in the clean energy sector?

Mr. WALSH. Well, there are many. One of my favorite examples is the offshore wind farm, the first grid-connected offshore wind farm in the country, off of the State of Rhode Island, at Block Island. That was a very small wind farm; it is now producing 50 megawatts. But it created jobs for 300 building trade workers across 10 different local unions under a project labor agreement.

Keep in mind, that is a very small project, whereas we now have states up and down the mid-Atlantic and northeastern coast that have teed up commitments for 20 gigawatts of offshore wind. The job creation estimates of that on an annual basis range anywhere from 122,000 to a little over 200,000 jobs per year.

Mr. LUJÁN. Appreciate that. Thank you, Mr. Walsh.

Dr. BAPTISTA, I am one of the co-authors of the Clean Energy Standard Act. I was proud to partner with my colleagues in the House and with United States Senator Tina Smith. We know that a nationwide clean electricity standard also means less air pollution and healthier communities and longer lives.

Dr. Baptista, what can America do to ensure that underserved frontline communities, who we know are suffering from air pollution, benefit from a nationwide clean energy standard?

Dr. BAPTISTA. Thank you, Representative Luján.

I believe that when we shift to clean energy sources, like wind and solar, in our energy production, we also have the very immediate benefits of reducing co-pollutants, those pollutants like particulate matter that have health harming impacts in near-adjacent communities to these energy-producing facilities.

And when we look across the country, we know that much of the infrastructure, the current infrastructure, fossil fuel infrastructure in the country resides in communities of color and low-wealth communities, who are impacted not only by the global greenhouse gases that come from traditional fossil fuel energy production but the co-pollutants that have immediate health impacts on those communities.

And so, when we talk about a national clean energy standard and the shifting of our energy production to cleaner sources, like wind and solar, what we see is a concomitant reduction in air pollutants that harm people today. So this is very, very important that we insist on the driving down not only of CO_2 but of these co-pollutants that have health impacts on local communities.

And, furthermore, we know that, as we shift to renewable energy sources, there are also opportunities created in communities of color and low-income communities that have historically not had the same opportunities for employment in these traditional industries. And new opportunities can open up for both economic development and an improvement in air quality and public health for communities that have been hard-hit by economic and environmental harms in the past.

Mr. LUJÁN. Thank you, Dr. Baptista.

Madam Chair, as the clock winds down here, it is good to hear the ranking member's support for union jobs across the country.

I look forward to partnering with you, Mr. Graves, and seeing what pro-union legislation we can work on together.

My father, my late father, was a union ironworker. My brother is IBEW; my grandfather, a union carpenter. So it is good to see that we can find some bipartisan support there, Madam Chair, and do look forward to working with all my colleagues as we move forward.

Thank you to all the panelists.

Mr. GRAVES. Absolutely.

Ms. CASTOR. Thank you, Mr. Luján.

And, Mr. Carter, you are recognized for 5 minutes.

Mr. CARTER. Well, thank you, Madam Chair.

And, Mr. Luján, thank you very much for that. My father was a union paper maker. So it is not something that is unique to just Democrats; it is also something that Republicans enjoy as well.

Madam Chair and members of the panel, it seems that we have been focusing a lot on the economics of this and the economics of the clean energy. And I am a little bit confused here when I hear the chairlady mention that renewable energy is so much cheaper than traditional energy and then I hear the ranking member cite examples of how much more expensive in California the petroleum is, how much more expensive the energy is, and the two of them just don't seem to jive. So I am a little bit confused there.

But I do want to mention that the majority staff's report that came out, it is obvious it would make it even more expensive and difficult in the U.S. to be competitive with energy prices than it would elsewhere. And that means that more jobs would go to China and that means that more jobs would go to areas that are not as environmentally conscious as we are here in the U.S.

In fact, it is estimated that, within the next decade, 90 percent of all the emissions will come from outside the U.S. And one of the ways that the majority staff's report suggests that we should counter that is with the carbon tax that advocates for border adjustment mechanisms, such as the carbon tax, so that we can level the playing field.

I wanted to ask you, Mr. Shellenberger, do you think that that is really an effective way to encourage other nations to reduce their emissions?

Mr. SHELLENBERGER. Yeah, thank you. And I also would like to address that, because there is—first of all, if solar and wind are cheaper than existing energy sources, why would they need subsidies? Why would they need to be mandated? I think that somebody needs to address that issue. In other words, why would we spend $2 trillion on solar and wind, and the transmission lines, if they are already cheaper than existing energy sources?

The second issue is that they are not. And so what they are measuring is, if you take a solar panel, buy a solar panel from China and you measure the cost of that electricity at that moment, yes, it is cheaper than the existing grid, but that solar panel doesn't provide reliable electricity.

And so the economic and environmental costs of industrial solar and wind projects are externalized, first, onto the natural environment—you are talking 300 to 400 times more land—second, onto ratepayers, who have to pay to have other power plants operating or some other kind of way to store that electricity so you can have reliable electricity.

That is the mechanism that the University of Chicago and other analysts have all identified as why renewables-heavy states and countries, like California and Germany, have much more expensive electricity.

On the issue of the carbon tax, you know, I personally would have no problem with a very low price on carbon, you know, somewhere between $1 and $5 per ton, if that money were used to benefit something positive. Because, you know, it is not a bad thing to tax bads and invest in goods. But that is not going to drive energy transitions.

What drives energy transitions, whether from wood to coal or wood to hydroelectricity or coal to natural gas, is the same thing that drove the energy transition from coal to natural gas in the United States, which is that the cost of natural gas came down because we opened up shales for fracking and so natural gas became cheaper than coal. That is the mechanism. We didn't subsidize natural gas into becoming cheaper than coal. We also didn't tax coal to becoming much more expensive than natural gas.

So I don't think we need to be super rigid about it. I mean, if there were some broader compromise where there was some price on carbon that benefited positive things, great. But I think it is

silly to imagine that making fossil fuels slightly more expensive is going to somehow make the difference between it and significantly cleaner sources of energy.

Mr. CARTER. Good.

Mr. SHELLENBERGER. If you want a national nuclear program, we need a national nuclear program, full stop. If we want to transition from coal to natural gas, we need to make natural gas cheaper.

Mr. CARTER. I want to jump on that. I have just a few seconds left. But you mentioned the nuclear plants, and you mentioned in Georgia. It is right above my district in Georgia.

And my question is, what is the biggest hurdle to nuclear energy in America? Why is it that even environmentalists are opposed to nuclear energy, when we know that it is green, we know that it is one of the cleanest forms of energy out there?

Mr. SHELLENBERGER. Well, I think one of the big reasons is because, if you do a lot of nuclear power, you don't need any renewables. I mean, France shows that you can do 75 percent nuclear of your electricity grid. Like I said, France's electricity is 10 times less carbon intensive than Germany's, and they spend a little bit more than half as much for their electricity. These are two real world cases that last over decades.

So, if you are absolutely in love with renewables and you think they are a way to harmonize human civilization with the natural world, which they are not, then nuclear is a threat to that vision. If you are trying to get control over the energy economy, nuclear is a threat to that vision.

There are still lingering concerns about nuclear weapons, but the fact of the matter is, the United States already has nuclear capability. It is not like it is going to change that.

So there is also—in my book, "Apocalypse Never," I describe the history of how the Democrats have opposed nuclear power for a long time for, I think, reasons that don't have much to do with the environment at all.

Mr. CARTER. Okay.

I am out of time. Thank you for your indulgence, Madam Chair. Thank you, and I yield back.

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

And two things that the gentleman from Georgia forgot: one, all the timber in your state and all of the solar energy as well.

Ms. Bonamici, you are recognized for 5 minutes.

Ms. BONAMICI. Thank you so much, Madam Chair.

And thank you to all of our witnesses today.

We are in an unprecedented moment in our nation's history. With coronavirus cases surging and unemployment rates climbing, our communities are having these long overdue conversations about systemic racism. But even in this moment in history when our communities are struggling and we have inequities that are exacerbated and highlighted, the climate crisis is continuing, and we cannot and must not wait any longer to take action.

And I am proud of this bold, science-based, comprehensive climate action plan. Building a resilient, clean energy economy using our climate action framework is going to boost our economic recovery at a time when we desperately need it but also allow us to begin to repair the legacy of environmental racism and pollution

that has disproportionately burdened low-income communities and communities of color for decades.

And I want to start with Mr. Walsh. We really appreciated the BlueGreen Alliance's engagement in drafting the climate action plan and your work to highlight the economic opportunities of addressing the climate crisis.

So, as a leader on the Education and Labor Committee and the granddaughter of a coal miner, I know that how we transition to a clean energy economy and support workers is as important as the transition itself. So I am working on the recommendation that we have that you mentioned in your testimony, to create a national economic transition office. I am working on that as a stand-alone bill.

So I want to ask, what are the most effective strategies to help workers prepare for those future transformations and avoid displacement? And how could a centralized office better help displaced or dislocated workers access the targeted support services and resources they need?

Mr. WALSH. Thank you for the question, Congresswoman. It acknowledges that America is already in the middle of an energy transition, right? And we need to have a conversation and we need to enact policies that get ahead of this transition, and we need to do it now.

I mentioned in my testimony the "National Economic Transition Platform," which outlines a set of policy recommendations focused on communities and workers hit hard by the decline of the coal industry, where that transition is most impactful at this point.

One of the key ideas put forward in that platform, as you mentioned, is the need for a new Federal office that would align, scale up, and target Federal resources for affected workers and communities and coordinate across different agencies within the Federal Government, particularly agencies that are focused on economic and workforce development.

We think creating an office of economic transition—call it what you want—is really key. In addition to synchronizing and aligning efforts across the Federal Government, it can also leverage new public- and private-sector investments.

And we also think this is an office that should be guided by an advisory board that is reflective of affected stakeholder groups and communities, including labor and local leaders.

The recommendations to create——

Ms. BONAMICI. Absolutely.

Mr. WALSH [continuing]. To create that kind of office are—we also have six other recommendations, and I am happy to share those with you when we have more time.

Ms. BONAMICI. Terrific. Thank you so much.

And, Dr. Baptista, I appreciate in your testimony you noted, "Without an intentional focus on equity and justice, we will replicate the same disparities."

So, throughout our conversations with the Affiliated Tribes of Northwest Indians and the National Congress of American Indians, we identified exclusionary provisions in Federal funding programs for Tribal nations. So the climate action plan will remedy those gaps and also better acknowledge traditional lands and waters that

Tribes access under their treaty rights, and which the Federal Government's historical injustices and failure to honor those rights—we need to address those as well.

So how have historical failures to invest in environmental justice communities and other underserved populations, how have they exacerbated inequities? And how can Congress better incorporate the principles of the "Equitable and Just National Climate Platform" in making future funding decisions?

Dr. BAPTISTA. Thank you, Congresswoman, for the question.

I think it is really critical that we center equity and justice. The "National Equitable and Just Climate Platform" tries to really drive home this point, that we can't continue to reproduce the same status quo policies that often leave out communities of color and historically disenfranchised communities that have not have the same access to employment opportunities and different economic development scenarios.

So we want to ensure that, as we move to a renewable economy, as we move to greener and healthier forms of manufacturing and production, that the communities that have been the sacrifice zones and have had to live with the harms of environmental pollution start to reap some of those benefits.

And how do we do that? One of the key ways that we do that is early consultation and input from environmental justice stakeholders on the ground that know these issues very well. There are fenceline and frontline communities around the country who have deep knowledge in these areas. And also by ensuring that we have explicit targets for employment in low- and moderate-income communities and people of color communities.

Ms. BONAMICI. Perfect. Thank you so much.

And I yield back. Thank you, Madam Chair.

Ms. CASTOR. Thank you.

Mrs. Miller, good to see you. You are recognized for 5 minutes.

Mrs. MILLER. Thank you, Madam Chair.

I don't think that there is any doubt that my State of West Virginia has taken the brunt of bad policy, unfunded mandates, and the Democrat regulatory agenda, which is evidenced by the impact on jobs in our coal communities.

We have been fortunate, as jobs related to natural gas have increased in my state. Not only has natural gas provided new and high-paying jobs to Appalachia, it is a vital resource to our energy security, our national security, and to reducing global emissions.

Dr. Baptista, Ms. Soholt, and Mr. Walsh, thank you all for being here today. I am glad that we have experts here before us.

Do you all know how many cubic meters of natural gas the EU consumes each year? The answer is 457.2 billion cubic meters.

Of the natural gas that Europe consumes, do you know what percentage of it comes from Russia? The percentage is 38.8 percent.

Does anyone know what total global carbon emissions were in 2018? Thirty-three-point-three gigatons, or 33 billion metric tons.

Now, if we can help our EU allies switch from dirty and dangerous Russian natural gas to cleaner and more secure American natural gas, global emissions could fall by more than 62 million metric tons a year.

Given the United States emitted 5.28 billion metric tons of carbon a year, we could effectively offset U.S. carbon emissions by 1.2 percent. This may not sound like a whole lot, but it would be like bringing down carbon emissions by almost 50 percent in each and every one of our congressional districts.

Just last week, I introduced a bill, the ESCAPE Act, or the Energy Security Cooperation with Allied Partners in Europe Act, and it is designed to reduce the influence of Vladimir Putin on our allies by promoting U.S. energy exports to Europe.

Even if you don't care about our national interests, if you care about climate change, you should join me on this bill, as Russian natural gas exports to Europe have a lifecycle emission profile of at least 40-percent higher than U.S. LNG. If my colleagues believe the climate crisis to be urgent and dire, then I hope they will support my bill, which will have a massive and immediate positive impact on global carbon emissions.

I yield back.

Ms. CASTOR. Thank you, Mrs. Miller.

Next, Rep. McEachin, you are recognized for 5 minutes.

Mr. MCEACHIN. Thank you, Madam Chair, and thank you for bringing today's hearing together.

And to our distinguished panelists, we thank you for your time and your expertise.

Dr. Baptista, thank you for your very kind written testimony where you mentioned the work of Chairman Grijalva and myself. That was very kind of you. It has been a pleasure working with him as well as many incredible leaders, including the members of the "Equitable and Just National Climate Platform," to advance priorities that reduce emissions, improve public health, and stimulate economic growth.

Jason Walsh, it is very good to see you. I have had the privilege of working with you over the past few years on policies to address our climate crisis in a way that creates and maintains high-quality jobs and ensures a just and equitable transition for communities.

As I have said many times before, nothing is more important than speeding our transition to a cleaner, more sustainable economy. It is the only way to deliver an equitable, healthy future. Building a clean economy will enhance economic opportunity, creating well-paying, family-sustaining jobs for those who need them most. And by reducing climate change pollution, it will improve public health. Additionally, it will give us the opportunity to address longstanding wrongs, to correct decades old environmental injustices that are still hurting communities today.

The Federal Government has a critical role to play in this fight, and it is essential that we advance carefully constructed policies that address these longstanding injustices and meet the challenge of our climate crisis.

Dr. Baptista, to that end, as we continue our transition to a clean energy economy, how can the Federal Government ensure that environmental justice communities shape investments in their communities? How can investments be made in partnership with EJ communities while reducing emissions and stimulating economic growth?

Dr. BAPTISTA. Thank you, Representative McEachin. And thank you so much for your leadership on environmental justice issues.

We know how to do this. We know who the environmental justice communities are across the country. There are community-based organizations and nonprofits around the country who know their communities well and can participate as key stakeholders as we develop these programs in renewable energy and energy efficiency.

We know that there are certain investments in energy efficiency and renewable energy that can create local jobs, but we need input early and often from those local stakeholders, local municipalities, and NGOs that can help guide that work and also direct the investment to ensure that there is greater access to those who have been disenfranchised and have barriers to employment.

So we need to follow the model that the "Equitable and Just Climate National Platform" set for us, which is a good collaboration on the development of those policies and in setting targets for local hiring and local investments to go to communities that need it most.

Mr. MCEACHIN. Thank you.

Madam Chair, just so you know—staff can help me out—I don't see the clock on my screen. I don't know if it is something I am doing or not, but I don't want to run over my time accidentally.

Ms. CASTOR. You have a minute and a half.

Mr. MCEACHIN. Thank you.

Doctor, what lessons have you learned throughout your work that can and should be applied to climate policy development at the Federal level?

Dr. BAPTISTA. I mean, I think that I am going to reiterate what I said in my comments, which is that equity and racial justice does not happen by coincidence. It has to be an intentional thing that we build into all of our national climate and energy policies.

We need to intentionally carve out opportunities for improving the quality of life and reducing legacy pollution in communities, but also for ensuring access to the benefits of a transition to a cleaner economy.

And so, without that intentional and explicit commitment to racial justice and equity in our national energy policies, they will not, you know, happen by chance. So I would recommend that we all focus our energies on equitable and just outcomes in these policies.

Mr. MCEACHIN. Thank you, ma'am.

And, Madam Chair, I yield back the balance of my time, if any.

Ms. CASTOR. Thank you, Rep. McEachin.

Next, we will go to Rep. Palmer, if he can turn on his video.

If not, we will go ahead to Mr. Levin.

All right, let's go to Mr. Levin.

And for those of you—to see the clock, I believe you need to be in grid view. So, if you see that icon and hover over it, it will give you an option for—I think it is the four dots grid view. If you click that, you will be able to see the clock.

So, Mr. Levin, you are recognized for 5 minutes.

Mr. LEVIN. Well, thank you very much, Chair Castor, for your great leadership and for this discussion today.

Before I begin, I would just like to remind my friend Mr. Graves, who took it upon himself to criticize California, that, according to

the EIA, my home state has the second lowest per capita carbon dioxide emissions in the nation, only behind New York.

And I am very proud of that and the leadership that we have shown, that you can put in place strong policies to protect the environment and build the clean energy jobs of the future at the same time.

And I would remind my friend Mr. Graves that his home State of Louisiana has the fifth highest per capita CO_2 emissions in the nation.

Mr. GRAVES. Will the gentleman yield?

Mr. LEVIN. So I hope we can agree that growing clean-energy jobs is really more important than ever, since unemployment——

Mr. GRAVES. Will the gentleman yield?

Mr. LEVIN [continuing]. Has skyrocketed due do COVID.

With that, I will turn to some questions.

Ms. Soholt, I have introduced bipartisan legislation called PLREDA, the Public Land Renewable Energy Development Act, which sets up a smart-from-the-start planning framework for renewable energy generation on our public lands.

This approach is better for developers and better for consumers, ultimately helps facilitate more renewable energy projects. And the Natural Resources Committee has unanimously approved the bill, and I hope will it be considered soon on the House floor.

Ms. Soholt, do you think this sort of smart-from-the-start approach is effective for transmission as well? And if so, how should it be implemented?

Ms. SOHOLT. Thank you, Representative, for the question.

First, if I may answer just briefly my fellow panelist, Mr. Shellenberger, and talk about unsubsidized cost of wind and solar compared to other fields.

Lazard does a report every year. And wind and solar, unsubsidized, no ITC/PTC, are the cheapest forms of new generation. That report is available every year. So it does not comport with what we are hearing from Mr. Shellenberger today.

As far as being unreliable, the Southwest Power Pool has had over 70 percent of their energy delivered to customers from wind just this summer. And so the fact that wind and solar are not reliable is not true.

As far as the land use goes, I think what Mr. Shellenberger's oversized land estimates account for is that he is looking at the entire footprint of a wind farm, for example. A wind turbine takes up very little land, maybe a quarter of an acre, and you can farm or graze right up to the base of that turbine. And so the estimates about land use Mr. Shellenberger is talking about are far exaggerated.

So, Representative Levin, thank you for your question.

We have seen in the Midwest that utilities who are out talking to communities, Tribal lands representatives—we don't have a lot of Federal land in the Midwest, I will have to admit. That is more in other areas of the country. But I think what we have learned is that fighting large infrastructure, no matter what, is a complicated and time-consuming process.

Anything that we can do at the beginning of the process to have a conversation about how to prudently site, whether it is a trans-

mission line or new power generation, new renewable generation, is time well spent.

Mr. LEVIN. Thank you for that.

Mr. Walsh, as I am sure you know, the Trump EPA is rolling back the light-duty vehicle greenhouse gas emission standard set by the last administration. This will cost consumers at least $175 billion more at the pump and result in the emission of an additional 867 million metric tons of carbon pollution at least.

Our report recommends we ratchet these standards back up as well as set standards for clean medium- and heavy-duty trucks. And, in your testimony, you mentioned that building cleaner cars and trucks is an important part of the clean energy economy that creates good jobs.

What are the jobs impacts of rolling back the light-duty vehicle standards? And can you talk a bit more about the jobs and environmental potential of clean trucks?

Mr. WALSH. Yes. And I will try to be brief. I know we are running out of time.

The rollback of the fuel economy and greenhouse gas emissions standards by the Trump administration was a job killer. By the Administration's own estimates, we will lose tens of thousands of jobs that we otherwise would have had in automotive supply chains, building hybrids, building advanced fuel economy technologies both across light-duty vehicles and medium-duty vehicles as well.

So it is a step back, which is why it was opposed by such a broad cross-section of stakeholders, including labor unions.

Mr. LEVIN. Thank you.

I am out of time, but I appreciate all your testimony and your being with us.

Thank you, Chair Castor. I yield back.

Ms. CASTOR. Thank you, Mr. Levin.

Mr. Casten, you are recognized for 5 minutes.

Mr. CASTEN. Thank you, Madam Chair.

I have to tell you, I am a little frustrated here. We have had 18 months of pretty good, pretty bipartisan hearings, with a recognition that climate is an emergency and we need to deal with facts. My colleagues across the aisle are just making stuff up today. You have a witness who is making stuff up.

I would like to introduce—with unanimous consent, would ask to introduce into the record an article from climatefeedback.org entitled "Article By Michael Shellenberger Mixes Accurate and Inaccurate Claims in Support of a Misleading and Overly Simplistic Argumentation About Climate Change."

Ms. CASTOR. Without——

Mr. GRAVES. Madam Chair, I am going to reserve the right to object.

Ms. CASTOR [continuing]. All right.

Mr. CASTEN. Garret, do me a favor——

Ms. CASTOR. Please have your—Mr. Casten, please have your staff submit the document to our repository. Thank you.

Mr. CASTEN [continuing]. We will do.

And, Ranking Member Graves, if you don't like the document, please read it. Read it, and then come to my office, and let's talk.

Mr. GRAVES. Happy to do it. Thank you.

Mr. CASTEN. These are scientists refuting almost everything that Mr. Shellenberger has said. It is from an article that he wrote on June 28 of this year substantially consistent with his testimony.

We do not have time on this committee to make things up. I have spent 20 years in the clean energy industry, and Mr. Shellenberger doesn't understand energy markets either.

Mr. Shellenberger, I am not going to ask you questions, because it would be a waste of my time.

I am going to ask questions, though, of Ms. Soholt, because you have a lot of experience in the Midwest System Operator.

I am looking right now at the MISO spot price of power, and it says that, at the Illinois hub, the price of power is about $28 a megawatt hour. As I understand it right, and I would ask you to confirm, that means that any generator who has a marginal operating cost below that level is going to operate. Is that about right, Ms. Soholt?

Ms. SOHOLT. Yes, that is true.

Mr. CASTEN. Okay. So help me understand, what is the marginal operating cost of a solar panel that is deciding whether to dispatch into that market?

Ms. SOHOLT. I would not know that off the top of my head, but I would be glad to get you that information.

Mr. CASTEN. Well, does it take any fuel to burn a solar panel, to——

Ms. SOHOLT. It does not.

Mr. CASTEN [continuing]. Run a solar panel?

Ms. SOHOLT. It does not.

Mr. CASTEN. Do you typically hire an operator, if you put a solar panel on your roof, to run it that you have to pay a salary to?

Ms. SOHOLT. No.

Mr. CASTEN. So it is darn close to zero, sounds like.

How about a wind turbine? Does a wind turbine have a high margin—I am not talking about the cost of capital. A wind turbine, does that have a very high marginal operating cost?

Ms. SOHOLT. No, Representative. Last time I checked, wind and sun are free.

Mr. CASTEN. Okay.

How about a nuclear plant? What is the marginal operating cost of a nuclear plant?

Ms. SOHOLT. It would have a higher cost than $28.

Mr. CASTEN. Would it be lower than a coal plant or higher than a coal plant?

Ms. SOHOLT. Well, that is a rather complicated answer, because a nuke in MISO would probably be a must-run facility. Nuke plants do not ramp well up and down, and so they need to basically run flat out. And so I don't think they would be on the margin. Coal and gas are going to be more on the margin. But they would have substantially higher operating costs than wind or solar.

Mr. CASTEN. Fair point.

And does MISO provide any guarantee of capital recovery? If you build a plant, are you guaranteed to earn your target return on capital, or do you just make a marginal dollar, not every hour?

Ms. SOHOLT. MISO has nothing to do with cost recovery.

Mr. CASTEN. Okay.

And the reason I ask those questions is because, when we passed the Energy Policy Act in 1992 and FERC Order 888, we created MISO, we created PJM, we created all these power markets, and we started dispatching assets based on the lowest marginal power supply.

Ms. SOHOLT. Right.

Mr. CASTEN. Since that time, the nuclear fleet went from 60 to 90 percent capacity factor. We built 200,000 megawatts of combined cycle that was almost twice the efficiency of the existing gas fleet. We built about 50,000 megawatts of renewables.

Now, for context, there is about 1,000 gigawatts on the grid. So 5 percent of the grid now is renewables, 20 percent is combined cycle.

The price of power since that period has fallen by over 6 percent, and the CO_2 emissions per megawatt hour have fallen by over 26 percent.

For people to sit here on this committee and say the deployment of clean energy is driving up the cost of power are living in fantasy land. Just imagine what we could do if we didn't spend our time putting denialists and deniers before us.

We have the opportunity to act. We have the opportunity to lower power prices. We have the opportunity to make the world cleaner. We have the opportunity to create good construction jobs. For goodness sake, let's do it.

Ms. SOHOLT. And, Representative, if I could just add one final thought. You know, the wholesale power prices in MISO have gone down dramatically in the last 10 years, and MISO has over 20,000 megawatts of wind and solar online currently today.

Utilities are purchasing wind and solar because they are economic, reliable resources, and they know how to run the grid with that robust amount of renewables on the grid.

Mr. CASTEN. Thank you.

Thank you. I yield back.

Ms. CASTOR. Thank you, Mr. Casten.

Mr. Huffman, you are recognized for 5 minutes.

Mr. HUFFMAN. Well, thank you, Madam Chair.

And I want to share the frustration that we heard from my colleague, Sean Casten. I had hoped for a productive conversation about climate solutions and the great economic upside of pursuing this clean energy future, and, instead, our friends across the aisle called someone who is not a scientist, not an economist. He is a guy with an anthropology degree that holds himself out as an expert on a whole bunch of subjects, but he has really not.

And for those of us that know his shtick, as I do, sadly, from years of experiencing it, you know that he has spent his career creating, publicizing, and monetizing a totally fake narrative that he is some sort of a fallen angel from high levels of the environmental community, but he has seen the light, and he is now speaking truth to environmental power by attacking renewables and climate leadership from the environmental community.

It is complete bunk. And all of us were cheapened a little bit, a few moments ago, when he actually gave the title of his book that he is out promoting. And that is really what this is all about. It

is what it is always about. We shouldn't be talking about pimping one's book under the guise of congressional testimony.

In any event, I am glad that the article is now going to be in the record from climatefeedback.org. Anyone that has questions about this really should read it, because you have six real scientists that take to task and dismantle all of the tropes that you heard in Mr. Shellenberger's testimony today, all of the tropes in the new book that he is hocking around the country. So have a good look at that.

And the fact that they have dismantled and debunked these things means that I don't have to. So I can bring my time to bear on a more productive conversation with the witnesses here who want to help us solve the climate crisis.

And, Ms. Soholt, I want to ask you about that, because we continually hear from critics that renewables are unreliable, that it is not always sunny, not always windy. But we are making incredible progress at bringing online far more renewables than just a few years ago people said you could do. In fact, I just checked my phone, and today, right now, on a peak summer day, California is running 50-percent renewables right now. That is way beyond anything that I was told as a State legislature less than a decade ago that we could achieve.

Talk about the way building out a nationwide and interconnected transmission system is helping us advance renewables far beyond all these limitations that we are always being warned about.

Ms. SOHOLT. Thank you, Representative Huffman, for the question.

So, yes, I think that our utilities—I would call them out—they have done a fantastic job of bringing renewable energy online and operating the grid reliably. They have seen that economic benefit to customers over the long term of adding renewables. And I am speaking from my experience in the Midwest, where we have an increasing amount of renewables on the system.

The reason we need to work on the Macro Grid vision is because we need to be able to move resources from where they are located to where they can be used. That is not a new phenomenon for the grid. It is just that we need to move the location specific resources to where they can be used.

But the grid does many more things than just facilitate interconnection of renewables. So we are going to get extra benefits of grid reliability. We are going to get the extra benefits of reducing prices by lowering congestion costs. We are going to get the additional benefit of communities getting taxes paid by the utilities and all the jobs and economic development that come along with the Macro Grid.

And so, you know, I think what I have endeavored to show in my testimony is that we have a three-fer here—at least a twofer, maybe a three-fer. We have, you know, a better environment through developing and dispatching renewable resources. We have job creation through both the grid and renewables. And we will be able to compete with China on that vision that they are on right now with having a very competitive U.S. through clean, low-cost, renewable electricity.

But we need to work on the pieces, not only the infrastructure but the approval processes, the construction of lines. We need to

tackle all of the pieces in order to have the benefits that flow from the Macro Grid.

Mr. HUFFMAN. If I could sneak a few more seconds in, Ms. Soholt, you have talked about the Macro Grid, but we are also using the built environment to generate a lot of renewables these days. And so the scare tactics we have heard about the amount of land you would need hypothetically for wind and solar, we have an awful lot of built environment that can be generating clean energy in a way that coexists beautifully with other uses.

Could you speak to that?

Ms. SOHOLT. Yes. Thank you, Representative. I will be brief.

So I think you are talking about building efficiency and transportation challenges that we can tackle with electric vehicles to bring down emission rates. There are great promise in all of those things, so, absolutely, couldn't agree more.

Mr. HUFFMAN. And photovoltaic solar generation on top of buildings and parking lots, et cetera.

Ms. SOHOLT. Absolutely.

Mr. HUFFMAN. So thank you very much.

I yield back.

Ms. CASTOR. Thank you.

Representative Brownley, you are recognized for 5 minutes.

Ms. BROWNLEY. Thank you, Madam Chair.

And I, too, want to thank the panel for being here and sharing your expertise and doing the work that you do every single day to save our planet. So we appreciate it very, very much.

Ms. Soholt, again, on the grid and expansion of the grid—and you mentioned that China is going ahead. China gets to do whatever they want to do because they are a communist country, and they don't, you know, have environmental impact studies, et cetera, that they have to really sort of deal with.

And I know one of your recommendations in terms of expanding the grid is about, you know, removing transmission barriers. So, you know, we had a whole hearing on this 6, 8 months or so ago. And, you know, just tell me how you remove transmission barriers in our country.

I just think that, you know, as we have tried to expand the grid and connect East and West, you know, it is a process that takes forever, and, in many cases, the end result is that it doesn't happen. So if you could enlighten me.

Ms. SOHOLT. Sure. Thank you, Representative Brownley, for the question. So we need to do a couple things.

We need some additional good direction from the Federal Energy Regulatory Commission on transmission planning across the seams. We have a big challenge right now with connecting the various power pools together to be able to plan and permit and build transmission across those seams. And the real benefit of doing that is that we are going to be able to deliver savings and cost-effective clean energy for customers. So it is all about the customer savings as well as the environment, and as well as the other benefits that flow. So we need additional direction from FERC on planning.

We may need some help from Congress on siting transmission. I think that utilities and States have done a lot to try to address siting issues. Utilities are really getting out early and often to talk

to communities about why additional power lines are needed. We are trying to be very judicious about the type of lines that are constructed, using our grid the best we can before we build new, and then using very little new right-of-way, if possible.

So there are different levels of things, but—so I would say, in the planning process, there are barriers that we have to remove. In the permitting process, we have challenges. And, you know, Congress needs to work with the states to really understand how we can tackle some of the siting and routing issues. And then, you know, we are going to have to figure out cost delegation policy among the beneficiaries of transmission.

So it is a challenging dilemma to solve, but the benefits are simply so great from building the Macro Grid.

Ms. BROWNLEY. Yeah. Yeah.

So I understand the siting challenges. Give me an example of what some of the planning barriers are with regards to FERC. What do you mean by that?

Ms. SOHOLT. Boy, we are going into the weeds here, Representative.

So, when we have two regions who are trying to look at what should be constructed across what we call a seam, they would each do an individual study. And what we need to be able to have them do is both use the same inputs——

Ms. BROWNLEY. Yeah.

Ms. SOHOLT [continuing]. So that they can come up with the same solutions and work on that together.

That doesn't always happen. And so we need some reform to allow the two power pools to work together more effectively.

But the proof is really in, are we getting anything built across those seams? And, so far, we are not seeing very much progress.

Ms. BROWNLEY. Thank you. Thank you very much.

My time is about to run out, but, Dr. Baptista, I wanted to ask you, you know, as we attempt to try to turn our report recommendations into actual legislation, are there policy tools that are better, I guess, at prioritizing the needs of environmental justice communities than others?

Dr. BAPTISTA. Well, I think, in terms of tools, much of what we looked at in the national climate platform looked at, you know, where are the existing programs that actually have done this work well in terms of environmental justice?

And, for example, the U.S. EPA's EJ Small Grants Program, the Weatherization Assistance Program, you know, some of the job training programs that I mentioned, those are programs that have effectively reached environmental justice communities and have been able to collaborate with those stakeholders on the ground and create jobs and also return benefits to those communities through collaborative processes, not just investments.

So I would suggest that we look at some of those existing policies and programs and look for not only expanding those but to model and replicate in other energy and climate policies that the plan puts forward.

Ms. BROWNLEY. Thank you very much.

And I apologize for going over my time, Madam Chairwoman, but I yield back.

Ms. CASTOR. Well, thank you, Rep. Brownley.

And I would like to thank all the witnesses for joining us today.

And now we are going to return to a few housekeeping matters.

Rep. Graves, you had two—you had reserved the right to object on two previous UC requests. One is the IRENA report on the cost of renewables, and the second is on Rep. Casten's Climate Feedback article. Are you going to maintain your objections on those?

Mr. GRAVES. Could you remind me, Madam Chair, on the objection you had on our documents, were those included in the record of the hearing, in the last hearing we had?

Ms. CASTOR. Yes, they were.

Mr. GRAVES. Okay. In that case, then that is fine. And I will review the document that Mr. Casten mentioned.

Ms. CASTOR. Great.

So, without objection, those two previous documents are admitted under unanimous consent.

[The information follows:]

Submission for the Record

Representative Kathy Castor
Select Committee on the Climate Crisis

July 28, 2020

ATTACHMENT: IRENA (2020), *Renewable Power Generation Costs in 2019*, International Renewable Energy Agency, Abu Dhabi.

The report is retained in the committee files and available at:

https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jun/IRENA_Power_Generation_Costs_2019.pdf

Submission for the Record

Representative Sean Casten
Select Committee on the Climate Crisis

July 28, 2020

ATTACHMENT: Swain, D., Ceballos, G., Francis, J., Emanuel, K., Sriver, R., Doerr, S., and Hausfather, Z. (N. Forrester, Ed.). "Article by Michael Shellenberger mixes accurate and inaccurate claims in support of a misleading and overly simplistic argumentation about climate change," Climate Feedback, 2020, July 13.

The article is retained in the committee files and available at:

https://climatefeedback.org/evaluation/article-by-michael-shellenberger-mixes-accurate-and-inaccurate-claims-in-support-of-a-misleading-and-overly-simplistic-argumentation-about-climate-change/

Ms. CASTOR. I would also like to ask unanimous consent to include in the hearing record a letter from the National Audubon Society that clarifies that wind turbines are not the greatest threat that birds face today. Actually, the letter says: "In short, wind turbines are not the greatest threat to birds today. Climate change is. Audubon's research has shown that two-thirds of North American bird species are at risk of extinction from global temperature rise."

Mr. GRAVES. Madam Chair, reserving the right to object, is this the letter that states that there are half a million eagles and hawks that are killed as a result of wind energy and that——

Ms. CASTOR. This is the July 27 letter that is in the portal.

Mr. GRAVES [continuing]. Okay. Thank you. I lift my objection.

Ms. CASTOR. Thank you.

So, without objection, the Audubon Society letter is entered into the record.

[The information follows:]

Submission for the Record

Representative Kathy Castor
Select Committee on the Climate Crisis

July 28, 2020

The Honorable Kathy Castor
Chair, House Select Committee on the Climate Crisis
H2-359 Ford Building
Washington, DC 20515

The Honorable Garret Graves
Ranking Member, House Select Committee on the Climate Crisis
H2-359 Ford Building
Washington, DC 20515

July 27, 2020

Re: Setting the Record Straight on Wind Power and Birds

Dear Chair Castor and Ranking Member Graves:

On behalf of the National Audubon Society and its more than 1.7 million members, I would like to address some of the mischaracterizations around wind power that one of your witnesses has previously raised, and is likely to raise again in today's hearing on "Solving the Climate Crisis: Building a Vibrant and Just Clean Energy Economy." In short, wind turbines are not the greatest threat birds face today; climate change is. Audubon's research[1] has shown that two-thirds of North American bird species are at risk of extinction from global temperature rise. To stave off the worst impacts of climate change, and to protect the ecosystems birds depend on, we need to take advantage of all forms of clean, cost-effective, renewable energy, including onshore and offshore wind power. Transforming the energy sector to 100 percent clean energy—part of our goal to reach net-zero emissions economy-wide by 2050—necessitates widespread deployment of industrial scale wind, solar, geothermal, storage, and the transmission needed to bring that energy to market. Audubon's policy is to work with the industry, agencies, our partners, and our chapter network to achieve that goal.

All forms of energy—including wind power—have direct and indirect impacts on birds. While wind energy helps birds on a global scale by curbing climate change, wind power facilities can harm birds through direct collisions with turbines and other associated structures, including power lines. But it's important to put the risks posed by wind turbines in perspective. An estimated 140,000 to 500,000 bird deaths occur per year due to turbine collisions, which is substantial, but significantly less than deaths caused by oil pits and communications towers.[2]

Beyond direct collisions, wind power facilities can also affect birds by degrading or destroying habitat, causing disturbance and displacement, and disrupting important ecological links. Placing wind projects in the path of migratory routes makes this problem worse. It is possible to mitigate this problem, however, by consulting with wildlife experts and ecological data to design projects that minimize these impacts. Wind power is critical to reducing greenhouse gas emissions and other forms of air pollution from fossil fuels—pollution that disproportionately affects low-income communities and communities of color.[3] Any level-headed analysis of wind power must look at the whole picture, which is why Audubon strongly supports wind energy that is sited and operated properly to avoid, minimize, and mitigate

[1] https://www.audubon.org/climate/survivalbydegrees
[2] https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php
[3] https://www.naacp.org/climate-justice-resources/fumes-across-fence-line/

effectively for the impacts on birds, other wildlife, and the places they need now and in the future.

Audubon's role is to make sure that key species and high conservation areas for birds are protected as much as possible and in accordance with federal law. To that end, rather than knee-jerk opposition to building new wind farms, we encourage and support the deployment of additional wind energy that takes the following commonsense and statutorily required precautions to minimize or avoid harm to birds and other wildlife:

- Proper siting and operation of wind farms and equipment, including transmission lines,[4] that follow federal[5] and state guidelines
- Development of new technologies[6] that help minimize harm to birds and other wildlife
- Consultation with wildlife experts, including Audubon staff and chapters, to help inform ecological studies and siting decisions,[7] and to support efforts to improve wind siting and technological solutions to reduce harm to birds
- Strong enforcement of existing laws that protect wildlife, including the Endangered Species Act, the Bald and Golden Eagle Protection Act, and the Migratory Bird Treaty Act[8]

This last point is critical, as we cannot protect birds and their habitats if we don't enforce the laws we have put in place to do just that. The MBTA is credited with saving many iconic species from extinction, and today, the MBTA protects most of the country's native bird species—including songbirds, shorebirds, raptors, wading birds, and more—from unauthorized taking or killing. Unfortunately, the Administration's legal opinion and proposed rule that interprets the MBTA to only apply to purposeful take has put at risk the significant progress that stakeholders have made in advancing bird conservation related to incidental taking.

Under the Act's authority, the Fish and Wildlife Service (FWS) and many industries have come to agreement on simple measures that protect birds, including the Land-Based Wind Energy Guidelines. We appreciate that the recent report from members of this Committee has recommended the passage of the Migratory Bird Protection Act to help ensure that there continues to be incentives to develop and implement these best practices, and at the same time, create additional legal certainty.

To ensure we continue to make every effort to mitigate the impact to birds of wind turbines—indeed, the impacts from all forms of infrastructure—we must follow the letter and the spirit of laws like the MBTA, along with other bedrock environmental laws such as the Endangered Species Act and the National Environmental Protection Act. Weakening safeguards and limiting opportunity for public comment on major infrastructure projects will ultimately lead to worse outcomes not just for birds, but for the wind energy industry as well.

On behalf of the National Audubon Society, I want to thank you and your staff for holding this hearing, and for all the important work that the Select Committee has done to date. Audubon is ready to work with this Committee and others to find common ground on clean energy and environmental protection, to help protect birds and the places they need, today and tomorrow.

Sincerely,

Sarah Greenberger
Senior Vice President, Conservation Policy
National Audubon Society

Ms. CASTOR. And, finally, we have heard a great deal about the recommendations in the "Solving the Climate Crisis" majority staff report today. I have submitted the link to the report to our repository, and I ask unanimous consent to include it in today's hearing record.

Without objection, it will be inserted.

[The information follows:]

---

[4] https://www.audubon.org/news/transmission-lines-and-birds
[5] https://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf
[6] https://www.audubon.org/magazine/spring-2018/how-new-technology-making-wind-farms-safer-birds
[7] https://www.nwf.org/-/media/Documents/PDFs/NWF-Reports/2019/Responsible-Wind-Power-Wildlife.ashx
[8] https://www.audubon.org/news/more-500-organizations-all-50-states-urge-congress-defend-bird-protection-law

Submission for the Record

Representative Kathy Castor
Select Committee on the Climate Crisis

July 28, 2020

ATTACHMENT: (June 2020), *Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America*, House Select Committee on the Climate Crisis Majority Staff, Washington, DC.

The report is retained in the committee files and available at:

https://docs.house.gov/meetings/CN/CN00/CPRT-116-CN00-D001.pdf

Ms. CASTOR. So thank you all very much. It is good to see everybody. I wish we could do this in person. I look forward to our next hearing. Thank you so much.

We are adjourned.

Mr. GRAVES. Madam Chair.

Ms. CASTOR. Mr. Graves.

Mr. GRAVES. Parliamentary inquiry. I believe that Mr. Huffman, Mr. Casten, and Mr. Levin all effectively accused us of not telling the truth. Further, he dragged one of the witnesses through the mud.

Ms. CASTOR. And what is——

Mr. GRAVES. I would just like to ask——

Ms. CASTOR [continuing]. Your parliamentary inquiry?

Mr. GRAVES [continuing]. Would it be appropriate to ask unanimous consent for the witness who got dragged through the mud to be able to respond to the allegations that were made against him?

Mr. HUFFMAN. He can do that on his book tour.

Ms. CASTOR. He is free to do that in the public square of ideas. So thank you all very much. We are adjourned.

Mr. GRAVES. That is entirely inappropriate.

[Whereupon, at 3:49 p.m., the committee was adjourned.]

United States House of Representatives
Select Committee on the Climate Crisis

Hearing on July 28, 2020
"Solving the Climate Crisis:
Building a Vibrant and Just Clean Energy Economy"

Questions for the Record

Dr. Ana Baptista
Assistant Professor of Professional Practice and
Associate Director of the Tishman Environment and Design Center
The New School

On Behalf of New Jersey Environmental Justice Alliance
and the Equitable and Just Climate Forum

THE HONORABLE KATHY CASTOR

1. Communities across the nation face the compound crises of reduced revenues, increased costs, and aging infrastructure that can exacerbate public health threats. In your testimony, you call for increased investment in climate resilient water infrastructure to address unsafe drinking water and climate-related flooding, sea level rise, and drought. What steps should the federal government take to ensure that federal infrastructure programs identify the needs of vulnerable communities and engage workers, firms,

and community organizations in infrastructure planning, siting and design? How can Congress ensure that federal disaster recovery projects in vulnerable communities engage local workers and firms to build back better?

In order to ensure that federal government actions are responsive to community needs, robust stakeholder engagement processes are essential. Processes to gather input on needs of vulnerable communities should include multiple opportunities and methods through which to gather critical information. Local knowledge should be incorporated into planning, siting and design of federal infrastructure programs and disaster recovery projects.

The unequal impacts of climate change have been long understudied and it is imperative that this is remedied. As the federal government designs research projects related to disaster recovery and infrastructure programs, these projects must also collect equity data and incorporate this analysis into planning, siting and design.

One way that the unequal impacts of climate change can be addressed is to ensure that workers from the most impacted communities have access to the employment opportunities from disaster recovery and infrastructure programs. We also know that in a transition to a cleaner economy more jobs can be generated that provide opportunities for communities. The Clean Energy Future report found that "clean energy" jobs require more workers in sectors such as energy efficiency programs, renewable energy production, and auto manufacturing (making electric cars). Net job gains increase over time, starting at a little under 200,000 per year in 2016-2020, and rising to 800,000 per year in 2046-2050. The report can be found on the ***Reference Page*** of the Clean Energy Future report. These projected renewable energy and energy efficiency jobs' increases do not ensure that the economic benefits will go to vulnerable communities. Therefore, it is important for Congress to include policies that directly target benefits for these impacted communities.

In order to engage local workers and build back better in vulnerable communities, Congress can include provisions to employ local workers using guidelines that can be embedded or given preference in programs which receive federal funding such as: community benefits agreements, first source hiring guidelines living wage, paid sick days, preferences for Minority-Owned Business Enterprises and Women-Owned Business Enterprises (MBE/WBE) and Ban the Box.

The federal government should also ensure that local community-based organizations, faith based and civic groups are able to access disaster relief funds, job training and placement opportunities that can best connect residents in underserved communities with jobs in rebuilding infrastructure and much needed disaster recovery services. The Illinois Future Energy Jobs Act[1] (FEJA) is a good model for ways to ensure that the local community is integrated throughout the development of the policy, from drafting to implementation.

2. In your testimony, you call for mobilization of new investment in safe and healthy communities through the creation of a National Climate Bank, with at least 60 percent of the Bank capital to be invested in tribal communities, low-income communities, and communities of color. What additional metrics and criteria should Congress consider as conditions for eligibility or prioritization of investments to ensure just, sustainable, and resilient infrastructure investments?

To design a National Climate Bank that will deliver real benefits to low income communities, tribal communities and communities of color, the Bank must have *criteria* to support projects that are community-driven and reflect the needs of the community. In addition, the Bank must have criteria to ensure that project developers work with local officials and community leaders to design and implement strategies to reduce the risk of long-time residents being displaced from their communities as neighborhood improvements drive up rents. These strategies could include an expansion of affordable housing; more inclusionary zoning that breaks down long-standing structural barriers and allows for greater housing density; community land trusts to support locally owned housing and business assets; and job training programs to support access to good careers and jobs.

Specifically, the Bank should include the following project criteria to meet social, environmental, and economic measures:

- Lower energy use and costs for residents
- Reduce local air pollution and greenhouse gas emissions

[1] https://ilcleanjobs.org/who-we-are/energy-jobs-act/

- Reduce public health risks or damages from more intense heat waves, hurricanes, flooding, other extreme weather events, and sea level rise for residents and businesses
- Address the needs of the community
- Support socio-economic mobility, equitable economic opportunities and affordable access to good jobs, schools, child care, and community services for low-income households, communities of color, tribal communities, women, and/or the disabled
- Create good jobs with fair wages and support the local economy
- Reduce the risks that low-income residents are displaced from their communities by climate change threats and neighborhood improvements that drive up rents

For more information on suggested project criteria and other design recommendations for the National Climate Bank, please see the following reports on the reference page; *Florida Future Fund, Building Resilient Infrastructure and Communities Across Florida, tate Future Funds: Jumpstarting Investments in Low-Carbon And Resilient Energy and Transportation Infrastructure, Three Bold Actions Congress Should Take to Equitably Address Weather and Climate Disasters.*

3. One of the hearing witnesses, Michael Shellenberger, testified that nuclear power is "the safest way to make electricity." Can you comment on some of the environmental justice concerns around nuclear power in the United States, including the history of uranium mining?

Nuclear energy is fading in importance globally. The peak in nuclear power's share of global electricity generation was 17.5 percent in 1996. Since then, this fraction has steadily declined reaching 10.1 percent in 2018 and the downward trend is expected to continue. The most important reason for the decline is that nuclear plants are no longer financially viable. In the last decade, it has become clear that not just constructing new reactors, but just operating one has ceased to make economic sense. This is because alternatives to nuclear energy, in particular renewable sources of electricity like wind and solar energy, have become drastically cheaper. It is for this reason that many utilities in the United States have required government subsidies to keep operating. Nuclear plants have a long track record of proving more expensive than initially projected. New nuclear reactor designs too are likely to be much more expensive in reality than what studies project. What are called Small Modular Reactors (SMRs) start off with an economic disadvantage because they lose out on economies of scale. SMR proponents hope that this can be compensated through mass manufacture and learning, but even under optimistic assumptions about the rates of learning, hundreds if not thousands of SMRs would have to be constructed before they break even in costs with large reactors, which are themselves not economical.

These economic challenges add to other well-known problems associated with nuclear energy, in particular, the absence of any demonstrated solutions to managing radioactive waste in the long run and the potential for catastrophic accidents. No reactor design is immune to these problems. Efforts to ameliorate one of these problems typically makes other problems worse. Finally, inasmuch as intermittent renewables such as solar photovoltaics and wind turbines are becoming a more important part of the electricity supply, technologies like nuclear power that are best suited for baseload power are going to become more redundant. Instead, the need is for flexible sources of power and storage capacity. For all these reasons, and more, it does not make sense to embark on nuclear energy.

The legacy of nuclear power plants in the United States also speaks to environmental injustice; from sourcing of the uranium, to siting of the plant, to disposal of the waste. Nuclear Power Plants (NPP) and the subsequent toxic nuclear waste cause "transgenerational justice issues of unprecedented duration in comparison to any other industry" (Dean Kyne and Bob Bolin 2016 p.1). Indigenous communities have borne the brunt of nuclear power's infrastructure in the form of the uranium mining, nuclear test sites and the disposal of nuclear waste which have left a legacy of pollution and public health harm in these environmental justice communities.

Please see the ***Reference Page*** for additional information.

4. How can Congress best solicit the input and feedback from environmental justice communities on climate and clean energy policy? What would the ideal stakeholder engagement process look like during the development of legislation?

Having a variety of opportunities for stakeholder engagement is important to solicit input and feedback from environmental justice communities. These opportunities should include systems to support stakeholder engagement in places where

there is little to no technology. Opportunities for verbal and written feedback, as well as a variety of public meeting times during and outside of business hours are helpful. Information should also be provided in language accessible to the communities of interest and sufficient time should be allocated for public comments and feedback. Processes like those used to elicit input for the House Select Committee's majority staff report and Congressman McEachin and Chairman Grijalva's EJ For All Act are both great examples of how to engage stakeholders in legislative processes. These processes were interactive, took on multiple forms, were conducted with enough early consultation to allow for productive and meaningful discussions and included the feedback given from stakeholders into the policy design. Often stakeholders are only given an opportunity for feedback when a draft is completed, but having a more interactive process, with early consultation and a wide breadth of input supports a wider stakeholder engagement and ultimately a stronger policy.

Please see the ***Reference Page*** for additional information for the benefits of participatory policy making.

REFERENCES

1. Engage Workers, and Ensure that Vulnerable Communities Benefit

CBAs: Definitions, Values, and Legal Enforceability, by Julian Gross, The Partnership for Working Families, January 2008, available at: https://www.forworkingfamilies.org/resources/publications/cbas-definitions-values-and-legal-enforceability

Clean Energy Future, Introduction and conclusion are by Labor Network for Sustainability; the body of the report is by Synapse Energy Economics, 2015, available at: https://www.labor4sustainability.org/wp-content/uploads/2015/10/cleanenergy_10212015_main.pdf

Delivering Community Benefits Through Economic Development: A Guide for Elected and Appointed Officials, by Benjamin S. Beach, The Partnership for Working Families, December 2014, available at: https://www.forworkingfamilies.org/resources/publications/cba-elected-officials

Future Energy Jobs Act, available at *https://www.futureenergyjobsact.com/about*

Illinois energy bill: After race to the finish, what does it all mean?, by Kari Lydersen, Energy News Network, December 2016, available at: https://energynews.us/2016/12/08/midwest/illinois-energy-bill-after-race-to-the-finish-what-does-it-all-mean/

2. National Climate Bank

Florida Future Fund, Building Resilient Infrastructure and Communities Across Florida, by Cathleen Kelly, Miranda Peterson, Guillermo Ortiz, and Yoca Arditi-Rocha, the Center for American Progress and the CLEO Institute, September 8, 2018, available at: https://www.americanprogress.org/issues/green/reports/2018/09/05/457440/florida-future-fund/

State Future Funds: Jumpstarting Investments in Low-Carbon And Resilient Energy and Transportation Infrastructure, by Cathleen Kelly, the Center for American Progress, June 2015, available at:
https://cdn.americanprogress.org/wp-content/uploads/2015/06/StateFutureFunds-report6.22.pdf

Three Bold Actions Congress Should Take to Equitably Address Weather and Climate Disasters, by Guillermo Ortiz and Cathleen Kelly, the Center for American Progress, January 30, 2020, available at: https://www.americanprogress.org/issues/green/news/2020/01/30/479843/3-bold-actions-congress-take-equitably-address-weather-climate-disasters

3. Risks from Nuclear Energy

Eyes Wide Shut: Problems with the Utah Associated Municipal Power Systems Proposal to Construct NuScale Small Modular Nuclear Reactors, by M. V. Ramana, Oregon Physicians for Social Responsibility, September 2020, available at https://d3n8a8pro7vhmx.cloudfront.net/oregonpsrorg/pages/1625/attachments/original/1598897964/EyesWideShutReport_Final-30August2020.pdf?1598897964

Emerging Environmental Justice Issues in Nuclear Power and Radioactive Contamination, by Dean Kyne and Bob Bolin, 2016, Int. J. Environ. Res. Public Health, 13(7), available at: https://www.mdpi.com/1660-4601/13/7/700/htm

Environmental Justice and American Indian Tribal Sovereignty: Case Study of a Land-Use Conflict in Skull Valley, Utah, by Noriko Ishiyama, February 2003, available at: https://onlinelibrary.wiley.com/doi/abs/10.1111/1467-8330.00305

For The Navajo Nation, Uranium Mining's Deadly Legacy Lingers, by Laurel Morales, April 2016, National Public Radio, available at:
https://www.npr.org/sections/health-shots/2016/04/10/473547227/for-the-navajo-nation-uranium-minings-deadly-legacy-lingers

From wasteland to waste site: the role of discourse in nuclear power's environmental injustices, by Danielle Endres, 2009, Vol. 14 Issue 10, p917-937, available at: https://www.tandfonline.com/doi/abs/10.1080/13549830903244409

The Courage to Challenge the Nuclear World Order, by M. V. Ramana and Zia Mian, Economic and Political Weekly, December 2017, available at https://www.epw.in/journal/2017/48/commentary/courage-challenge-nuclear-world-order.html

Technical and social problems of nuclear waste, by M. V. RamanaWIREs Energy and Environment, 2018, available at https://onlinelibrary.wiley.com/doi/abs/10.1002/wene.289

Yellow Dirt: A Poisoned Land and the Betrayal of the Navajos Judy Pasternak, 2011 by Free Press, Simon & Schuster, Inc; Reviewed by Kelly Ann Nestor, Villanova University, Book Review is available at: https://www.igi-global.com/pdf.aspx?tid%3D179906%26ptid%3D132248%26ctid%3D17%26t%3Dyellow+dirt%3A+a+poisoned+land+and+the+betrayal+of+the+navajos%26isxn%3D9781466694071

4. Community Engagement and Participatory Policy

Citizens, Experts, and the Environment: The Politics of Local Knowledge, Frank Fischer, 2000,Durham, North Carolina: Duke University Press.

Defining Environmental Justice: Theories, Movements, and Nature, David, Schlosberg, 2007, New York: Oxford University Press. p.69

Achieving Justice Through Public Participation: Measuring the Effectiveness of New York's Enhanced Public Participation Plan for Environmental Justice Communities, by Alma Lowry, 2013, available at:
https://surface.syr.edu/cgi/viewcontent.cgi?article=1181&context=socsci_etd

Questions for the Record

Mr. Jason Walsh
Executive Director
BlueGreen Alliance

THE HONORABLE KATHY CASTOR

1. Building thriving communities and a just, clean energy economy will be accelerated through leadership at the state, regional, and federal levels. In your testimony, you highlighted the potential for progress in the State of Colorado through passage of H.B. 1314 and implementation of the Colorado Just Transition plan. How can Congress incentivize other states to show similar leadership and ensure that states and communities have a strong federal partner in their planning and investments to diversify their economies, advance community resilience, and support workers through transition?

The state of Colorado has advanced legislation that provides a model for achieving these goals. It passed landmark legislation, House Bill 1314, during the 2019 legislative session. The legislation, which was envisioned and championed by the BlueGreen Alliance and our partners, created the first State Office of Just Transition, and mandated creation of a statewide Just Transition plan for coal workers and communities.

The Colorado Just Transition plan recommends structural improvements to how the state supports rural communities where coal mining or power plants are likely to close. Key to Colorado's plan will be developing worker support programs that assist impacted workers in transition to new work. Several states are watching Colorado's implementation of HB 1314, and considering similar initiatives, but any plan advanced by forward-looking states will have to be supported and supplemented by additional Federal resources. Federal funding, especially as the COVID-19 pandemic stretches already thin state and local budgets, will be vital to giving coal communities the resources and tools they need to diversify their economies and support their workers through transition.

America is in the middle of an energy transition. We need to have a conversation about getting ahead of this transition, and we need to do this now. That's why—alongside partners and allies from coal communities across the country—the BlueGreen Alliance participated in the development of the National Economic Transition platform, which outlines a policy framework and priorities to invest in communities and workers hit hard by the decline of the coal industry.

One of the key ideas put forward in this platform is the need for a new federal transition program that would target and expand resources for affected communities and workers and coordinate across sectors and agencies. We think creating an Office of Economic Transition is key here—to help synchronize ongoing efforts across the federal government and leverage new public and private sector investments. We think this office should be guided by an advisory board reflective of affected stakeholder groups and communities, including labor and local leaders.

The platform puts forward seven pillars that are critical to this effort:

1. Investing in local leaders and long-term economic development planning.
2. Expand investments in entrepreneurship and small-businesses in new sectors to help communities diversify and strengthen their economies.
3. Providing a bridge of support and pathways to quality in-demand, family-sustaining jobs for workers, including paid training, guaranteed pensions, relocation assistance, healthcare support, a bridge of wage differential and replacement, and ensuring miners suffering from black lung disease receive the benefits to which they are entitled.
4. Reclaiming and remediating coal sites to create jobs while cleaning up the environment.
5. Improving inadequate physical and social infrastructure.

6. Addressing the impact of coal company bankruptcies on workers, communities, and the environment. And
7. Coordinating across programs to ensure communities have access to the resources they need. Launching an interagency grants program helps ensure affected stakeholders have a voice and empowers local communities with federal resources.

More detailed information about how to ensure a just transition for communities can be found in the National Economic Transition Platform.

2. The Select Committee Democrats' majority report calls for developing a national strategy for securing critical minerals in the clean energy and electric vehicle supply chain in an environmentally and socially responsible way. Your coalition of environmental and labor groups has been grappling with this question. What does the BlueGreen Alliance propose to secure the critical materials necessary for a clean economy?

Numerous metals and minerals are essential components in the transition to a low-carbon and clean energy future. A May 2020 World Bank report found that production of minerals such as lithium and cobalt may need to increase by nearly 500% by 2050 to meet the growing demand for clean energy technologies. The same report estimates that over 3 billion tons of minerals and metals will be needed for energy storage and solar/wind power generation.[1] The U.S. currently lacks a secure domestic supply of many of these critical materials, as well as a strategy to responsibly mine these materials domestically. To secure critical materials necessary for a clean economy, and to do so in a way that is environmentally, economically, and socially responsible, the BlueGreen Alliance has proposed the following necessary steps:

- Develop a comprehensive national critical minerals strategy guided by a commitment to environmentally, economically, and socially responsible production, reclamation and recycling domestically and worldwide by:
  - Identifying R&D for recycling and replacements of critical minerals, as well as chemistry, fundamental material science, and applied R&D for processing and manufacturing of critical minerals.
  - Design this R&D strategy in coordination with existing efforts by the Critical Materials Institute (CMI), DOE Office of Science, NOAA Office of Ocean Exploration and Research, NIST, DoD, EPA, and National Laboratories.
  - Develop a federal program within CMI that supports the private sector in demonstration, evaluation, testing, and certification of substitution or alternative materials.
  - Develop a roadmap that identifies key R&D needs and coordinates ongoing activities for source diversification, and more efficient use and recycling.
  - Complete technical and economic feasibility studies of the production of critical minerals and related materials from secondary/unconventional sources.
  - Establish new public-private partnerships and leverage existing partnerships to address underlying scientific and early-stage applied research.
  - Ensure funding for hard rock mining reclamation.
- Incentivize and enhance use of responsibly produced critical minerals and metals by
  - Utilizing trade, procurement and other measures to enhance domestic and international supply chain accountability.
  - Set and raise minimum environmental and labor standards for critical minerals mining.
  - Develop and adopt a certification process that address supply chain accountability and corporate, environmental and social responsibility.
  - Ensure U.S. strategic energy, materials and technology stockpiles are domestically or responsibly sourced.
- Jump-start domestic projects to recycle key strategic materials and reduce reliance on these materials in clean technology production in conjunction with deployment of innovative circular economy processes and products.
  - Investment to spur full-scale domestic projects to responsibly reuse and recycle strategic minerals and materials as one of several priorities for an industrial bank or revolving loan fund.
  - Provide and enhance funding through existing loan, grant, tax, and other clean energy investment incentives for deployment of responsible recy-

[1] http://pubdocs.worldbank.org/en/961711588875536384/Minerals-for-Climate-Action-The-Mineral-Intensity-of-the-Clean-Energy-Transition.pdf

cling, and expand or create a new clean technology tax credit for responsible critical materials recycling and reclamation.
- Create a critical materials recycling insurance or investment guarantee program.

More detailed information on the BlueGreen Alliance's recommendations to responsibly mine, reclaim, and recycle critical materials can be found in our Manufacturing Agenda.

3. The BlueGreen Alliance's Manufacturing Agenda calls for investing "at scale" in a new generation of American manufacturing. What are the key components of that investment?

Worldwide, nations and regions are rushing to capture the economic gains from rapidly growing demand for clean technology. Even as the U.S. joins other nations in deploying clean technology, our ability to manufacture these technologies is not keeping pace, as we are dependent on other nations for critical subcomponents or technology. Failure to build the next generation of clean technology here in the U.S. threatens future jobs and the economy.

We must make a significant national investment now to jumpstart domestic clean technology manufacturing, secure critical supply chains in the U.S., transform energy—intensive manufacturing in line with achieving net-zero emissions economywide by mid-century, and ensure a new generation of clean and safe industrial development in America. We propose the following steps necessary to invest at scale in American manufacturing:

- Establish and capitalize a major new industrial transformation bank and/or revolving loan fund to support key domestic clean technology manufacturing priorities and large-scale industrial transformation and emissions reduction.
- Make an increased, sustained, and coordinated investment in three critical areas:
  - *Domestic clean technology supply chains.* Convert, retool, or establish clean technology manufacturing facilities in the United States, sufficient to recapture leadership in critical clean energy, transportation, infrastructure, efficiency, and climate resilience technology and advanced materials production.
  - *Industrial transformation.* Modernize and cut emissions from domestic energy-intensive manufacturing, including implementing innovative and efficient processes across heavy industry and materials production.
  - *Responsible mining.* Establish environmentally, economically and socially responsible production, recycling, and reclamation of minerals and materials critical to the clean economy.
- Invest in, expand, and refocus existing DOE energy and manufacturing loan programs to establish and strengthen domestic clean technology manufacturing and supply chains, and to deploy first-in-class, innovative, and large-scale industrial efficiency and emissions reduction projects.
  - Fund and prioritize manufacturing conversion grants to secure and transition existing facilities to manufacture emerging clean technology, and to establish and grow domestic clean technology supply chains.
  - Enhance tax credits/grants in lieu of credits available to promote domestic clean technology manufacturing and supply chains.
  - Enhance tax credits available to spur industrial emissions reductions.
  - Spur far broader adoption of established efficiency technologies, CHP and WHP systems through tax incentives and grants in conjunction with enhanced technical and deployment assistance.

In addition, we need to:

- Greatly increase U.S. funding for research, development, and demonstration (RD&D)—as well as for deployment, as discussed in Pillar 1—to levels commensurate with competitor nations and to meet ambitious clean technology leadership and industrial transformation objectives.
- Establish a new DOE Office of Industrial Transformation charged with leading and coordinating DOE's efforts on industrial innovation and competitiveness consistent with the goal of achieving net-zero greenhouse gas emissions economy-wide by 2050.
- Execute a robust industrial transformation program, including technology development, demonstration, and deployment.
- Coordinate, fund, and execute a program to develop robust and comprehensive supply chains for critical clean technologies in the United States within ten years.

- Establish a permanent jobs, labor, and energy workforce program modeled on the Energy Jobs Strategy Council in the office of the Secretary of Energy, working in collaboration with DOL and DOT, and with the Office of Economic Impact, Diversity, and Employment, that specifically targets the labor and workforce needs in a transition to a clean energy, technology, and net-zero GHG economy.
- Enhance public benefit from publicly funded research and innovation, and
- Ensure domestic clean economy manufacturing objectives are elevated as a primary focus of a proposed National Institute of Manufacturing. In the event that all U.S. efforts related to manufacturing across government agencies are coordinated through a new National Institute of Manufacturing, a primary objective of the Institute should be positioning U.S. manufacturing and workers to lead in the global transition to a clean and net-zero carbon economy.

More detailed information on the BlueGreen Alliance's recommendations to invest at scale to transform American manufacturing can be found in our Manufacturing Agenda.

4. How can Congress ensure that taxpayer-funded R&D leads to a more robust manufacturing sector and clean energy supply chain in the United States?

In the global race to lead in the next generation of clean technology, the U.S. is under-investing in innovation—from basic research through translation of innovation into domestic production of innovative technology. We know that investing in R&D works—U.S. government investments in innovation have launched technological transformations that led the world and underpinned prosperity and growth.

In order to ensure that taxpayer-funded R&D leads to a more robust manufacturing sector and clean energy supply chain, the BlueGreen Alliance recommends:

- Funding and focusing R&D to ensure U.S. innovation is translated into domestic manufacturing and supply chains; Enhance demonstration and technical assistance; sustain successful clean energy and technology programs—from basic research, to commercialization partnerships, to manufacturing and deployment support—and put an enhanced focus on emerging low-and zero-carbon technologies and processes, and on labor and community-friendly innovation
- Enhance demonstration and technical assistance.
- Sustain successful clean energy and technology programs, from basic research, to commercialization partnerships, to manufacturing and deployment support, and
- Putting an enhanced focus on emerging low-and zero-carbon technologies and processes, and on labor and community-friendly innovation.

In addition, innovating to transform U.S. industry should include:

- Establishing a new Office of Industrial Transformation at DOE to lead and coordinate DOE's efforts on industrial innovation and competitiveness consistent with the goal of achieving net-zero ghg emissions economy-wide by 2050.
- Executing a robust industrial transformation program, including technology development, demonstration, and deployment in fuel, feedstock and infrastructure innovation, and circular economy processes and materials redesign.
- Coordinating, funding, and executing a program to develop robust and comprehensive supply chains for critical clean technologies in the U.S. within 10 years.
- Establishing a permanent jobs, labor, and energy workforce program modeled on the Energy Jobs Strategy Council in office of the Secretary of Energy to target the labor and workforce needs in a transition to a clean energy economy.
- Enhancing public benefit from publicly funded research and innovation, and
- Ensuring domestic clean economy manufacturing objectives are elevated as a primary focus of a proposed National Institute of Manufacturing.

We must also ensure that R&D investments are translated into good, family-sustaining manufacturing jobs. We can do this by updating and enhancing long-standing Buy America/nand other procurement standards—and ensuring labor and domestic content standards apply to all major public investments in clean technology deployment. These provisions can play a critical role not only in strengthening domestic manufacturing and jobs in emerging technology, but in building public support and momentum for the clean economy.

More detailed information on the BlueGreen Alliance's recommendations to ensure R&D is translated into a more robust American manufacturing sector and clean energy supply chain can be found in our Manufacturing Agenda.

5. How can the federal government use procurement to support a strong, clean, fair manufacturing economy across the United States?

Public procurement can play a crucial role in creating demand and a robust market for clean and advanced technology in America, in spurring domestic manufacturing of that technology, and in setting a high standard for the jobs and community benefits our public investments support. They also play an important role in spurring near-term demand for clean technologies and low-carbon products, and sustaining strategic investments in U.S. manufacturing even when economic times are tough or in the face of other market uncertainty. In order to use procurement to support a clean, fair, and strong manufacturing economy in the U.S., we need to:

- Utilize direct federal—and state and municipal—procurement to spur demand for clean, fair, safe, and domestically manufactured clean technology, including for example, boosting government purchases of clean vehicle fleets and net zero building technology, innovative community resilience and disaster response technology, and innovative domestic energy and grid technology adoption—all in conjunction with domestic content requirements.
- Review U.S. strategic energy, materials, and technology stockpiles and, if necessary, reform them to ensure they support the need for rapid clean energy technology deployment and domestic manufacturing development, and industrial emissions reduction.
- Improve and extend Buy America/n and ensure its effective application to manufactured goods, clean technologies, and materials.
- Utilize soundly crafted Buy Clean procurement policies to incentivize and reward clean, low carbon production of energy intensive materials.
- Utilize "Fair and Responsible" procurement approaches to enhance labor standards, workers' rights, career pathways, equity, and community benefits—and ensure their applicability to manufacturing and manufacturing supply chain.
- Ensure all major public spending on clean technology deployment—such as tax incentives, loans, grants, and bonds—also support high labor standards and domestic manufacturing throughout the supply chain.
- Develop and enact the globally leading energy, emissions, and pollution standards necessary to drive demand for clean technology production in the United States. Strong domestic energy and emissions standards and a proactive manufacturing agenda go hand in hand to support and sustain manufacturing and manufacturing jobs in the United States.

Updating and enhancing long-standing Buy America/n and other procurement standards—and ensuring labor and domestic content standards apply to all major public investments in clean technology deployment—can play a critical role not only in strengthening domestic manufacturing and jobs in emerging technology, but in building public support and momentum for the clean economy.

In addition, we recommend instituting Buy Clean procurement standards to ensure that federal spending is directed towards the cleanest, lowest-carbon products. Buy Clean standards promote spending taxpayer dollars on infrastructure supplies and materials that are manufactured in a cleaner, more efficient, and climate friendly manner—rewarding companies that are doing things the right way and putting a break on leakage and offshoring of emissions and jobs across the supply chain.

More detailed information on the BlueGreen Alliance's recommendations to utilize procurement to spur demand and support a strong, clean, and fair manufacturing economy can be found in our Manufacturing Agenda.

REFERENCES

BlueGreen Alliance. Manufacturing Agenda: A National Blueprint for Clean Technology Manufacturing and Leadership and Industrial Transformation. June 2020. Available at: http://www.bluegreenalliance.org/wp-content/uploads/2020/06/2020_BGA_Manufacturing_Agenda-vFINAL.pdf

Just Transition Fund. National Economic Transition Platform. 2020. Available at: https://nationaleconomictransition.org/

Questions for the Record

Mr. Michael Shellenberger
Founder and President
Environmental Progress

THE HONORABLE GARRET GRAVES

1. At the hearing, you were accused of "making stuff up" and not having expertise on climate and energy policy. Unfortunately, you were not given the opportunity to respond to those attacks. For the record, would you like to respond to those accusations and to any others that were lodged against you during the hearing?

Shortly after giving expert testimony to the committee, I had the startling experience of being attacked by Representatives Sean Casten of Illinois and Jared Huffman of California who used the whole of their allotted time to claim that I am not a real environmentalist, that I am not a qualified expert, and that I am motivated by money.

Had I been given a chance to respond, I would have noted that I have been a climate activist for 20 years and an energy expert for 15 years. In the early 2000s I co-created and advocated for the predecessor to the Green New Deal, the New Apollo Project, which President Barack Obama implemented as his $90 billion green stimulus.

My new book, *Apocalypse Never*, has received *strong praise* from leading environmental scientists and scholars, including the father of modern climate science, Tom Wigley, who said, "This may be the most important book on the environment ever written." And in early 2020, the United Nations Intergovernmental Panel on Climate Change invited me to serve as an expert reviewer.

Finally, I would have noted, I have always been financially independent of industry interests and disclose my donors on my organization's web site.

But I wasn't given the chance to say any of that. After Casten and Huffman lied about me, Rep. Garret Graves asked the committee's chairperson, Rep. Kathy Castor of Florida, to let me respond. She refused and abruptly ended the hearing.

2. Ms. Beth Soholt, Executive Director of the Clean Grid Alliance, disagreed with your testimony on the competitiveness of wind and solar energy. Specifically, she claimed that unsubsidized wind and solar are the cheapest and most reliable forms of energy. Would you like to respond?

Renewable energy advocates propose spending hundreds of billions of public and ratepayer money on renewable energy, new transmission lines, energy efficiency, mass transit, electric vehicles, carbon capture and storage, and advanced nuclear energy. They argue that these federal investments will result in millions of good jobs with high pay, and also pay for themselves through higher economic growth.[1]

But similar programs over the last decade did not result in the benefits being promised. During the first decade of this century I advocated a suite of policies nearly identical to the ones currently being proposed and watched them fail to create a new manufacturing capacity, good jobs with high pay, or higher economic growth.

Rather, they resulted in low-wage service sector jobs, greater dependence on imported Chinese technologies, and higher energy costs. And they resulted in higher electricity prices and the net transfer of wealth from lower to upper income citizens.

A former Obama administration economist at the University of Chicago found last year that consumers in states with renewable energy mandates paid $125 billion more for electricity in the seven years after passage than they would have otherwise.[2]

Renewables contributed to electricity prices rising six times more in California than in the rest of the US since 2011, the state's "take-off" year for rapid growth in wind and solar, a price rise that occurred despite the state's reliance during the same years on persistently-low-priced natural gas.[3]

Renewables have the same impact everywhere in the world. They have caused electricity prices to rise 50 percent in Germany since 2007, the first year it got more than 10 percent of its power from subsidized wind, solar, and biomass. By 2019, German household electricity prices were 45 percent higher than the European average.[4]

Despite investing nearly a half-trillion dollars, Germany still generated just 42 percent of its electricity from non-hydro renewables last year, as compared to the 72 percent France generated from nuclear.[5] If Germany didn't count emissions-pro-

ducing and land-intensive fuels like biomass and biofuels as renewable, which most environmental groups, even Greenpeace, believe it shouldn't, the share of its electricity from non-emitting, non-hydro renewables is just 34 percent.[6]

Solar and wind make electricity more expensive because they are unreliable, requiring 100 percent backup, and energy-dilute, requiring extensive land, transmission lines, and mining. Solar and wind developers do not pay for the costs they create but rather pass them on to electricity consumers and other producers.[7]

Interest in massively subsidizing renewables comes at a time when industrial renewable energy projects are being blocked around the world, as even their boosters now admit. "Biden plots $2tn green revolution but faces wind and solar backlash," *read* recent Guardian headline. "New York's bold green plans hit opposition," reported *Financial Times* on September 1, 2020.

Ask yourself why, if renewables are cheaper than existing grid electricity, do solar and wind developers require $2 trillion from American taxpayers in the form of subsidies?

And why, if renewables are so cheap, do they make electricity so expensive?

Clean Grid Alliance, for the record, is an industrial wind-energy funded organization with a direct financial interest in promoting the continued subsidization of wind energy.

3. Many of the policies contained in the Biden proposal and the majority staff report of the committee closely mirror the approach in California—both in targets and in scope.

Can you tell us a little bit about your experience in California about the impacts of the state's climate policies on jobs, access to jobs, housing cost and costs—particularly on those who can least afford it—and communities of color?

Renewable energy advocates are basing their climate agenda on what California, my home state, did, but our electricity rates since 2011 rose six times more than they did in the rest of the US, thanks mainly to the deployment of renewables and the infrastructure they require, such as transmission lines. And now, California's big bet on renewables, and shunning of natural gas and nuclear, is *directly responsible* for the state's electricity shortages.

The immediate cause of California's blackouts is a mismatch between electricity supply and demand. Higher temperatures have led to greater demand for air conditioning. And California has less electricity, including from wind energy, available.

The underlying reason blackouts are occurring is because California *lacks reliable*, in-state supply. And the reason for that is California has been closing both natural gas and nuclear power plants.

"People wonder how we made it through the heat wave of 2006," said California's electricity grid manager, Caliso's Steven Berberich. "The answer is that there was a lot more generating capacity in 2006 than in 2020. . . . We had San Onofre [nuclear plant] of 2,200 MW, and a number of other plants, totalling thousands of MW not there today."[8]

Despite these capacity shortfalls, the state is *moving ahead* with plans to remove 2,200-MW of reliable electricity from the grid. That's the amount of power produced by Diablo Canyon nuclear power plant, which will be closed in stages in 2024 and 2025.

Renewables advocates have long pointed to batteries as the way to integrate unreliable renewables onto the grid. Yes, renewables are unreliable, they admit. But if we can store energy collected during periods of peak capacity, we can parcel it out during periods of peak demand.

However, batteries are simply not up to the task. One of the largest lithium battery storage centers in the world is in Escondido, California. It can only store enough power to service 24,000 of California's 13,000,000 households.

And it can only do so for four hours. If demand surges for the better part of a day, the system will fail. Indeed, for renewables to work, batteries would need to be able to store the power for weeks and perhaps even months.

"Batteries don't generate any power," said Berberich. "And during extended cloud cover over solar fields, we will be in load shedding. We have told the Commissioners again and that solar will need to be overbuilt to serve load and charge batteries at same time."

People don't sit idly by when electrical systems fail or when reliability flags. Instead, businesses and individuals reach for tried and true methods of powering their day-to-day lives.

4. Last month Mary Nichols, the head of the California agency tasked with climate policies tweeted out:

> ***"I can't breathe" speaks to police violence, but it also applies to the struggle for clean air. Environmental racism is just one form of racism. It's all toxic. Government needs to clean it up in words and deed. We who do climate and environmental policy can and must do more."***

She quickly deleted that text, but The Two Hundred tweeted in response:

> ***"She wants to cry out "environmental racism" when the Enviro ideas SHE pushes as President of (CARB) leave the most marginalized communities in California to foot the bill AND pushes low-income families out of their neighborhoods" They go on to say "that is why we filed a lawsuit against her racist policies."***

What do you think will be the impact of nationalizing California climate policies on jobs throughout the country, particularly the impact on low income folks and communities of color?

Poor people and people of color are disproportionately impacted by climate policies that restrict energy consumption.

In May, a California civil rights coalition filed a lawsuit against the state to prevent implementation of climate law aimed at reducing driving. The coalition calculates that the proposed law will increase the cost of a home by anywhere from $40,000 to $400,000.

"Latino, African American, and Asian American families," the coalition wrote in a letter to the governor, "are disproportionately victimized by the confluence of massively destructive state, regional and local housing policy choices."[9]

Consider what happened after California closed the San Onofre nuclear plant in 2013. Both carbon emissions and air pollution spiked. And air pollution disproportionately harms poor people. This is especially true in Los Angeles, where poor people of color have borne the brunt of increased pollution.

From 2011 to 2018, California's industrial electricity prices *rose* 32 percent, while the average price in the other 49 states fell one percent. The good manufacturing jobs in renewables are mostly in China, which makes most of the world's solar panels, including America's, while the US is stuck with temporary low-wage service jobs installing solar panels and wind turbines, and doing energy efficiency retrofits.

Now, faced with the electricity supply crisis, Gov. Newsom has *suspended air-pollution regulations,* which may increase the use of diesel generators, and worsen air pollution in the inner-city.

Advocates for renewables claim that solar and wind projects were somehow part of the battle for environmental justice. In reality, solar and wind projects are imposed on poorer communities and successfully resisted by wealthier ones.

In fact, a major new report *found* nearly 200 cases of human rights violations when renewable energy projects were imposed on poor communities. In Hawaii and Nebraska, indigenous leaders *are* resisting wind energy projects that threaten native bird species, including the nene and whooping crane, whose number one cause of mortality is transmission lines.

5. You're an activist for civil nuclear power—not only because of its air quality and greenhouse gas emissions benefits, but because of the national security benefits to the United States of having a robust fleet of reactors.

Do you believe that the nuclear-related package in the majority staff would help or harm the U.S. civil nuclear program? And in general, what would be the impact on greenhouse gas emissions?

The Green New Deal proposed by Rep. Alexandria Ocasio-Cortez and others last year called for the closure of US nuclear power plants. The written statement distributed by the office of Rep. Ocasio-Cortez said, "the plan is to transition off of nuclear."[10]

And yet study after study finds that closing nuclear plants increases air pollution and harms public health.

A 2017 study in *Nature Energy* found that the temporary closure of two nuclear plants led directly to lower birth weights, a key indicator of poor health outcomes later in life.[11] The study found that reduction in birth weight as small as 5.4 percent can result in a lower intelligence quotient and lower income, as well as higher rates of illness, stunted growth, and neurodevelopmental problems.[12]

In response to the Fukushima nuclear accident, the Japanese government shut down its nuclear plants and replaced them with fossil fuels. As a result, the cost of electricity went up, resulting in the deaths of a minimum of 1,280 people from the cold between 2011 and 2014.[13] In addition, scientists estimate that Japan's nuclear plant closures resulted in more than four thousand (avoidable) air pollution deaths per year.[14]

Unreliable electricity from solar and wind energies has been unable to compensate for the loss of reliable, near-zero pollution nuclear energy. A 2016 study found that the electricity lost from the closure of the San Onofre nuclear plant was mostly replaced by burning natural gas, which increased air pollution in southern California and raised the costs of generating electricity from natural gas by $350 million.[15]

In 2005, Vermont legislators promised to reduce emissions 25 percent below 1990 levels by 2012, but instead the state's emissions rose 16.3 percent, over twice as much as national emissions rose during the same period, in part due to the closure of the state's sole nuclear plant under pressure from climate activists, and in part due to the inability of unreliable solar and wind to replace lost nuclear energy electrical generation.[16]

New York State is in the process of closing Indian Point nuclear power plant and replacing it with fossil fuels. Under pressure from elected leaders, Indian Point's operator closed one of its two reactors in April of this year, and intends to close the other one in April 2021. In May, a few weeks after calling for a phase-out of nuclear energy, Rep. Ocasio-Cortez said she wanted to leave "the door open on nuclear,"[17] but five months later called for closing Indian Point nuclear plant.[18] Environmental and climate justice advocates are protesting its closure.[19] They point to a Harvard University study, which found that higher air pollution results in higher coronavirus death rates.[20]

The US could lose half to two-thirds of its nuclear energy over the next decade. By 2025, the US will close twelve reactors, which constitute 10.5 gigawatts of low-carbon power.[21] This should be extremely troubling for anyone who cares about air pollution and climate change. Deep decarbonization of US energy supply will require receiving 100 percent of electricity from zero-emissions sources as well as replacing all natural gas and petroleum used in transportation, cooking, and heating, which constitute roughly two-thirds of total primary energy. The cheapest and fastest way to achieve this decarbonization is to add nuclear reactors at existing nuclear power plants. Closing those plants will foreclose that future option.

Recently, in a major blow to the US nuclear-energy industry, China *is reportedly helping Saudi Arabia* create a facility to produce uranium "yellowcake" from uranium ore. The deal is further evidence that America's anti-nuclear energy policies are pushing US allies into the arms of our illiberal and undemocratic rivals.

Nations that partner with Russia or China to build nuclear plants are effectively absorbed into their sphere of influence. The line between soft power and hard power runs through nuclear energy. On the one side is cheap and clean electricity. On the other, a stepping stone to a weapons program.

Some nuclear-industry officials hope that the US will, in the future, "leapfrog" over China and Russia with smaller "modular" reactor designs, micro-reactors, and radical new reactor-coolant combinations such as those being pursued by Bill Gates. But China and Russia are already far ahead on building and selling small, modular and radical designs, as well as the standard water-cooled ones most nations have chosen since the 1950s.

The China-Saudi deal should serve as a wake-up call to Congress and the national-security and nonproliferation community. It's time for the United States to realign its policies with the NPT and take action to compete with the Chinese and Russians.

Nations looking to build nuclear plants will choose partners with experience building them. To compete, the US must make global nuclear-energy superiority a national security goal. This starts with either designating a new "national champion" nuclear building firm or creating a state-owned nuclear company capable of competing with Russian and Chinese firms.

As part of this effort, Congress should make sure all of today's reactors, including recently shuttered ones, stay open for at least 80 years. It should also consider amending the Atomic Energy Act to let the US help nations develop uranium-enrichment facilities, just as China and Russia do now.

Nuclear power plants, which can operate for 80 years or longer, *require* high-wage, high-skilled, and permanent jobs for multiple generations, and yet Democratic policymakers are seeking to shut down nuclear power plants in the U.S.

Congress and the White House must act thoughtfully and deliberately—but also decisively— before it's too late.

6. Why do you think many climate activists oppose fossil fuel technology innovation when it comes to solving the problem of climate change?

It is sometimes claimed that environmental or climate policies are required for lower pollution, but recent events show that not to be the case. US electricity sector emissions decreased 34 percent from 2005 to 2019, including an astonishing 10 percent in 2019, which is the largest year-on-year decline in history.[22] By contrast, the Obama administration's proposed carbon regulation of the power sector, the "Clean Power Plan," proposed emissions reductions of 32 percent— by 2030.[23] Thanks in large measure to natural gas replacing coal, the International Energy Agency (IEA) forecasts carbon emissions in 2040 to be lower than in almost all of the IPCC scenarios.[24]

Carbon emissions are thus following the same trajectory as other air pollutants. As a result of cleaner-burning coal, the transition to natural gas, cleaner vehicles, and other technological changes, developed nations have seen major improvements in air quality. Between 1980 and 2018, US carbon monoxide levels decreased by 83 percent, lead by 99 percent, nitrogen dioxide by 61 percent, ozone by 31 percent, and sulfur dioxide by 91 percent. While death rates from air pollution can rise with industrialization, they decline with higher incomes, better access to health care, and reductions in air pollution.[25]

The dominant form of climate policy in international bodies and among nations around the world emerged from 1960s-era environmental policies aimed at constraining food and energy supplies. These policies are correctly referred to as Malthusian in that they stem from the fears, first articulated by the British economist Thomas Malthus in 1798, that humans are at constant risk of running out of food. Real world experience has repeatedly disproven Malthusianism. If it hadn't, there wouldn't be nearly eight billion of us. Worse, Malthusian ideas have been used to justify unethical policies that worsen socioeconomic inequality by making food and energy more expensive, including closing down nuclear plants.[26]

Policymakers should explicitly reject policies that significantly raise food and energy prices, directly or indirectly. Republicans and Democrats alike should affirm their commitment to human flourishing and prosperity, both of which depend on cheap food and energy, which depend on the rising productivity of inputs to agriculture and electricity generation, including labor, land, and capital.

The large reductions in air pollution, including carbon emissions, in recent decades came overwhelmingly from making natural gas cheap, not from making fossil fuels more expensive. Short-term and focused subsidies and mandates may help accelerate technological innovation. But the main focus must be on making the new energy source affordable.

7. In the past, you've talked about the success of the United States in reducing emissions. In absolute terms since 2005, we've reduced emissions more than the next twelve reducing emissions countries combined. You credit the vast amount of emissions reduced to our use of nuclear and natural gas. In fact, you've said that natural gas reduced emissions 11 times more than solar energy and 50 percent more than wind energy in the United States.

Do you think the current thinking in the Democratic party and their opposition to fracking make sense as an economics job and a global climate mitigation strategy?

For nearly a decade, climate activists have claimed that natural gas is worse for the climate than coal,[27] And yet, on virtually every metric, natural gas is cleaner than coal. Natural gas emits 17 to 40 times less sulfur dioxide, a fraction of the nitrous oxide that coal emits, and almost no mercury.[28] Natural gas is one-eighth as deadly as coal, counting both accidents and air pollution.[29] And burning gas rather than coal for electricity requires 25 to 50 percent less water.[30]

The technological revolution allowing for firms to extract far more natural gas from shale and the ocean floor is the main reason that U.S. carbon emissions from energy declined 13 percent between 2005 and 2018, and a big part of the reason why global temperatures are unlikely to rise more than 3 degrees centigrade above pre-industrial levels.[31]

Anti-natural gas activists make their claims that coal is better than natural gas by using an inappropriately short timeframe for global warming of just twenty years. The United States government and most experts agree that the appropriate timeframe to use is one hundred years. Their timeframe thus exaggerates the impact of natural gas as a heat-trapping gas.[32]

Despite a nearly 40 percent increase in natural gas production since 1990, the EPA reported a 20 percent decrease in methane emissions in 2013, in part because

of improved gaskets, monitoring, and maintenance.[33] No matter how much methane leaks, natural gas will still have half the impact of energy on global warming by 2100 as compared to if the same energy were coming from coal.[34]

Natural gas fracking resulted in the decline 62 percent decline in the mountaintop mining for coal between 2008 and 2014.[35] Where fracking for natural gas cracks shale below the Earth's surface, imposing very small impacts aboveground, coal mining devastates mountain ecosystems. More than 500 mountains, covering more than one million acres, have been destroyed in central and southern Appalachia by mountaintop removal.[36]

When mining companies demolish mountains with explosives to harvest coal, they dump millions of tons of crushed rock into nearby valleys, destroying forests and headway streams. Exposed rock leeches heavy metals and other toxins, which hurt wildlife, insects, and humans. Dust that blows into the air from such operations can harm miners and people who live in nearby communities.[37]

No energy transition occurs without human and environmental impacts. Fracking brings pipelines, rigs, and trucks, which can disrupt peaceful landscapes that people rightly care about. Frackers have created small earthquakes and improperly disposed of fracking wastewater. These problems are serious and should be addressed, but they are nowhere as bad as coal mining, which has in many ways become worse throughout the decades, not better, culminating in mountaintop removal and the destruction of river ecosystems.[38]

What explains the lower environmental impact of natural gas fracking as compared to coal mining is power density. A natural gas field in the Netherlands is three times more power-dense than the world's most productive coal mines.[39]

Today, many if not most scientists and environmentalists support natural gas as a substitute for coal. "People are placing too much emphasis on methane," climate scientist Raymond Pierrehumbert told *The Washington Post*. "People should prove that we can actually get the CO_2 emissions down first, before worrying about whether we are doing enough to get methane emissions down."[40]

Pollution regulations helped make coal plants more expensive to build and operate. But what mattered most was the creation of a more power-dense, abundant, and cheaper alternative.

8. An article published March 19, 2019, by the Institute for Energy Research (https://www.instituteforenergyresearch.org/the-grid/wind-generation-fails-in-midwest-due-to-weather-events-polar-vortex-and-el-nino/) analyzed the performance of wind generation during acute weather events and included the following statement,

> ***"During the polar vortex, wind turbines shut off when temperatures dipped below minus 20 degrees Fahrenheit. There has been little focus on developing wind turbines to operate below minus 20 degrees Fahrenheit because at these temperatures, there is not much wind blowing. The economics of producing wind energy in such extreme conditions would not justify the additional cost, according to wind experts."***

How did renewables perform (what percent of capacity was dispatched) during the polar vortex of 2014 and the polar vortex of 2019 in the regions impacted by each polar vortex?

When people's health and safety depended on power during the polar vortex, what were the best performing sources of energy?

The consulting firm Wood Mackenzie evaluated the polar vortex that occurred between January 27 to February 2, 2019 and concluded that, even with solar and wind scaled-up to produce the *total* equivalent quantity of electricity as the grid produces now, millions of people would have remained without power for several in freezing temperatures. "Any mix of wind and solar to serve load would require long-duration storage or optimization of multiple 'stages' of shorter duration," it found.[41]

By contrast, nuclear power plants performed exceedingly well during the polar vortexes. Wood Mackenzie found that "existing nuclear reduces the magnitude of hourly generation imbalances." During the polar vortex, nuclear plants ran with very high "up-time," with just one re-fueling outage.

It is notable that nuclear plants out-perform renewables in situations of high-heat as well. For example, Washington State's Columbia Generating station, a nuclear plant, is under a "no-touch" order to generate power during the West's current heat wave.[42]

REFERENCES

[1] Majority Staff Report, "Solving the Climate Crisis," June 2020, https://climatecrisis.house.gov/sites/climatecrisis.house.gov /files/Climate%20Crisis%20Action%20Plan.pdf

[2] Michael Greenstone and Ishan Nath, "Do Renewable Portfolio Standards Deliver?" *Energy Policy Institute at the University of Chicago* 62 (May 2019): 1-45, https://epic.uchicago.edu/wp-content/uploads/2019/07/Do-Renewable-Portfolio-Standards-Deliver.pdf.

[3] "California," Environmental Progress, accessed July 25, 2020, https://environmentalprogress.org /california. Calculations based on data from "Electricity Data Browser: Retail Sales of Electricity Annual," United States Energy Information Administration, accessed January 10, 2020, https://www.eia.gov/electricity/data/browser.

[4] Eurostat, **"Electricity prices for household consumers—bi-annual data (from 2007 onwards)"** December 1, 2019, accessed January 20, 2020, https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_pc_204&lang=en.

[5] Germany spent 32 billion euros on renewables subsidy every year between 2014 and 2018, or about one percent of its GDP a year, which if adjusted for economy size would be like the United States spending $200 billion annually but only increasing its share of electricity from solar and wind by 11 percentage points. German spending from Frank Dohmen, "German Failure on the road to a renewable future," *Spiegel*, May 13, 2019, https://www.spiegel.de/international/germany/german-failure-on-the-road-to-a-renewable-future-a-1266586.html; Conversions made using OECD data for Purchasing Power Parity.

Increase in German wind and solar percentages from "Annual Electricity Generation in Germany," Fraunhofer ISE, January 10, 2020, accessed January 10, 2020, https://www.energy-charts.de/energy.htm.

[6] "Annual Electricity Generation in Germany," Fraunhofer ISE, January 10, 2020, accessed January 10, 2020, https://www.energy-charts.de/energy.htm.

[7] Steven M. Grodsky, "Reduced ecosystem services of desert plants from ground-mounted solar energy development," *Nature*, July 20, 2020.

[8] Michael Shellenberger, "Democrats Say California is a model for climate action but its blackouts say otherwise," Forbes, August 17, 2020.

[9] Jim Jakobs, "Latest State 'Green' Edict Discriminates Against Minorities: Lawsuit," *GV Wire*, May 7, 2020.

[10] "Green New Deal FAQ," February 7, 2020, accessed August 3, 2020, https://apps.npr.org/documents/document.html?id=5729035-Green-New-Deal-FAQ.

[11] E. Severnini, "Impacts of nuclear plant shutdown on coal-fired power generation and infant health in the Tennessee Valley in the 1980s," *Nature Energy*, 2017; Michael Shellenberger, "Nuclear Power: Unexpected Health Benefits," *Nature Energy*, 2017.

[12] S.E. Black, et al, *Journal of Economic Perspectives*, 122, 2007, p. 409–439. M. Hack, Future Child, No. 5, 1995, p. 176–196.

[13] Matthew J. Neidell, Shinsuke Uchida, and Marcella Veronesi, "Be Cautious with the Precautionary Principle: Evidence from Fukushima Daiichi Nuclear Accident" (Working Paper 26395, National Bureau for Economic Research (NBER), Cambridge, MA, October 2019), https://doi.org/10.3386/w26395.

[14] David E. Weinstein and Molly K. Schnell, "Evaluating the Economic Response to Japan's Earthquake" (Working Paper 301, Center on Japanese Economy and Business, Columbia University, New York, May 2012), https://gsb.columbia.edu/cjeb/research.

[15] Lucas Davis et al., "Market impacts of a nuclear power plant closure," *American Economic Journal, Applied Economics*, 2016, p. 92–122.

[16] Department of the Environment, Vermont, "Greenhouse Gas Emissions Inventory Update: 1990–2015. EPA, "Sources of Greenhouse Gas Emissions," 2020, https://dec.vermont.gov/sites/dec/files/aqc/climate-change/documents/_Vermont_Greenhouse_Gas_Emissions_Inventory_Update_1990–2015.pdf.

[17] Jacqueline Toth, "Ocasio-Cortez: Green New Deal 'Leaves the Door Open' on Nuclear," Morning Consult, May 6, 2019.

[18] "AOC on Nuclear Power: 'Indian Point Should Have Been Shutdown a Long Time Ago,'" October 3, 2019, https://grabien.com/story.php?id=254389.

[19] "Governor Cuomo, a pandemic is the wrong time to shutter Indian Point," Climate Coalition, http://climatecoalition.org/dear-governor-cuomo.

[20] Xiao Wu et al., "Exposure to air Exposure to air pollution and COVID-19 mortality in the United States: A nationwide cross-sectional study," Harvard University, April 24, 2020, https://projects.iq.harvard.edu/covid-pm.

[21] U.S. Energy Information Administration, "Despite closures, U.S. nuclear electricity generation in 2018 surpassed its previous peak," March 21, 2019.

[22] Trevor Houser and Hannah Pitt, "Preliminary US Emissions Estimates for 2019," Rhodium Group, January 7, 2020. https://rhg.com/research/preliminary-us-emissions-2019/

[23] Environmental Protection Agency (EPA), "Fact Sheet: Overview of the Clean Power Plan," EPA, August 3, 2015. https://archive.epa.gov/epa/cleanpowerplan/fact-sheet-overview-clean-power-plan.html

[24] "World Energy Outlook 2019" (Paris: International Energy Agency, 2019), https://www.iea.org/reports/world-energy-outlook-2019.

[25] United States Environmental Protection Agency, "Air Quality—National Summary," 2020, https://www.epa.gov.

[26] Michael Shellenberger, *Apocalypse Never: Why Environmental Alarmism Hurts Us All,* HarperCollins, 2020, p. 222-249.

[27] Bill McKibben, "Bad News for Obama: Fracking May Be Worse Than Coal," Mother Jones, September 8, 2014, https://www.motherjones.com; Bill McKibben, "The Literal Gaslighting That Helps America Avoid Acting on the Climate Crisis," *New Yorker*, October 9, 2019, https://

www.newyorker.com; Bill McKibben, "The Literal Gaslighting That Keeps America From Acting on Climate Change," *New Yorker*, October 9, 2019, https://www.newyorker.com/.

[28] Paulina Jaramillo, "Landfill-Gas-to-Energy Projects: Analysis of Net Private and Social Benefits," *Environmental Science and Technology* 39, no. 19 (2005): 7365–7373, https://doi.org/10.1021/es050633j.

[29] Anil Markandya and Paul Wilkinson, "Electricity Generation and Health," *The Lancet* 370 (2007), 979–990, https://doi.org/10.1016/S0140–6736(07)61253–7.

[30] Bridget R. Scanlon, Robert C. Reedy, Ian Duncan, William F. Mullican, and Michael Young, "Controls on water use for thermoelectric generation: Case study Texas, US," *Environmental Science & Technology* 47 (2013): 11326–11334, https://doi.org/10.1021/es4029183.

[31] BP Energy Economics, "BP Statistical Review of World Energy 2019, 68th Edition," BP, June 2019, accessed January 16, 2020, https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-full-report.pdf; Perry Lindstrom, "Carbon dioxide emissions from the US power sector have declined 28% since 2005," EIA, October 29, 2018, https://www.eia.gov/todayinenergy/detail.php?id=37392.

[32] Sophie Dejonckheere, Mari Aftret Mørtvedt, and Eilif Ursin Reed, "Methane: A climate blind spot?," Center for International Climate Research [CICERO], March 25, 2019, accessed January 4, 2020, https://www.cicero.oslo.no/en/posts/klima/methane-a-climate-blind-spot; Zeke Hausfather, "Bounding the climate viability of natural gas as a bridge fuel to displace coal," *Energy Policy* 86 (November 2015): 286–294, https://doi.org/10.1016/j.enpol.2015.07.012; Adam Voiland, "Methane Matters," National Air and Space Association, https://earthobservatory.nasa.gov/features/MethaneMatter; Gunnar Mhyre et al., "Anthropogenic and Natural Radiative Forcing," Intergovernmental Panel on Climate Change, http://www.climatechange2013.org/images/report/WG1AR5_Chapter08_FINAL.pdf.

Most of the methane molecules that leak into the atmosphere today won't be there in ten years. By contrast, most carbon dioxide will remain in the atmosphere for centuries. As a result, even if methane were leaking at a higher rate than the US EPA estimates, as some claim it is, its impact on global warming would still be relatively small compared to the benefits of reduced carbon emissions compared to coal.

[33] Kevin Begos, "EPA methane report further divides fracking camps," *Yahoo! News*, April 28, 2013, https://news.yahoo.com.

[34] Zeke Hausfather, "Methane matters, but doesn't eliminate gains from emissions reductions," The Breakthrough Institute, October 14, 2019, https://thebreakthrough.org/issues/energy/howarth-natural-gas. Using the EPA's numbers, the leaked methane lowers the amount of carbon emissions reduced between 2005 and 2018 from 13 percent to 12 percent. Using larger methane leak numbers lowers the reductions from 13 percent to 10 percent, at most.

[35] JenAlyse Arena, "Coal production using mountaintop removal mining decreases by 62% since 2008," US Energy Information Association, July 7, 2015, https://www.eia.gov/todayinenergy/detail.php?id=21952.

[36] Appalachian Voices, "Ecological Impacts of Mountaintop Removal," accessed January 16, 2020, http://appvoices.org/end-mountaintop-removal/ecology.

[37] Editorial Board, "The dirty effects of mountaintop removal mining," *Washington Post*, October 21, 2014, https://www.washingtonpost.com.

[38] Richard Schiffman, "A Troubling Look at the Human Toll of Mountaintop Removal Mining," Yale E360, November 21, 2017, https://e360.yale.edu/features/a-troubling-look-at-the-human-toll-of-mountaintop-removal-mining.

[39] Vaclav Smil, *Power Density* (Cambridge: The MIT Press, 2016), 104, 112, 125, 126, 197. On average oil power densities are far less. Iraq's oil fields have a power density of only 5,000 W/m^2. But that is still twice as high as Australia's coal mines. As always there is a large range, with some petroleum fields producing as little as 100 W/m^2. A typical natural gas well in Alberta, Canada has a power density of 2,300 W/m^2 while the Netherlands' gas fields have a power density of 16,000 W/m^2. A Liquified Natural Gas (LNG) terminal has a power density of 4,600 W/m^2 while a regasification terminal has a power density of an astonishing 60,000 W/m^2.

[40] Chris Mooney, "Why we're still so incredibly confused about methane's role in global warming," *Washington Post*, May 2, 2016, https://www.washingtonpost.com.

[41] Wood Mackenzie, "Performance Review: Nuclear, fossil fuels, and renewables during the 2019 polar vortex," February 7, 2019.

[42] Annette Cary, "Northwest heat wave puts nuclear power plant near Tri-Cities under 'no touch' order," Tri-City Herald, September 4, 2020.

Questions for the Record

Ms. Beth Soholt
Executive Director
Clean Grid Alliance

THE HONORABLE KATHY CASTOR

1. As the United States moves toward a national, interconnected grid, what can the federal government and industry do to ensure that new transmission lines do not cause unintended environmental harm?

A more nationally interconnected Macro Grid has multiple environmental benefits, starting with the connection of abundant, zero-emissions wind and solar resources in remote rural areas to population centers with high electricity demand.

A nationwide, high-voltage direct current (HVDC) network, optimized for the nation's best wind and solar resources, could deliver 80% carbon emission reductions from the grid by 2030.[1] Furthermore, the decarbonization of our power sector enabled by expanded and enhanced transmission would greatly reduce co-pollutants like small particulate matter that lead to an estimated 21,000 deaths per year.[2]

We expect a very high percentage of future transmission expansion to utilize existing rights-of-way of various types. There are utility rights-of-way all over the country, which in many cases have old lines that are ready to be replaced. With new technology, including HVDC lines, far more power can be delivered over rights-of-way than in the past.

A critical point about transmission is that, at larger scales, less right-of-way is needed for a given amount of energy delivery. Therefore, it is important to plan ahead of time to build at the size that will be needed over the long term in order to reduce the amount of right-of-way needed.

Occasionally, new rights-of-way are needed. When new rights-of-way are required, local, state, and sometimes federal permitting processes require environmental review prior to being granted permits. The reviews are often very thorough. For example, in New York, Title 16, Part 86 of the New York Compilation of Codes, Rules, and Regulations outlines the several requirements for an interstate transmission line. An application is required to "submit detailed maps...[that] shall include" the location of a right-of-way and possible damage to the environment as well as historical areas.[3] Further, the applicant must "submit a statement explaining what consideration, if any, was given to: (1) any alternative route; (2) the expansion of any existing right-of-way...[and] (3) any alternate method which would fulfill the energy requirements with comparable costs" where the applicant may compare the benefits and drawbacks of the alternative.[4] When lines cross federal lands, Environmental Impact Statements are required prior to federal agency permitting. Of course, it is also the case that multiple agency processes without clear accountability can lead to delays, so efforts such as the FAST Act approach to rationalize the process can speed lengthy approval requirements while protecting the environment.

It is beneficial to proactively plan transmission to take renewable resource and sensitive habitat into account. For example, "Smart from the Start" transmission planning efforts in the west have engaged wildlife and lands experts along with renewable energy and transmission developers to identify corridors.

Better coordinated interregional and interstate planning can ensure we have the grid we need to power a clean and thriving economy, while minimizing cost and environmental impact. For example, as states seek to develop offshore wind, coordinated planning to create an offshore grid that collects electricity generated from multiple wind projects, along with a plan to upgrade onshore transmission, can lower overall costs for customers, and prevent major additional work on land. Fewer cables could also minimize impacts on traditional maritime interests, including shipping and fishing.[5]

2. How can Congress support or require more efficient use of existing transmission infrastructure?

Newly available grid-enhancing technologies such as dynamic line ratings, power flow control systems, storage-as-transmission, and topology optimization can reduce congestion and resource curtailment, raising the efficiency of existing transmission infrastructure. Many regions of the country are currently working to understand and incorporate the benefits of these technologies in RTO/ISO tariffs. The Energy Policy Act of 2005 directs FERC to incentivize the deployment and use of efficiency-improving transmission technologies for the benefit of electricity consumers. Unfortunately, FERC's recent Notice of Proposed Rulemaking on transmission incentive policy limits the ability of the aforementioned, lower-cost grid-enhancing technologies to actually receive these incentives. FERC's proposal is based on a return-on-equity approach, which awards utilities greater incentives for the deployment of more expensive projects, such as power lines. Under the proposal, for example, a

---

[1] MacDonald, Clack Et Al., "Future Cost-Competitive Electricity Systems and Their Impact on U.S. CO_2 Emissions," January 25, 2016, https://www.vibrantcleanenergy.com/wp-content/uploads/2016/09/Future_cost-competitive_electricity_syst.pdf.

[2] Penn, Arunachalam Et Al., "Estimating State-Specific Contributions to PM2.5- and O3-Related Health Burden from Residential Combustion and Electricity Generating Unit Emissions in the United States", March 2017, https://ehp.niehs.nih.gov/doi/pdf/10.1289/EHP550.

[3] N.Y. Comp. Codes R. & Regs. tit. 16, § 86.3 (1970).

[4] N.Y. Comp. Codes. R. & Regs. tit. 16, § 86.4 (1970).

[5] Maldonado, Samantha and French, Marie J., "Offshore Grid Planning in the Wind," August 2020, https://www.politico.com/states/new-york/newsletters/weekly-new-york-new-jersey-energy/2020/08/24/offshore-wind-transmission-planning-338452.

100 basis point incentive on $1 million of equity invested yields only $50,000 in additional earnings.[6] It is hard to imagine senior utility management even having a meeting to discuss an action that could achieve only a $50,000 contribution to the bottom line, especially when 100 basis points on a $100 million transmission line with potentially similar system benefits would yield $5,000,000 in additional earnings. Congress should consider directing FERC to avoid using an incentive awards methodology that preferences high-cost projects, although new transmission will be needed in many parts of the country.

A major opportunity for efficient use of our limited rights of way is replacing aging assets with higher capacity lines so that we make maximum use of corridors. New transmission line conductor technologies are available that increase resilience and energy delivery capability over these paths.

Additionally, expanded wholesale energy markets can help better utilize existing transmission infrastructure by ensuring that generators are dispatched over the broadest area in the least-cost manner. A shared sense of Congress that wholesale energy market growth is beneficial may help encourage utilities and states to consider joining these markets.

Finally, transmission upgrades can vastly improve the efficiency of the entire electric system. This is because line losses increase significantly when power lines operate close to their maximum capacity, and the lines are hot. The Southwest Power Pool calculated that its transmission upgrades are saving consumers around $100 million from reduced transmission losses,[7] while the Midwest ISO estimates line loss savings of $200 million to $1 billion dollars in net present value due to upgrades.[8]

3. How can increasing transmission development at the "seams" between regions save consumers money and expedite renewable energy deployment?

Transmission that can stitch together the "seams" between regions could save consumers up to $47 billion annually[9] and return more than $2.50 for every dollar invested.[10]

While 15 states between the Rockies and the Mississippi River account for 88 percent of the nation's wind technical potential and 56 percent of solar technical potential, this region is home to only 30 percent of expected 2050 electricity demand.[11] Connecting centers of high renewable resources to high electric demand would expedite development of those resources and save consumers money.

Access to electricity over a large region allows locations with rich wind and solar resources to supply cheap power to distant markets. The key enabling technology for delivering these multiple benefits is a well-planned network of high-voltage direct-current (HVDC) transmission lines.

Currently, a lack of transmission is greatly constraining development of both wind and solar resources, as evidenced by interconnection queue backlogs. Access to consumers is paramount for zero-marginal-cost, location-constrained resources like wind and solar. At the end of 2017, over 188 GW of proposed solar projects and 180 GW of proposed wind projects were waiting in queues to connect to the grid after having applied for interconnection.[12] Historically, the vast majority of queue projects have failed to proceed to development, in many cases because of the costs and delays associated with interconnecting to the grid.

---

[6] Assuming 50% debt, tax of 27%, debt interest of 5%, target base ROE of 10%, O&M rate of 3% and discount rate of 7%.

[7] Southwest Power Pool, "The Value of Transmission,"
https://www.spp.org/documents/35297/the%20value%20of%20transmission%20report.pdf

[8] Midwest Independent System Operator, "MISO Value Proposition,"
https://www.misoenergy.org/about/miso-strategy-and-value-proposition/miso-value-proposition/

[9] MacDonald, Clack Et Al., "Future Cost-Competitive Electricity Systems and Their Impact on U.S. CO_2 Emissions," January 25, 2016,
https://www.vibrantcleanenergy.com/wp-content/uploads/2016/09/Future_cost-competitive_electricity_syst.pdf.

[10] National Renewable Energy Laboratory, Interconnections Seam Study,
https://www.nrel.gov/analysis/seams.html.

[11] Wind Solar Alliance, "Transmission Upgrades & Expansion: Keys to Meeting Large Customer Demand for Renewable Energy," January 2018, https://acore.org/transmission-upgrades-expansion-keys-to-meeting-large-customer-demand-for-renewable-energy/.

[12] American Wind Energy Association, "Grid Vision: The Electric Highway to a 21st Century Economy," May 2019, https://
www.awea.org/Awea/media/Resources/Publications%20and%20Reports/White%20Papers/Grid-Vision-The-Electric-Highway-to-a-21st-Century-Economy.pdf.

Finally, expanding access across the seams will help consumers by making the wholesale power markets more competitive, while promoting renewable development through expanded market opportunities. Consumers will also benefit from the improved reliability and resilience that comes from interregional transmission.

4. Although renewable energy costs have fallen significantly, why does the renewable energy sector need continued federal support as the country confronts the climate crisis?

The COVID-19 pandemic has had multiple adverse impacts on the renewable energy sector. Supply chain disruptions, construction and permitting delays, and a constrained tax equity market have all hit the renewable industry hard. Over 14% of renewable energy workers have lost their jobs since March.[13] Additionally, BloombergNEF is now projecting a $23 billion tax equity shortfall impacting more than 30 gigawatts of renewable projects over the next 18 months.[14]

In order to get these hard-working Americans back on the job building America's clean energy future, the renewable sector needs commonsense emergency relief in the form of 1) temporary refundability for renewable credits to facilitate their continued monetization in an increasingly constrained tax equity market, and 2) delaying the scheduled phasedown of the PTC and the ITC in recognition of COVID-19's nationwide impact on renewable development this year. Enacting these two commonsense emergency relief measures into law would stem ongoing job losses in every state and enable the renewable industry to help power the nation's economic recovery.

As we look past the current downturn and towards a more sustainable economic recovery, there is a suite of complementary climate policies that Congress can consider to accelerate the deployment of emissions-free, renewable power: 1) a federal high-penetration renewable energy standard (RES) or clean energy standard (CES) to provide long-term market certainty and catalyze renewable energy investment and deployment; 2) a technology-neutral tax credit for zero- or low-carbon electricity generation to attract capital and lower the delivered cost of clean energy to consumers; 3) effective carbon pricing to internalize the cost of carbon pollution across all sectors of the economy; and 4) building a 21st century Macro Grid to deliver our nation's abundant renewable resources from where they are produced to where they are ultimately consumed.[15]

5. How can adding clean energy to the electric generating mix increase electric system reliability and resilience?

A diverse mix of resources is key to electric reliability and resilience. Clean energy provides an abundant source of domestic power that can be rapidly deployed and available even during extreme weather conditions. With zero reliance on global fuel supply, renewable energy sources are not subject to the vagaries of the global marketplace or unexpected changes to fuel availability. Renewable energy can even enhance power reliability under extreme weather conditions, not requiring fuel supplies that may be disrupted and bouncing back quickly from interruptions.

Moreover, as previously described, expanding and upgrading the transmission system with a 21st century Macro Grid would lower consumer costs and help prevent outages, thereby enhancing reliability and resilience.

Notably, the Department of Defense is increasingly relying on renewable energy and energy storage to improve its energy security, enhance readiness and ensure reliable and resilient power for critical domestic functions and forward operations. For example, the Fort Carson solar-plus-energy storage project supplies around-the-clock energy resilience to the 4th Infantry Division, the 10th Special Forces Group and 3,400 military family residences. By shifting energy between times of high and low demand, this system also saves taxpayers $500,000 per year on the installation's utility bill.[16]

---

[13] American Council on Renewable Energy, "Recovery Stalls as Few Clean Energy Employees Return to Work in July," August 12, 2020, https://acore.org/recovery-stalls-as-few-clean-energy-employees-return-to-work-in-july/.

[14] Bloomberg, "Covid Created a U.S. Clean Energy Shortfall of Up to $23 Billion," July 15, 2020, https://www.bloomberg.com/news/articles/2020-07-15/covid-likely-created-23-billion-shortfall-for-u-s-clean-energy/.

[15] American Council on Renewable Energy, "Advancing America's Climate Leadership," January 9, 2020, https://acore.org/advancing-americas-climate-leadership/.

[16] Citizens for Responsible Energy Solutions, "Defense Spotlight: Fort Carson Optimizes Energy Storage," April 2020, https://www.citizensfor.com/defense-spotlight-fort-carson-optimizes-energy-storage/.

6. During the 2014 Polar Vortex and other severe winters, how did the cold weather affect on-site fuel for fossil-fueled power plants fare? How can electric utilities and regional organizations ensure the reliability and resilience of the grid in extreme temperatures?

According to the North American Electric Reliability Corporation (NERC), fossil fuel facilities relying on natural gas and coal are susceptible to damages due to low temperatures, such as frozen coal stockpiles and disrupted natural gas pipelines, and are thus the largest sources of cold weather-related power outages.[17] According to NERC, coal and gas generators made up 81% of power outages during the 2014 Polar Vortex.[18] During the 2019 Polar Vortex in the Midwest, there was a fire in a gas plant in Michigan that forced it to shut down, along with gas delivery issues.

Last month, CAISO CEO Steve Berberich attributed California's rolling blackouts partially to a power plant that "tripped" in the high heat,[19] likely a natural gas plant that tripped offline during the heatwave,[20] as natural gas plants often struggle in extreme temperatures, further illustrating the importance of a diverse, fuel-free resource mix.

In FERC's resilience proceeding, grid operators were clear about the benefits of transmission for system resilience:

- NYISO said "... resiliency is closely linked to the importance of maintaining and expanding interregional interconnections, the building out of a robust transmission system. ..."[21]
- PJM said "Robust long-term planning, including developing and incorporating resilience criteria into the RTEP, can also help to protect the transmission system from threats to resilience."[22]
- SPP said "The transmission infrastructure requirements that are identified through the ITP process are intended to ensure that low cost generation is available to load, but the requirements also support resilience in that needs are identified beyond shorter term reliability needs. For example, the ITP identified the need for a number of 345 kV transmission lines connecting the panhandle of Texas to Oklahoma. These lines were identified as being economically beneficial for bringing low-cost, renewable energy to market, but their construction has also supported resilience by creating and strengthening alternate paths within SPP."[23]

As previously discussed, expanding transmission would increase reliability by enabling access to power in unaffected regions. In addition, modernizing the transmission system can also play a significant role in ensuring grid reliability and resilience in extreme temperatures and weather events. A smarter grid can respond to disruption by re-routing power or re-shaping load using demand response. These improvements include integrating storage and distributed energy technologies in wholesale power markets, using smart meters to detect grid outages, and expanding the nation's high-voltage transmission network to connect centers of supply with areas of demand.

---

[17] Bade, Gavin, "Polar Vortex set to test Midwest grids amid FERC resilience debate," UtilityDive, January 30, 2019, https://www.utilitydive.com/news/polar-vortex-set-to-test-midwest-grids-amid-ferc-resilience-debate/547231/.

[18] Ibid.

[19] Kahn, Debra and Bermel, Colby, "California has first rolling blackouts in 19 years—and everyone faces blame," Politico, August 18, 2020, https://www.politico.com/states/california/story/2020/08/18/california-has-first-rolling-blackouts-in-19-years-and-everyone-faces-blame-1309757.

[20] Gilbert, Alex and Bazilian, Moran, "California power outages underscore challenge of maintaining reliability during climate change, the energy transition," UtilityDive, https://www.utilitydive.com/news/california-power-outages-underscore-challenge-of-maintaining-reliability-du/583727/.

[21] NYISO filing in FERC Docket No. AD18–7, p. 4.

[22] PJM filing in FERC Docket No. AD18–7, p. 49–50.

[23] SPP filing in FERC Docket No. AD18–7, p. 8.

THE HONORABLE GARRET GRAVES

1. You stated that unsubsidized wind and solar (no ITC/PTC) are the cheapest forms of new energy. That is good news for the environment and for the taxpayers who have been subsidizing wind and solar either through tax credits, mandates or other market preferences. If, in fact, wind and solar are the cheapest forms of new energy, then the subsidies and mandates that have supported wind and solar are no longer necessary as market distortions (e.g.,, subsidies/mandates) are only necessary in those cases when the source is unable to compete without them.

a. As a member of the MISO Advisory Committee can you identify any federal and/or state subsidies (tax credits/incentives, mandates or other preferences) for wind and solar in the MISO market that are no longer necessary in order for new wind and solar to successfully compete in the market?

Policies in support of clean, low-cost, and reliable wind and solar deployment create numerous environmental, consumer and economic benefits, including over 350,000 jobs around the country.[24] For example, renewable energy standards help drive deployment of pollution-free renewable power by providing the long-term market certainty needed to catalyze investment in our communities. Policymakers have different preferences about how fast they would like to reduce emissions. Incentives can speed up deployment of clean energy beyond what the market would do on its own, and counteract the incentives that still exist for conventional, polluting resources.

b. When you made the statement that renewables are the cheapest form of energy, did your analysis include the cost of new transmission to move wind/solar generated power from the source to the consumer?

When building new generation facilities, developers are responsible for connecting their plants to the nearest utility grid. Interconnection often requires construction of radial lines or other equipment such as substations. FERC Order 2003 stipulates that a generator seeking interconnection is responsible for the cost of all facilities, equipment, and all other transmission improvements between the point of interconnection and a public utility's system.[25]

Despite additional expenses associated with transmission upgrades needed to access remote resources, renewables still remain cost-competitive. A February 2020 report on the estimated levelized cost of electricity (LCOE) for new generation resources entering service in 2022 found that new wind and solar facilities would be substantially cheaper than fossil fuel units. When accounting for the levelized cost of new transmission, the LCOE of wind and solar were $27.71 and $28.88 per MWh, respectively, compared to $33.53 and $64.19 per MWh for combined cycle and combustion plants.[26]

Additionally, investment in large interregional transmission buildout to optimize the grid as a whole has broad economic benefits. In fact, efficiencies and access to cheap renewables facilitated by a nationwide power system would save U.S. consumers an estimated $47.2 billion annually.[27] The National Renewable Energy Laboratory also finds that stitching together the nation's electrical grid through a nationwide HDVC network would provide ratepayers $2.50 in benefits for each dollar invested.[28]

Finally, the package of transmission lines in the MISO Multi-Value Portfolio (MVP) approved by the MISO Board of Directors in 2011 provide reliability benefits, relieve congestion, create a well-functioning energy marketplace and deliver energy from renewable resources that benefit customers. In short, investing in transmission provides multiple benefits.

---

[24] NASEO and EFI, "2020 U.S. Energy and Employment Report," https://static1.squarespace.com/static/5a98cf80ec4eb7c5cd928c61/t/5ee78423c6fcc20e01b83896/1592230956175/USEER+2020+0615.pdf, p. 40.

[25] Norton Rose Fulbright, "Network Upgrades Controversy," October 2003, https://www.projectfinance.law/publications/network-upgrades-controversy.

[26] Energy Information Administration, "Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2020," https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf.

[27] MacDonald, Clack Et Al., "Future Cost-Competitive Electricity Systems and Their Impact on U.S. CO_2 Emissions," January 25, 2016, https://www.vibrantcleanenergy.com/wp-content/uploads/2016/09/Future_cost-competitive_electricity_syst.pdf.

[28] National Renewable Energy Laboratory, Interconnections Seam Study, https://www.nrel.gov/analysis/seams.html.

c. With regard to transmission costs associated with renewables that are a large distance from the consumer, what are your thoughts on cost allocation for those transmission projects?

Under FERC rules and court directives, costs should be allocated to those who benefit. Typically, there is some form of cost-sharing across different entities. Cost allocation policies should recognize the full regional benefits of significant inter-regional transmission, including reliability, effects on delivered energy costs, and access to low-cost resources. Many RTOs are currently discussing additional benefit metrics in the transmission planning process to recognize the full plethora of benefits transmission provides. The requisite portion of those costs should be allocated to reflect regional benefits to all beneficiaries in the region, regardless of their utility's or customers' contractual status with the new project. The number of benefits that accrue to customers from a robust transmission grid, or the harm that comes from the lack of one, can simply not be overstated.

2. In his discussion with you, Mr. Casten noted that there are very few jobs associated with operating a wind and solar plant and because of that, operating costs were low.

a. Do you agree with Mr. Casten that operational wind and solar generation provide few jobs?

According to the 2020 U.S. Energy and Employment Report (USEER), solar and wind operations rank first and second, respectively, for employment in the U.S. electric power generation sector, each exceeding that of all other generator types.[29] Solar and wind plants employ over 350,000 Americans across the nation.[30]

There is no direct relationship between operating costs and total job growth in the solar and wind sectors. The growth of employment in the solar and wind sectors has been increasing even though O&M costs in both sectors have been decreasing. Solar and wind employment in the electric power generation sector increased by 2.4% and 3.2%,[31] respectively, in 2019 and was expected to continue to grow by 7% and 4% in 2020 prior to the pandemic.[32] According to the Bureau of Labor Statistics (BLS) Occupational Outlook Handbook, solar panel installers and wind turbine service technicians are expected to be the fastest growing jobs from 2018–2028.[33]

b. On average, how many employees, union and otherwise, are required to operate a fully constructed and functioning wind or solar powered generation unit in MISO?

Jobs in the renewable sector span across the manufacturing, construction, wholesale trade, professional and business services, utility, and other industries. The utility-scale solar sector has high labor productivity with decreasing transaction costs per unit of capacity deployed.[34] The MISO region employs about three[35] solar O&M jobs[36] per MW[37] of front-of-meter solar capacity. According to the National Renewable Energy Laboratory, a utility-scale wind farm requires about five to seven workers to maintain every 100 MW of a wind project with a lifecycle of 25 years.[38] Lower operational costs for renewable facilities translate to lower costs for ratepayers, com-

---

[29] NASEO and EFI, 2020 U.S. Energy and Employment Report, https://static1.squarespace.com/static/5a98cf80ec4eb7c5cd928c61/t/5ee78423c6fcc20e01b83896/1592230956175/USEER+2020+0615.pdf, p. 40.

[30] Ibid.

[31] Ibid.

[32] Ibid, pp.58-61.

[33] U.S. Bureau of Labor Statistics, "Fastest Growing Occupations, Occupational Outlook Handbook," https://www.bls.gov/ooh/fastest-growing.htm, accessed August 24, 2020.

[34] The Solar Foundation, "Solar Jobs Census 2019," https://www.solarstates.org/#states/solar-jobs/2019.

[35] The Solar Foundation, "Solar Jobs Census 2019," https://www.solarstates.org/#states/solar-jobs/2019, accessed August 24, 2020, and Clean Energy Canada, "Clean energy opportunities are spread across the country," https://canwea.ca/wp-content/uploads/2019/05/Postcard_Opportunities-spread-across-the-country_20190521.jpg, accessed August 24, 2020.

[36] Number of jobs calculated by aggregating MISO state job numbers using The Solar Foundation State Map and Canadian Wind Energy's Manitoba webpage.

[37] MISO, "Planning Year 2020–2021 Wind & Solar Capacity Credit," https://cdn.misoenergy.org/2020%20Wind%20&%20Solar%20Capacity%20Credit%20Report408144.pdf, p. 3, accessed August 24, 2020.

[38] Keyser, David, Tegen, Suzanne, The Wind Energy Workforce in the United States: Training, Hiring, and Future Needs, NREL, available at https://www.nrel.gov/docs/fy19osti/73908.pdf, p. 5, accessed August 24, 2020.

pared to more employment-intensive or higher-risk generation technologies, like nuclear power.[39]

i. On average, how many employees, union and otherwise, work at a nuclear plant in MISO?

According to the Nuclear Energy Agency, each nuclear unit employs 400 to 700 direct workers.[40]

c. If wind and solar replaced all the nuclear plants in MISO, what would be the net impact on direct daily operating jobs at the generation unit (per your discussion with Mr. Casten)?

As noted above, operating nuclear power plants are more labor- and thus more cost-intensive than renewable energy facilities. However, replacing nuclear power plants with wind and solar facilities would result in new jobs outside of power plant operation in construction, wholesale trade, professional and business services and other industries.

i. If wind and solar replaced all the nuclear plants in MISO, what would be the net impact on emissions (including required back up power for renewables to ensure reliability)?

Because both renewable and nuclear energy generation yield zero emissions, there would be no difference in emissions. However, nuclear energy generation produces harmful, radioactive waste which requires extensive government regulation—a cost and environmental burden that is eliminated with the shift to renewable energy.

Renewables do not need to be paired with non-renewable or "backup" sources of energy to replace nuclear facilities and/or be integrated into the grid. Energy storage technology, demand response, large regional power markets, and a robust transmission network can ensure that electrons flow across the country at all hours of the day and night. Due to cost reductions, renewables have been steadily replacing other generation over the past few years[41] with a 19% share of total electricity generation in 2019, which is roughly equivalent to today's share of nuclear generation.[42] EIA's Annual Energy Outlook forecasts that solar PV will be less costly than natural gas to replace retiring coal and nuclear plants in the Southeast and Mid-Continent regions, where solar generation is growing.[43]

3. In the hearing, you stated that renewables are not only the cheapest form of energy, but also the most reliable.

a. Can you provide any facts or data that show wind and solar being more reliable than other competing forms of energy?

Reliability is a system concept. A reliable system includes a diverse portfolio of resources that together meet load at all times. A high renewable energy portfolio can be part of a low-cost, low- carbon, reliable power system.

As the share of wind and solar power in the U.S. electricity mix has grown over time, official metrics indicate that system reliability has been stable or improved. According to a 2019 report to Congress, wind and solar power increased from 1% of generation in 2008 to 8% in 2018, while during the same period 9 of the 13 metrics the North American Electric Reliability Corporation uses to assess reliability were stable or improved.[44] In fact, wind and solar have increasingly provided the majority of generation in different regions without impacting reliability. At certain points in 2019, wind sources supplied 56% of electricity demand in ERCOT and 67.3% of demand in SPP, while solar supplied 59% of demand in CAISO—with bulk power system reliability being maintained during each of these periods.[45]

---

[39] Davis, Lucas, "The High Cost of Nuclear Jobs," The Energy Institute at Haas, March 2020, https://energyathaas.wordpress.com/2020/03/09/the-high-cost-of-nuclear-jobs/.

[40] NEA and IAEA, "Measuring Employment Generated by the Nuclear Power Sector," https://www.oecd-nea.org/ndd/pubs/2018/7204-employment-nps.pdf, p. 30, accessed August 24, 2020.

[41] Energy Information Administration, "Renewable energy explained," https://www.eia.gov/energyexplained/renewable-sources/, accessed August 24, 2020.

[42] Energy Information Administration, "Annual Energy Outlook 2020: Electricity," https://www.eia.gov/outlooks/aeo/pdf/AEO2020%20Electricity.pdf, p. 2, accessed August 24, 2020.

[43] Ibid, p. 20.

[44] Congressional Research Service, "Maintaining Electric Reliability with Wind and Solar Sources: Background and Issues for Congress," June 10, 2019, https://fas.org/sgp/crs/misc/R45764.pdf.

[45] Ibid.

In addition to providing low-cost, pollution-free energy, renewables also deliver a suite of grid reliability services to help keep the lights on during disturbances, including ride-through capability, voltage and reactive power control, and flexibility, frequency regulation, and primary frequency response.[46] Wind and solar can also improve power system resilience during extreme weather conditions. Wind's reliability was demonstrated during the 2014 Polar Vortex event, when turbines continued to turn even when freezing temperatures disrupted natural gas pipelines and froze coal piles, rendering many thermal plants inoperable. According to NERC, coal and gas generators made up 81% of power outages during the event.[47] Wind and solar also remain resilient during heat waves, occurrences that will only increase in frequency due to a changing climate. As described above, CAISO CEO Steve Berberich attributed California's rolling blackouts in part to a power plant that "tripped" in the high heat,[48] likely a natural gas plant that shut down during the heatwave,[49] as natural gas plants often struggle in extreme temperatures.

b. If MISO were to build wind and solar capacity equal to capacity needs and resource adequacy in MISO, how much back up natural gas generation would need to be on-line in order to ensure around the clock reliability?

If entities built wind and solar capacity equal to capacity needs and resource adequacy in MISO, then, by definition, no backup would be needed. As noted above, renewables do not necessarily need to be paired with non-renewable or "backup" sources of energy. Energy storage technology, demand response and a robust transmission network can ensure that electrons flow across the country at all hours of the day and night. A very low-carbon portfolio can also be achieved with natural gas included in the resource mix.

---

[46] American Wind Energy Association, "Renewables on the grid: Market-based solutions support reliability," https://www.aweablog.org/renewables-grid-market-based-solutions-support-reliability/.

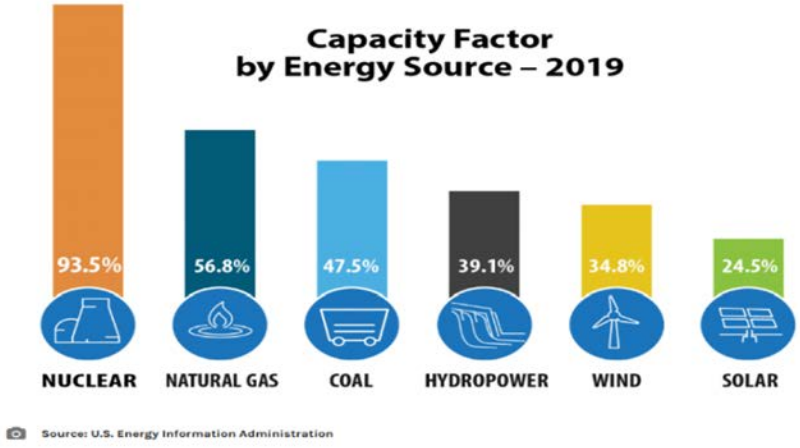
[47] Bade, Gavin, "Polar Vortex set to test Midwest grids amid FERC resilience debate," UtilityDive, January 30, 2019, https://www.utilitydive.com/news/polar-vortex-set-to-test-midwest-grids-amid-ferc-resilience-debate/547231/.

[48] Kahn, Debra and Bermel, Colby, "California has first rolling blackouts in 19 years—and everyone faces blame," Politico, August 18, 2020, https://www.politico.com/states/california/story/2020/08/18/california-has-first-rolling-blackouts-in-19-years-and-everyone-faces-blame-1309757.

[49] Gilbert, Alex and Bazilian, Moran, "California power outages underscore challenge of maintaining reliability during climate change, the energy transition," UtilityDive, https://www.utilitydive.com/news/california-power-outages-underscore-challenge-of-maintaining-reliability-du/583727/.

4. Capacity factor is a measurement for an energy sources' reliability. According to the chart below (published by the Department of Energy based on EIA data), wind and solar are the least reliable forms of energy (https://www.energy.gov/ne/articles/what-generation-capacity). Do you disagree with EIA capacity factor data?

The Capacity Factor



Capacity factors allow energy buffs to examine the reliability of various power plants. It basically measures how often a plant is running at maximum power. A plant with a capacity factor of 100% means it's producing power all of the time.

Nuclear has the highest capacity factor of any other energy source—producing reliable, carbon-free power more than 92% of the time in 2016. That's nearly twice as reliable as a coal (48%) or natural gas (57%) plant and almost 3 times more often than wind (35%) and solar (25%) plants.

Respectfully, capacity factor is not a measurement of an energy source's reliability. A capacity factor is a ratio of energy output relative to maximum potential output over a period of time. For example, a car with a top speed of 90 mph that typically cruises on the highway at a speed of 65 mph and only reaches 90 mph one day a month could be said to have a capacity factor of only 3%. This does not mean the car is unreliable. In fact, a typical wind turbine generates electricity 90% of the time.[50]

Additionally, the capacity factors listed in the chart are an aggregate of all wind and solar projects. As the technologies continue to improve, so do their capacity factors. For example, according to Lawrence Berkeley National Laboratory, "the average 2019 capacity factor among [wind] projects built from 2014 through 2018 was 41%, compared to an average of 31% among projects built from 2004 to 2012 and 25% among projects built from 1998 to 2001."[51]

Finally, most new utility-scale renewable development is not of single-resource projects, but rather hybrid multi-generator or generator-plus-energy storage projects that combine the unique benefits of multiple technologies to achieve reliability and economic gains rarely before seen in power generation.[52] The capacity factors of hybrid resources are absent from the EIA data presented here, but they are by definition higher than any single-resource renewable generator. A hybrid resource that includes energy storage can shift the electrons generated by a variable power resource from times of surplus to times of need. A hybrid resource with more than

[50] American Wind Energy Association, "Basics of Wind Energy," https://www.awea.org/wind-101/basics-of-wind-energy/.

[51] Lawrence Berkley National Lab, "Wind Technologies Market Report," https://emp.lbl.gov/wind-technologies-market-report/.

[52] American Council on Renewable Energy, "Multi-Resource 'Hybrid' Power Plants are the Present and Future of Energy Generation," August 19, 2020, https://acore.org/multi-resource-hybrid-power-plants-are-the-present-and-future-of-energy-generation/.

one generator can ensure that it is always producing power from the most available, least costly fuel of the day, be that sunlight, wind or water.

5. According to the MISO MTEP18 report (https://cdn.misoenergy.org/MTEP18%20Book%202%20Resource%20Adequacy 264875.pdf)

> ***"MISO's ongoing goal is to support the achievement of Resource Adequacy—to ensure enough capacity is available to meet the needs of all consumers in the MISO footprint during all time frames and at just, reasonable rates."***
>
> **Resource Adequacy credits in MISO are determined by Module E-1 tariffs in MISO. This tariff determines the ability of the source to provide resource adequacy support in MISO. According to the MISO report titled "Planning Year 2020-2021 Wind and Solar Capacity Credit" published in December 2019 (https://cdn.misoenergy.org/2020%20Wind%20&%20Solar%20Capacity%20Credit%20Report408144.pdf), the system wide capacity credit for wind during the planning year is 16.6 percent. Can you explain how MISO calculated the 16.6 percent capacity credit and what it means in terms of winds capability to meet MISO resource adequacy?**

This NREL fact sheet[53] describes the terms. MISO and other operators use Effective Load Carrying Capability to determine capacity value. NERC has defined ELCC in this document.[54]

6. According to a recent MISO report, MISO has an installed wind capacity of 20,452MW, yet August 5, 2020 at 2:30pm CST—wind was providing only 3,891 MWs of power to the MISO grid.

> **a. Why is over 80% of the wind capacity in MISO not providing power to customers?**

Very high penetrations of renewable energy are part of any low-cost, low-carbon, reliable portfolio. Natural gas, coal, nuclear, renewable, and all resources have planned and forced outages, and exogenous factors that affect their availability. That does not mean that any single resource or type of resource is available at all times, which is why all systems utilize diverse portfolios. States and grid operators need to assemble portfolios that work together to meet load at all times.

> **b. Is that normal for the majority of wind capacity in MISO not to be delivering power at any single point in time in the summer?**

Very high penetrations of renewable energy are part of any low cost, low carbon, reliable portfolio. Natural gas, coal, nuclear, renewable, and all resources have planned and forced outages, and exogenous factors that affect their availability. That does not mean that any single resource or type of resource is available at all times which is why all systems utilize diverse portfolios. States and grid operators need to assemble portfolios that work together to meet load at all times.

7. At 2:30pm CST on August 5, 2020, the LMP in MISO was approximately $25.00. If according to the conversation between you and Mr. Casten the marginal cost of wind was $0 and therefore wind would be dispatching at any price over zero, can you explain why over 80% of the wind in MISO is not dispatching when the market was paying $25.00?

Because of the free market, suppliers are not required to sell at any given price. Marginal cost therefore refers to the cost of the supplier to dispatch electricity, not the price at which the supplier must sell electricity. When wind dispatches at prices above $0, it earns a profit due to its zero-marginal cost.

Additionally, LMP refers to locational marginal price, a construct that exists because transmission constraints preclude the formation of any single market price for electricity in MISO at any given time. Prices vary across localized nodes, called LMPs. An expanded and updated transmission system would go a long way towards reducing this price variability and deliver the cleanest, lowest-cost power to consumers.

---

[53] https://www.nrel.gov/docs/fy13osti/57582.pdf
[54] https://www.nerc.com/files/ivgtf1-2.pdf

8. An article published March 19, 2019, by the Institute for Energy Research (https://www.instituteforenergyresearch.org/the-grid/wind-generation-fails-in-midwest-due-to-weather-events-polar-vortex-and-el-nino/) analyzed the performance of wind generation during acute weather events and included the following statement,

> ***"During the polar vortex, wind turbines shut off when temperatures dipped below minus 20 degrees Fahrenheit. There has been little focus on developing wind turbines to operate below minus 20 degrees Fahrenheit because at these temperatures, there is not much wind blowing. The economics of producing wind energy in such extreme conditions would not justify the additional cost, according to wind experts."***

a. How did renewables perform (what percent of capacity was dispatched) during the polar vortex of 2014 and the polar vortex of 2019 in the regions impacted by each polar vortex?

In January 2014, freezing temperatures descended upon the Midwest and Eastern regions of the United States, setting a winter peak demand record in MISO, SPP, ERCOT, PJM, and NYISO, along with most of the utilities in the Southeast.[55] During this event, cold temperatures disrupted natural gas pipelines and froze coal piles and mechanical components at generators, rendering many inoperable.[56] Fortunately, wind energy output was well above expectations for its contribution during the peak demand period, helping to keep the lights on for millions of customers.[57]

For example, in an assessment of operational events and market performance, PJM highlighted that wind generation performed well above its capacity for the duration of the event, and performed at nearly 70% of its maximum capacity on January 6th.[58] Additionally, also on January 6, 2014, the Nebraska Public Power District (NPPD) met record winter electricity demand as wind provided about 13% of the utility's electricity. NPPD explained that "Nebraskans benefit from NPPD's diverse portfolio of generating resources. Using a combination of fuels means we deliver electricity using the lowest cost resources while maintaining high reliability for our customers." During the Polar Vortex, the utility also noted that "NPPD did not operate its natural gas generation because the fuel costs were up more than 300 percent over typical prices."[59]

During the 2019 Polar Vortex, freezing temperatures also impacted much of the Midwest and Eastern U.S. During the event, wind energy output was again consistently well above the level planned for by MISO and PJM during the period of highest electricity demand on January 30-31. Wind output was even higher on the evening of January 29 when the Midwest experienced very high demand.[60] This was in part driven by an intrusion of fast-moving, dense air which proportionally increased wind turbine output.

Wind energy worked especially well during the 2019 Polar Vortex, as wind output in MISO and PJM consistently outperformed grid operators' expectations as seen through the figure below.[61]

---

[55] Federal Energy Regulatory Commission, "Recent Weather Impacts on the Bulk Power System", January 16, 2014.

[56] Bade, Gavin, "Polar Vortex set to test Midwest grids amid FERC resilience debate," Utility Dive, January 30, 2019, https://www.utilitydive.com/news/polar-vortex-set-to-test-midwest-grids-amid-ferc-resilience-debate/547231/.

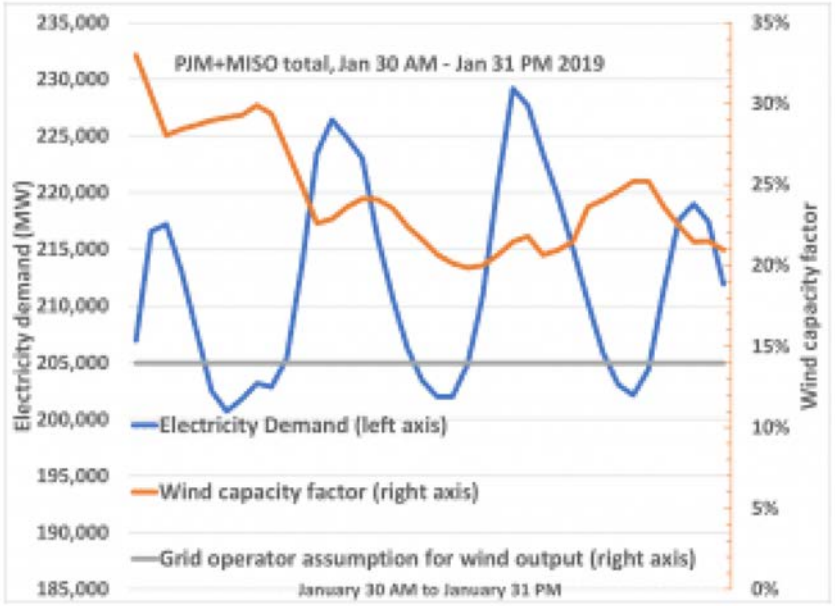
[57] Goggin, Michael, "Renewables on the grid: Market-based solutions support reliability," July 19, 2017, https://www.aweablog.org/renewables-grid-market-based-solutions-support-reliability/.

[58] PJM, "Operational Events and Market Impacts January 2014 Cold Weather." May 9, 2014, https://pjm.com/-/media/library/reports-notices/weather-related/20140509-presentation-of-january-2014-cold-weather-events.ashx?la=en.

[59] Nebraska Public Power District, "Nebraska Customers Set Winter Peak," accessed January 2015, http://www.nppd.com/2014/nebraska-customers-set-time-winter-peak-nppd/.

[60] Goggin, Michael, "How transmission helped keep the lights on during the Polar Vortex," February 14, 2019, https://www.aweablog.org/transmission-helped-keep-lights-polar-vortex/.

[61] American Wind Energy Association, "How transmission helped keep the lights on during the Polar Vortex," February 14, 2019, https://www.aweablog.org/transmission-helped-keep-lights-polar-vortex/.



During the 2019 Polar Vortex, Michigan utility DTE noted that its 277 wind turbines performed at full capacity for nearly the whole week.[62]

b. When people's health and safety depended on power during the polar vortex, what were the best performing sources of energy?

Coal and natural gas constituted the greatest proportion of forced outages in MISO from 2014 to 2019, the period of the two most recent polar vortices. By comparison, while wind plants in MISO experienced 4 GW of shutoffs, this figure pales in comparison to the nearly 14 GW of coal and natural gas facilities driven offline during the 2019 Polar Vortex.[63]

9. As renewable penetration increases, should we put in place requirements that ensure an "American Made" supply chain across the spectrum from extraction to assembly?

According to the Department of Energy, domestically manufactured content for recently installed wind projects in the U.S. was over 90% for nacelle assembly, between 75 and 90% for towers, and between 50% and 70% for blades and hubs.[64] Additionally, 95% of the wind power capacity installed in the U.S. last year was built by wind turbine manufacturers with at least one American manufacturing facility.[65]

Although U.S. global market share for solar technology has declined in recent years, domestic solar photovoltaic manufacturing has expanded. An August 2017 International Trade Commission report found that, between 2012 and 2016, production capacity of U.S. PV module manufacturers rose 34%, and domestic production

---

[62] DTE Energy, "DTE's wind fleet weathers cold temperatures," February 1, 2019, https://empoweringmichigan.com/dtes-wind-fleet-weathers-cold-temperatures/.

[63] MISO, "MISO January 30-31 Maximum Generation Event Overview," February 27, 2019, available at HYPERLINK https://cdn.misoenergy.org/20190227%20RSC%20Item%2004%20Jan%2030%2031%20Max%20Gen%20Event322139.pdf, p. 5, accessed August 24, 2020.

[64] Department of Energy, "2018 Wind Technologies Market Report," 2018, https://emp.lbl.gov/sites/default/files/wtmr_final_for_posting_8-9-19.pdf.

[65] American Wind Energy Association, "Wind Powers America Annual Report 2019," April 2020, https://www.awea.org/resources/publications-and-reports/market-reports/2019-u-s-wind-industry-market-reports.

expanded by 24%.[66] Furthermore, a 2019 National Renewable Energy Laboratory report on U.S. infrastructure availability for PV manufacturing found that this growth in domestic demand could represent a significant catalyst for growth in upstream industries. The NREL report noted that the U.S. has significant steel and aluminum production capacity that could be utilized for manufacturing extruding racking and module frames, and further production capacity that could be adapted and scaled for other important components such as inverters, encapsulants, flat glass, and Tedlar.[67]

Today's renewable energy supply chain is a testament to the strength and diversity of American manufacturing, which plays a central role in the nation's renewable energy success story.

○

[66] Congressional Research Service, "Domestic Solar Manufacturing and New U.S. Tariffs," February 2018, https://fas.org/sgp/crs/misc/IF10819.pdf.

[67] Smith, Brittany L., and Robert Margolis, "Expanding the Photovoltaic Supply Chain in the United States: Opportunities and Challenges," National Renewable Energy Laboratory, 2019, https://www.nrel.gov/docs/fy19osti/73363.pdf.