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CLIMATE CHANGE: PREPARING FOR THE ENERGY TRANSITION

OVERSIGHT HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES

OF THE

COMMITTEE ON NATURAL RESOURCES
U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED SIXTEENTH CONGRESS

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CONTENTS

Page

Hearing held on Tuesday, February 12, 2019 1

Statement of Members:
- Cunningham, Hon. Joe, a Representative in Congress from the State of South Carolina, prepared statement of 74
- Gosar, Hon. Paul A., a Representative in Congress from the State of Arizona 5
- Lowenthal, Hon. Alan S., a Representative in Congress from the State of California 1
  - Prepared statement of 4

Statement of Witnesses:
- Bissett, Bill, President and CEO, Huntington Regional Chamber of Commerce, Huntington, West Virginia 19
  - Prepared statement of 20
- Dennison, Brandon, Founder and CEO, Coalfield Development, Huntington, West Virginia 31
  - Prepared statement of 32
- Farley, Chandra, Director, Just Energy, Partnership for Southern Equity, Atlanta, Georgia 8
  - Prepared statement of 10
- Hille, Peter, President, MACED, The Mountain Association for Community Economic Development, Berea, Kentucky 22
  - Prepared statement of 23
- Mason, Joseph, Professor, Department of Finance, Louisiana State University, Baton Rouge, Louisiana 38
  - Prepared statement of 40
- Shrader, Sarah, Owner and Co-Founder, Bonsai Design; President, Outdoor Recreation Coalition of the Grand Valley, Grand Junction, Colorado 14
  - Prepared statement of 15

Additional Materials Submitted for the Record:
- List of documents submitted for the record retained in the Committee's official files 83
- Submission for the Record by Rep. Cheney
  - Overview and FAQs, Green New Deal 62
- Submissions for the Record by Mr. Dennison
  - *Forbes* article, "Solar Employs More People In U.S. Electricity Generation Than Oil and Gas Combined," by Niall McCarthy, January 25, 2017 82
  - Statement in Response to Dr. Mason 83
- Submissions for the Record by Rep. Gosar
  - *Financial Times* article, "China's demand for electric vehicles charges copper," February 12, 2019 75
  - *Financial Times* article, "Australia hopes to cash in on new cobalt rush," February 12, 2019 76
- Submission for the Record by Rep. Graves
  - January 2019 Electricity Prices by State 58
- Submission for the Record by Rep. Lowenthal
  - Energy Jobs—Current Employment Statistics from the Bureau of Labor Statistics, February 13, 2019 80

OVERSIGHT HEARING ON CLIMATE CHANGE: PREPARING FOR THE ENERGY TRANSITION

Tuesday, February 12, 2019
U.S. House of Representatives
Subcommittee on Energy and Mineral Resources
Committee on Natural Resources
Washington, DC

The Subcommittee met, pursuant to notice, at 10:03 a.m., in room 1324, Longworth House Office Building, Hon. Alan S. Lowenthal, [Chairman of the Subcommittee] presiding.

Present: Representatives Lowenthal, Levin, Cunningham, Brown, Huffman, Gosar, Lamborn, Westerman, Graves, Cheney, and Hern.

Also present: Representatives Case and Neguse.

Dr. LOWENTHAL. Welcome, everybody. We are now in the first Energy and Mineral Resources Subcommittee in the 116th Congress. I want to welcome everyone. I am really looking forward to all of us working together.

The Subcommittee is meeting today to hear testimony on climate change and preparing for the transition to a clean energy economy. This is where we are starting from today.

Under Committee Rule 4(f), any oral opening statements at hearings are limited to myself as the Chairperson and the Ranking Minority Member, or my dear friend, Mr. Gosar.

I ask unanimous consent that all other Members' opening statements be made part of the hearing record if they are submitted to the Subcommittee Clerk by 5 p.m. today.

Hearing no objection, so ordered.

STATEMENT OF THE HON. ALAN S. LOWENTHAL, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Dr. LOWENTHAL. To begin with, I would like to thank my partner and congratulate Ranking Member Gosar on his Subcommittee leadership position. We have developed a good relationship. I served as the Ranking Member with Mr. Gosar previously, and I found it very positive. I think we work very well together—not always agreeing on things, but we work together well on things. We also have mutual likes—tamales, coffee—as I just took some, as well as opportunities to work together on this Subcommittee. I look forward to sharing with the members of this Committee ways on how we can work together. I am going to mention one of those things in the statement.

I think—I haven't checked with anyone in the Capitol, the historians, but I think this is the only Subcommittee with both the Chair and the Ranking Member who are doctorates but don't have a doctorate in juris prudence. You know, we are a psychologist and a dentist. Exactly what the Congress needs at this moment is a psychologist.

Before I turn to the topic of today's hearing, I want to emphasize that, even though we are not going to have any shortage of policy disagreements on this Subcommittee, it is my intention to run it in ways that keep discussions thoughtful and respectful, based upon facts, not putting people down, and with an eye to wherever we can find agreement, let's go for it. If we can't find agreement, let's respect each other and understand that.

This Subcommittee is going to have a tremendously important role in our country's debate over energy and climate. I know it is doubted by some of my colleagues. I think that is their position where they are starting, not all, who say we have no jurisdiction over climate change and no reason to discuss it. Well, I totally disagree with that point of view, and I think that is just not right.

In addition to the tremendous impacts from climate change that are affecting our public lands, these lands are responsible for nearly one-quarter of the Nation's greenhouse gas emissions, which we have jurisdiction over. They are also home to some of the best renewable resources in the country, if not on this planet, which we have jurisdiction over. We are talking about geothermal. We are talking about large-scale solar. We are talking about major offshore wind which is beginning to become a reality.

Managing our Nation's vast energy resources, addressing the health and the environmental impacts of energy production, and understanding the role of public lands in mitigating climate change are just some of the issues we will discuss.

I want this Subcommittee to be a forum where we can discuss these issues and develop solutions that have the buy-in from the communities across the country, because we are really talking about beginning to embark on an adventure where we will not solve it all here. We have to have buy-in from our communities.

In the coming weeks, I look forward to meeting with individuals on this Subcommittee to get to know them, to discuss your goals and priorities. But I have also talked to my Ranking Member about maybe periodic—maybe once a quarter—having an off-the-record, informal, no press, no public prepared statements way of getting to know each other, whether they are round tables we could find someplace, where we can really hear each other's story. What are you passionate about? What do you want to do? Why are you here?

The more you know each other's story, the more difficult it is to dehumanize in this situation. We have enough differences that we don't need to dehumanize each other in that process. We need to hear and respect where people are coming from. Plus, it makes it the most enjoyable parts of a committee if we kind of know the other members and why they are here and what they—it makes the formal aspects, which we will be focusing on, more interesting to do and more fun.

So, when I meet with you individually, I want to ask about some—we are not going to do a lot of them. We are going to do some where it is off the record, folks. You come when you want to come. You don't prepare anything. You want to share who you are and who you are in relationship to some of these issues that are important to you and your community, not to the committee or to anybody else.

I really look forward to that. And plus, Paul said he is going to help us with making sure we have the tamales and coffee. So, we are going to work on that.

I would also like to give a warm welcome to our witnesses and thank them for testifying this morning. This month, in the entire Natural Resources Committee, we are discussing the impacts of climate change, whether it is tribes we are talking about, oceans, national parks, forests, wildlife. All of these are seeing huge consequences, and I think from most people's perspective, the worst is yet to come.

There must be changes in how we produce and use energy in this country. And there is no doubt that a transition away from fossil fuels to zero-emission energy sources is essential if we are to leave a recognizable world for our grandchildren and great-grandchildren. They are usually not at the table. But these are issues that they have to be considered at the table from now on, that anything that we do has to understand how it is going to have that impact.

I think this transition has to happen quickly. My colleagues on the other side of the aisle may not feel the same urgency. That is why we have different—not that they are any different, but they may not feel the same urgency. They may not worry or they may have different concerns about the disruption of jobs and what this means for the economy or that their local economies will be greatly affected or it doesn't really impact them as much.

I hope in using science and listening to each other, that we grow more, that we come closer in looking at we don't have a lot of time. Time is not on our side, and we need to figure out what we can work together on and how we can move forward.

One of the things I think we all are going to agree upon is the need to help the people that are most impacted by that transition, that there are different parts of the country that are going to be impacted the most. And we don't want to leave people out of that transition, and what is happening is not new. We have already gone through—in 1943, we had over half a million coal miners in the country; 130,000 in West Virginia alone. And for decades, Appalachia and workers and families that call this region home supplied the United States with coal that kept the lights on, powered the world's largest economy, and were instrumental in winning World War II and protecting democracy. So, we are talking about something that is part of the Nation's fabric.

But today, there are barely one-tenth as many coal mining jobs. It has not been due to government policies. It is because of the sense of the economics that is going on, automation that is going on and other alternatives. But the cause of it is irrelevant. What is really relevant, I think right now, not that it is all irrelevant in the causes because it is not. But the real thing is the effect that there are out-of-work coal miners. Their families are unsure of what they are going to do for a living. Whole communities are practically vanishing, and if we use as the mantra the solution is to provide false hope that there is going to be a resurrection of coal, we are not doing our responsibility. We are not acting responsibly.

The solution is going to be to provide new opportunities for these workers and new options for towns to grow and thrive. As we move

toward clean energy, other regions of the country are going to be impacted in a different way, and we are going to have to understand how we are going to deal with that. Some areas are already preparing for this.

Wyoming, a major coal-producing state in the Nation, just recently released an ambitious 20-year plan to diversify their economy and to reduce the state's over-reliance on coal. We do have doubters and those that think we should be doubling down now on fossil fuel. I think personally that is a recipe for even more hardship if we double down, whether it is because of climate change, resource depletion, or normal boom-or-bust cycles of fuel prices. Putting all your chips on fossil fuels I think now is a bad bet, and we need to at least address those issues. We need to support American communities and workers with the same effort and urgencies that we need to confront climate change. And I think that there is one sense that we are hearing is there is an urgency to what we do, and we have to deal with that.

Thank you. And I will assure you in the future I will not talk this long.

[The prepared statement of Mr. Lowenthal follows:]

PREPARED STATEMENT OF THE HON. ALAN S. LOWENTHAL, CHAIRMAN, SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES

The Subcommittee on Energy and Mineral Resources will come to order. Good morning, and welcome to the first Energy and Mineral Resources Subcommittee hearing in the 116th Congress.

The Subcommittee is meeting today to hear testimony on climate change and preparing for the transition to a clean-energy economy.

To begin, I'd like to congratulate Ranking Member Gosar on his Subcommittee leadership position. We've developed a good working relationship over the past few years, in Congress and on this Subcommittee. We have already sat down together to discuss our mutual love for tamales, coffee, as well as opportunities to work together on this Committee. I look forward to talking to you more on our shared priorities and ways we can work together moving forward.

I haven't actually checked this, but I believe this is the only committee or subcommittee in the House with a Chair and Ranking Member with Doctorates other than a JD. I don't know about you, but I think what the country needs now is a psychologist and a dentist.

Before I turn to the topic of today's hearing, I want to emphasize that even though we will have no shortage of policy disagreements on this Subcommittee, it's my intention as Chairman to run this Subcommittee in a way that keeps the discussion thoughtful and respectful, based on facts, and with an eye toward finding agreement whenever possible.

We have moved a number of bills through this Subcommittee on a bipartisan basis in the last two Congresses, and I want to thank Ranking Member Gosar for working with our side on many of those bills, and I intend to continue and build on that cooperation in this Congress.

This Subcommittee has a tremendously important role in our country's debate over energy and climate. I know this is doubted by some of my colleagues on the other side, who say we have no jurisdiction over climate change and no reason to discuss it. That is flat-out wrong.

In addition to the tremendous impacts from climate change that are affecting our public lands, those lands are responsible for nearly one-quarter of this country's greenhouse gas emissions. They also are home to some of the best renewable resources in this country, from geothermal to large-scale solar to offshore wind.

Managing our Nation's vast energy resources, addressing the health and environmental impacts of energy production, and understanding the role of public lands in mitigating climate change are just a few of the critical issues we will discuss.

I want this Subcommittee to be a forum where we discuss these issues and develop legislative solutions that have the buy-in from communities across the country.

In the coming weeks I look forward to sitting down individually with each member of this Subcommittee, from both parties, to get to know them and discuss their own goals and priorities in Congress and in this Subcommittee.

I would also like to hold periodical, off-the-record, roundtables with the members of the Subcommittee to help foster frank and honest conversation to help all of us understand each other's approach, interest, and, priorities.

Finally, I want to give a warm welcome to our witnesses and thank them for testifying this morning.

This month in the Natural Resources Committee we are discussing the impacts of climate change. Tribes, oceans, national parks, forests, and wildlife are already seeing huge consequences, and unfortunately worse is yet to come.

There must also be changes in how we produce and use energy in this country.

There is no doubt that a transition away from fossil fuels to zero-emission energy sources is essential if we are to leave a recognizable world for our grandchildren, our great-grandchildren, and beyond.

I believe this transition must happen quickly. My colleagues on the other side may not feel the same urgency. Whether this is because of the worries over disruption of jobs and their local economies or something else entirely, I hope the scientists, and storms, and floods, and climate refugees convince them there is no time to waste. I assure you—we can push for a zero-carbon energy future and have economic growth.

One thing we certainly agree on is the need to help people who may be left behind or left out as this transition occurs.

This is not new. In 1941, there were nearly 550,000 coal miners in this country, with roughly 130,000 in West Virginia alone.

For decades, Appalachia and the workers and families that call this region home supplied the United States with the coal that kept the lights on and powered the world's largest economy. Appalachian coal miners were instrumental in winning World War II.

Today, there are barely one-tenth as many coal mining jobs. This hasn't been due to any government policy. It was because of economics and automation. But the cause is irrelevant. The effect is thousands of out-of-work coal miners, families unsure what their children will do for a living, and whole communities practically vanishing.

The solution to this is not to provide false hope that there will be a resurrection of coal. The solution is to provide new opportunities for workers and new options for towns to grow and thrive.

As we make the necessary transition to clean energy, other regions and other workers will face some of the same challenges. We cannot simply sit back and watch. We must take actions to help those who may be hurt.

Some areas are already preparing. Wyoming recently released an ambitious 20-year plan to diversify their economy and reduce the state's over-reliance on coal.

Some, however, believe they should double down on fossil fuels and hope for the best. This is a recipe for even more hardship. Whether it's because of climate change, resource depletion, or just the normal boom-and-bust cycle of fuel prices, putting all your chips on black gold is a losing bet.

We need to support American communities and workers with the same effort and urgency that we need to confront climate change.

Dr. LOWENTHAL. I now recognize Mr. Gosar for his opening statement.

STATEMENT OF THE HON. PAUL A. GOSAR, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ARIZONA

Dr. GOSAR. I thank the gentleman.

And, yes, my good friend Dr. Lowenthal brings a smile every morning. And as a recovering dentist, I will tell you: A smile tells me everything I need to know. A smile tells me you are happy with yourself; you are willing to engage. If you are willing to engage, you are willing to communicate. If you are willing to communicate, you can solve a problem. So, if you want to solve a problem, smile.

So, thank you again, and thank the witnesses for being here.

Before I get into my opening statement, Mr. Chairman, I would like to reflect on the Majority's non-compliance with Committee Rule 4(c) by failing to provide a public memo on the scope of today's hearing. Without a memo, the public is kept in the dark and members of this Committee are unable to prepare for an informed debate. I ask my Democratic colleagues to please return to a transparent process so that we can do the deliberative work of this body in a more effective manner.

I think my colleagues on both sides of the aisle would agree that legislating shouldn't be done in the dark.

Now, for the matter at hand. The title of this hearing, "Climate Change: Preparing for the Energy Transition," implies our country is on the cusp of a sweeping transformation into a green economy and that communities with vibrant energy economies today should be planning accordingly. This implication is manifested by the dramatic socialist resolution that was introduced last week, the Green New Deal. This proposal calls for net-zero emissions in the next 10 years through Federal mandates, 100 percent clean and renewable energy, a phaseout of plane travel. And according to the bills accidentally uploaded frequently asked questions, guaranteed economic security for all those unable or unwilling to work.

This is just what it sounds like: a socialist fairytale right up there with "if you like your healthcare plan, you can keep it."

Let me be clear. Though the Green New Deal may not be our primary topic today, the Majority will see this hearing to bolster the case for why and how we can replace 6-figure energy jobs with bioenergetic hemp farms and wind-powered coffee shops through a Federal takeover of the country.

Indeed, many members of this Committee have co-sponsored this radical resolution, including the Chairman of the Committee, Mr. Grijalva, as well as my friend and Chairman of this Subcommittee, Mr. Lowenthal, and fellow Subcommittee members, Mr. Huffman and Mr. Neguse.

We will hear testimony today from several witnesses regarding their efforts to create jobs in the Appalachia and the Mountain West outside of the fossil fuel industry. I appreciate their efforts and their commitment to getting Americans back to work, particularly after so many Americans were laid off from their high-paying energy jobs after the regulatory assault of the previous administration.

I do believe there are wonderful opportunities that can help regions that are dependent on traditional sources to diversify their economies and to prevent devastation afflicting regions like Appalachia due to failed Federal mandates.

Despite what the Majority's intent with this hearing, I want to assure the American people about our energy economy and its importance for the foreseeable future. From the 10.3 million jobs in the United States supported by the oil and gas economy to the geopolitical certainty we can provide our European, Asian, and other allies, and to continued domestic investments, such as ExxonMobil's announcement last week of a $10 billion LNG export facility in Texas, conventional energy sources have played an overwhelmingly positive role in defining our country. Innovation in these fields has reduced emissions. At the same time, production

has increased. Moreover, energy demand in the United States and around the world is strong. The void left by America would be filled by opportunistic countries with far worse environmental standards if the United States exited the conventional energy market. Even saying that, these words feel ridiculous, but these are strange times.

Let's take a moment to talk about what a green economy really means. If I may borrow a term, an inconvenient truth about renewable energy is a need for vast amounts of critical minerals and rare earth elements to make them work. For example, wind power requires neodymium and dysprosium, and demand for these minerals is expected to go up by 700 percent to 2,600 percent, while solar panels rely almost solely on minerals the United States currently imports from countries like China, despite being a Nation blessed with many of the resources that can be mined here.

In the last several years, America has experienced an energy renaissance. U.S. natural gas, oil production and exports are at record levels. In 2017, the United States also led the world in carbon emissions reductions. This occurred because of American ingenuity and in spite of anti-energy policies of the previous administration and seemingly the agenda of the new House Majority.

Delusional Federal mandates proposed in the Green New Deal will only topple America's dominance in the energy economy, creating unemployment, high energy costs, and weakening our position globally. It would be a mass tax and a mass displacement of the poorest among us.

My Democratic colleagues in the past have claimed to support an all-the-above energy strategy. It turns out this was just an election year talking point as many now wage war on nuclear energy, natural gas, and even hydropower.

The irony with the Green New Deal's facts page proposing an end to the use of nuclear energy is nuclear energy is one of the cleanest and most reliable sources in America.

I am glad we are able to highlight the good work our witnesses are doing back in Appalachia and across the country. But we should be discussing ways to remove red tape, empower job creators, pursue innovative technologies that bolster our strong status as the leader in emissions reductions. If the Majority has their way and the policies of the green dream somehow are magically enacted, then the economic plight of Appalachia will be a microcosm of the rest of our great Nation.

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

Dr. LOWENTHAL. Thank you. And I take it you won't be a cosponsor.

Dr. GOSAR. No, I don't think so. You can probably take that to the bank.

Dr. LOWENTHAL. Thank you, Paul.

Now, I would like to introduce today's witnesses.

But first I would like to ask unanimous consent for Congressman Case and Congressman Neguse to sit on the dais and participate in this morning's hearing.

Hearing no objections, so ordered.

I am going to introduce our first witness. First, we have Chandra Farley. Ms. Farley is the director of Just Energy, the Just Energy program for the Partnership for Southern Equity.

Our second panelist is Sarah Shrader. Ms. Shrader is the owner and co-founder of Bonsai Design and the president of the Outdoor Recreation Coalition of the Grand Valley.

Next, we have Dr. Bill Bissett. Dr. Bissett is the president and the CEO of the Huntington Regional Chamber of Commerce.

Our fourth witness is Peter Hille. Mr. Hille is the president of the Mountain Association for Community Economic Development.

Our fifth witness is Brandon Dennison. Mr. Dennison is the founder and the CEO of Coalfield Development Corporation.

And, finally, we have Dr. Joseph Mason. Dr. Mason is a professor in the Department of Finance at the Louisiana State University.

Let me remind our witnesses that, under our Committee Rules, they must limit their oral statements to 5 minutes but that their entire statement will appear in the hearing record. When you begin, the lights on the witness table in front will turn green. And then, after 4 minutes, the yellow light will come on. Your time will then have expired after 1 more minute when the red light comes on, and I will ask you to please complete your statement.

I am also going to allow the entire panel to testify before Members up here on the dais begin questioning.

I will now recognize Ms. Farley to testify. Welcome.

STATEMENT OF CHANDRA FARLEY, DIRECTOR, JUST ENERGY, PARTNERSHIP FOR SOUTHERN EQUITY, ATLANTA, GEORGIA

Ms. FARLEY. Thank you.

Honorable Chairman Lowenthal, Ranking Member Gosar, and members of the House Subcommittee on Energy and Mineral Resources, thank you for inviting me here today.

My name is Chandra Farley, and I am the Just Energy director at the Partnership for Southern Equity based in Atlanta, Georgia. I am honored to provide this testimony in support of a just and equitable transition to the clean energy economy.

We know with data-informed certainty that systematically disenfranchised under-resourced communities and communities of color in the South bear a disproportion burden of the negative impacts of the changing climate and carbon-based energy production. Three of the top five biggest carbon polluters are in the South. This is compounded by the fact that four southern cities, Memphis, Birmingham, Atlanta, and New Orleans, hold the greatest energy burdens for low-income households but face the greatest barriers to weatherization assistance and energy efficiency programs that can reduce these high burdens.

Also, the Southeast region serves as home to 84 percent of all U.S. counties that experience persistent poverty. This is defined as a county in which at least 20 percent of the population experiences poverty for three decades or more. Pile on the fact that the South experiences a higher frequency of billion dollar weather and climate disaster events than any other region, we can begin to contextualize the constant struggle and mounting barriers that historically marginalized communities face in this era of changing climate and rapid energy transition.

Despite bearing an inequitable portion of negative impacts due to climate change and carbon-based energy production, disenfranchised communities are virtually unrepresented in the energy planning and decision-making processes that drive inequitable outcomes in energy regulation, distribution, and policy.

While unfamiliar to many citizens, these policies significantly impact household economic stability and impinge upon the overall quality of our air, water, and other natural resources that affect our health and well-being.

Directly related to the health and well-being stressors of carbon-based energy production is the rising cost of energy. The resulting energy burden or percentage of household income spent on energy bills is a crippling financial burden for working families. According to the American Council for Energy-Efficient Economy, the energy burden on African American and Latino households with lower incomes is up to three times as high as others.

When you consider that the median energy burden in the ACEEE sample was 3.5 percent, we can see the paralyzing effects of increasing energy costs on many families' ability to thrive. With eliminated funding for weatherization assistance programs and financial barriers to cost-saving energy efficiency upgrades, the mounting cost of energy bills translate to unimaginable choices for our working families and senior citizens. Do you pay the light bill and go without your medicine, or do you buy groceries or heat your home?

Collectively, these conditions stem from the underlying forces of structural and institutional racism that are embedded in our land use policies and energy systems. From the siting of carbon-based energy production facilities and the resulting negative health impacts to the disproportionate burden of rising energy costs on low-wealth communities, these societal barriers have hampered the opportunity for marginalized communities to lend their perspective to the shaping of their clean energy future and fully benefit from rapidly expanding clean energy markets. For instance, only 7 percent of solar workers in 2017 were African American while the percentage of solar workers in the United States grew 168 percent since 2010 according to The Solar Foundation.

Against the backdrop of global climate change, these disparities have driven equity and justice to the forefront of the energy transition conversation and made Just Energy a top priority. When utilized as a framework for mobilizing advocacy around energy equity issues, Just Energy represents an equity ecosystem of frontline communities, subject-matter experts, houses of worship, youth movements, and academia organizing together to ensure that the benefits of a clean energy economy include fair prices, freedom from negative health impacts, and access to thriving wage employment. We believe that this approach is central to the energy equity movement and that the future of our communities is dependent upon collective action toward an equitable inclusive just energy future for all.

Thank you.

[The prepared statement of Ms. Farley follows:]

PREPARED STATEMENT OF CHANDRA FARLEY, JUST ENERGY DIRECTOR, PARTNERSHIP FOR SOUTHERN EQUITY

We know with data-informed certainty that systematically disenfranchised, under-resourced communities and communities of color in the South bear a disproportionate burden of the negative impacts of the changing climate and carbon-based energy production. Three of the top five biggest carbon polluters in the power sector are in the South where investments in consumer-directed clean energy continue to lag. This is compounded by the fact that four southern cities—Memphis, Birmingham, Atlanta and New Orleans, hold the greatest energy burdens for low-income households but face many barriers to the energy efficiency programs that can reduce these high burdens. Also, the Southeast regions serve as home to 84 percent of all U.S. counties that experience persistent poverty (defined as a county in which at least 20 percent of the population experiences poverty for three decades or more). Pile on the fact that the South experiences a higher frequency of billion-dollar weather and climate disaster events than any other region, we begin to contextualize the constant struggle and mounting barriers that historically under-resourced and marginalized communities face in this era of changing climate and energy transition.

Despite bearing an inequitable proportion of negative impacts due to climate change and carbon-based energy production, disenfranchised communities are virtually unrepresented in the energy planning and decision-making processes that drive inequitable outcomes in energy regulation, distribution and policy. While unfamiliar to many citizens, these policies significantly impact household economic stability and impinge upon the overall quality of our air, water and other natural resources that affect our health and well-being. This is evidenced by a report from the NAACP noting that 68 percent of African-Americans live within 30 miles of a coal-fired power plant. In addition to lower property values, proximity to these coal plants carries health risks such as increased infant death, heart disease, lung disease, asthma attacks and asthma associated deaths. Plus, the disproportionate impacts reach the healthcare and education sectors as emergency room visits, hospitalizations and missed school days (that leads to missed work and job insecurity for parents) all increase due to these harmful, life-threatening emissions.

Adding to the worsening impacts of climate change is carbon-based energy production. Climate change pressures on the energy system result in increased demand for electricity as heatwaves worsen, power failures caused by storms and flooding increase and system failures and inefficiencies caused by extreme heat mount. These shocks and stressors are exacerbated by the destruction of local economies due to short-sighted, extractive practices by the coal, oil and gas industries. With fossil fuels still supplying nearly two-thirds of the United States' electricity, the increased demand will increase the carbon emissions that disproportionately impact marginalized communities.

Directly related to the health and well-being stressors of carbon-based energy production is the rising cost of energy. The resulting "energy burden," or percentage of household income spent on energy bills, is a crippling financial burden for families with lower incomes. According to the American Council for an Energy-Efficient Economy (ACEEE), the energy burden on African-American and Latino households with lower incomes is up to three times as high as other homes. In my home state of Georgia, nearly 300,000 households with incomes of below 50 percent of the Federal Poverty Level pay 41 percent of their annual income for their home energy costs. When you consider that the median U.S. energy burden across the cities in the ACEEE sample was 3.5 percent, we can see the paralyzing effects of increasing energy costs on family's ability to thrive. With limited funding for weatherization assistance programs and financial barriers to cost-saving energy efficiency upgrades, the mounting costs of energy bills translate to unimaginable choices for working families and senior citizens. Do you pay the light bill and go without your medicine? Do you buy groceries or heat your home?

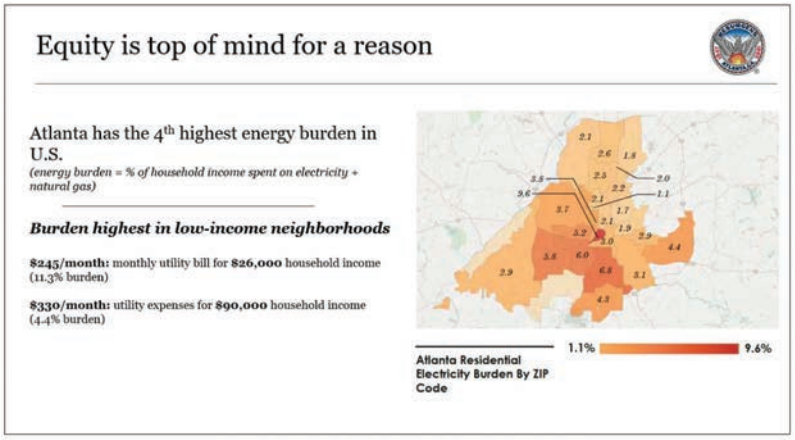


Figure 1: City of Atlanta energy burden. Source: Farley, C., Garret, C., & O'Neil, M. (2018). Atlanta: Equity and Policy Overview. Presentation, New York, New York.

Collectively, these conditions stem from the underlying forces of structural and institutional racism that are embedded in our land-use policies and energy systems—from the siting of carbon-based energy production and the resulting negative health impacts, to the disproportionate burden of rising energy costs on under-resourced communities and communities of color. Against the backdrop of global climate change, a reckoning with the South's history of racial inequality is driving equity and justice to the forefront of the energy transition narrative.

In order to frame the intersection of race and energy and act on the resulting inequitable impacts, the Partnership for Southern Equity (PSE) created the Just Energy Initiative to focus on energy equity. Founded in 2008, PSE was established to advance policies and institutional actions that promote racial equity and shared prosperity for all in the growth of metropolitan Atlanta and the American South—a region riven by racial, economic and class disparities. While equal rights under the law, or equality, have afforded many opportunities to those previously denied "certain unalienable rights," an equity agenda works to combat these disparities and advance just and equitable outcomes that are sensitive to the needs and circumstances of disenfranchised populations. As one of four strategic focus areas including equitable development, economic inclusion and health, PSE defines "energy equity," or Just Energy, as the fair distribution of the benefits and burdens from energy production and consumption. Utilized as a framework for mobilizing advocacy around energy equity issues, individuals, businesses and organizations representing frontline communities, subject-matter experts, houses of worship, youth movements and academia are working together and organizing to forge collective action toward a more equitable, inclusive, clean energy future for all.

Certainly, advocacy for energy equity and climate justice issues focused on the South are gaining an increasing amount of attention in the public, private and philanthropic sectors. However, our frontline communities must quickly learn to advocate on their own behalf as many traditional environmental conservation institutions struggle to make inroads because they often lack the cultural competency to authentically confront the South's history of racial supremacy and exploitation. Centuries of oppressive power structures have stifled even modest attempts by communities of color to organize, generating an inherent mistrust of anyone seeking to do so even within communities much in need of advocacy. These societal barriers have hampered the opportunity for marginalized communities to lend their perspective to the shaping of their clean energy future and fully benefit from rapidly expanding clean energy markets. For instance, only 7 percent of solar workers in 2017 were African-American while the percentage of solar workers in the United States grew 168 percent since 2010 according to The Solar Foundation. On the deployment of solar technology itself, a report published in the Nature Sustainability journal found that census areas with over 50 percent African-American or Hispanic populations have close to 40 percent less solar panel installations than white-majority census tracts, even when controlling for household income. These examples further

demonstrate the impact of societal barriers on the ability of marginalized Americans to access clean energy benefits such as lower bills, more jobs and cleaner air.

By highlighting the inequities present across the energy sector and connecting the dots between energy, racial injustice, economic disinvestment, health disparities and other associated equity challenges, PSE has been able to organize with community to channel their civic power for energy equity advocacy. Strengthened by the deep relationships resulting from the organizing as well as education and engagement, coalition building and leadership development offerings, PSE is building a "Southern Equity Ecosystem" positioned to connect, educate, and build power with all who support a just and equitable transformation of the energy sector. A sector that no longer depends on the extreme extraction of human, natural and economic resources from distressed communities, but one that supports a regenerative, clean energy economy rooted in shared principles of social, environmental, economic and racial justice.

To advance this reality, the Just Energy Circle (JEC) anchored by PSE was created in 2013. The mission of the JEC is to build power with communities and encourage participation in developing clean energy solutions that benefit everyone. The JEC also seeks to inspire new, diverse, authentic leadership that is recognized in prominent decision-making positions in both civic and private sectors. We aim to establish structures that ensure clean energy opportunities are available to all, including low-income protections, fair prices, freedom from negative health impacts and access to thriving wage employment. We represent an equity ecosystem of diverse business, political, and community representation and interests. We believe that this approach is central to the energy equity movement and that the future of our communities is dependent upon "Just Energy" for all.

Building upon this vision, the JEC is guided by the following principles:

- We believe that community partnerships are vital for the equitable progression toward self-sufficient people and neighborhoods.
- We believe in access to high-quality energy at a fair price for all.
- We believe in transformational relationships and sustainable solutions for ever-pressing issues in the American South.
- We believe in transparency and accountability for energy providers and policy makers.
- We believe that equity is the superior growth model for the American South.
- We believe in honoring the idea that all people must have a part to play in our emerging clean energy economy.
- We believe in utilizing and leveraging a combination of the best field and scientific research to find the best energy solutions.

Amplifying the knowledge shared amongst our partners, we work collaboratively to build political and community capital to champion the racial, social, environmental and economic benefits that clean energy investments can produce when centered in equity. Many organizations committed to advancing more equitable outcomes have fought hard for national, state and local level climate and energy policies designed to lower energy costs, strengthen local economies and build healthier, more resilient communities. However, first and most impacted communities remain the least likely to benefit from the clean energy advancements and energy efficiency policies and programs that can reduce the burden of rising energy costs and offset the harmful effects of climate change and carbon-based energy production.

As demonstrated by the generational consequences and disproportionate burdens of energy policy decisions, the South is undoubtedly on the frontlines of struggles for climate justice, economic justice, racial justice, and inclusive democratic participation. Nevertheless, communities spanning from the Gulf Coast to Appalachia continue to advance equity and opportunity through education and engagement on energy, climate and environmental justice. As the subject-matter knowledge base grows across the region, so does the number of well-informed, first-person advocates prepared to mobilize for expanded investment in clean energy, energy efficiency and other renewable energy strategies that support economic development for low-wealth communities.

Without a doubt, preparing for the energy transition must also address the harmful, disproportionate impacts of climate change and carbon-based energy production. Especially in the Southeast, which is at significant risk to four particular climate change-related hazards: drought, flooding, hurricane force winds, and sea-level rise. But what about the energy system itself? How will we truly be able to

confront the systemic disenfranchisement and under-resourcing of communities of color without addressing the underpinnings of the energy system as a whole?

Any equity-centered climate solutions strategy must include the democratization of our energy systems. Energy democracy is a foundational component of a just and equitable transition from a carbon-based energy economy to a regenerative, clean energy economy grounded in racial, economic and social justice. Energy Democracy is centered on the premise that you can't build a new energy economy on an old energy model. As discussed in the book, *Energy Democracy: Advancing Equity for Clean Energy Solutions*, we must not only champion the technological strategies that will decarbonize the energy system, but we must also transform the system itself. Nathaniel Smith, the founder and Chief Equity of Officer of PSE defines true equity as a way, not a what. In this vein, we understand that clean energy for all is but one step on the journey toward a decentralized energy system built upon the principals of cooperative economics and community-based decision making for resource allocation. Ultimately, this community-determined, energy equity ecosystem will strengthen household economic stability and build healthier, wealthier communities.

Now more than ever, it is time for an intentional expansion of the South's civic engagement infrastructure to ensure authentic inclusion at all points of the energy transition. Historically disenfranchised, under-resourced communities and communities of color are increasingly hungry to speak and act; not only for transition, but transformation of the energy system. We stand ready to wield our civic power in demand of equitable access to the benefits of the clean energy economy. The future of our communities is dependent upon "Just Energy" for all.

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Dr. LOWENTHAL. Thank you very much.

Our second panelist is, as I mentioned, Sarah Shrader. Ms. Shrader is the owner and co-founder of Bonsai Design and the President of the Outdoor Recreation Coalition of the Grand Valley.

Welcome to the Committee.

STATEMENT OF SARAH SHRADER, OWNER AND CO-FOUNDER, BONSAI DESIGN; PRESIDENT, OUTDOOR RECREATION COALITION OF THE GRAND VALLEY, GRAND JUNCTION, COLORADO

Ms. SHRADER. Chairman Lowenthal, Ranking Member Gosar, and distinguished members of the Subcommittee, thank you so much for the opportunity to discuss rural economic change in western Colorado today.

I live in a town called Grand Junction on the western slope of the Rocky Mountains. Our community is 74 percent public lands and is named after the junction of two mighty rivers, the Gunnison and the Colorado, that flow through the center of our town. Our valley has been on the leading edge of change that is playing out in rural communities across the United States.

Like many other rural communities in America, our area has had a volatile economic history driven largely by the fossil fuels industry, oil, gas, coal, shale, and uranium. Each wave of extraction has provided jobs and prosperity only to be followed by the inevitable bust when commodity prices fall or policies change.

This boom-and-bust cycle of extraction takes a toll on the economy and the psyche of our community. It creates a sense of hopelessness that persists even into new boom cycles because we are trained to believe that economic prosperity is fleeting and temporary.

The results over time have been devastating. Our county's medium household income is $13,000 below the state average and 56 percent of jobs where I live pay less than $17.50 an hour. A full 22 percent of children live in poverty compared to 15 percent in the state.

An extraction-based economy also inadvertently diminishes the importance of a college education. The number of kids graduating high school who obtain any kind of post-secondary education is 20 percent below the national average. At a time when companies chase skilled and educated work force, we are at a significant competitive disadvantage. Yet, the economic reliance on extraction industries has been changing in Grand Junction in the past few years. A new trend is emerging as our community shifts toward diversified employment, an outdoor-centric identity, a growing university, and an economy that has the potential to break this insidious cycle of poverty.

In 2004, my family relocated to Grand Junction, and shortly after, we started our company, Bonsai Design, out of our basement deploying a small crew to build aerial adventures from ziplines to challenge courses, aerial playgrounds, and canopy tours all over North America. Now we are a turnkey operation with over 50 employees that provides everything from concept design to engineering, installation, training, inspections and maintenance, and we even manufacture our own components.

Like many other outdoor rec manufacturers in our community, we are proud to work with local fabricators, machinists, and employees that have historically worked for the oil and gas industry. Our employees and subcontractors have grit, tenacity, and a strong work ethic, and they love creating outdoor adventure experiences for people to enjoy for years to come.

Bonsai also works in similar communities which, like ours, have been long dependent on extraction and are now diversifying. Our clients are, for example, the Boy Scouts of America jamboree site in Mount Hope, West Virginia, where we built 26 Bonsai courses between 2011 and 2013. Our company is currently working with several municipalities, including the city of Rocklin, California, in an old quarry, and the city of Farmington, New Mexico, as well as Pipestem State Park in West Virginia. These communities are rebranding themselves as outdoor adventure hubs.

The outdoor recreation industry is a powerhouse economic force in America at almost 3 percent of the GDP. In Colorado, it is a $62.5 billion industry employing over 500,000 Coloradans. In our community alone, the outdoor rec industry contributes over $300 million annually and thousands of jobs. And rural communities all over the country are realizing the important role that the outdoor recreation industry could play in helping their economies thrive.

In addition to providing jobs, the outdoor recreation industry in Grand Junction is leading efforts to redevelop and ignite our riverfront on the Colorado River.

Long neglected, the riverfront was populated with junkyards, old tires and appliances, and an old uranium mill. We are turning a barren stretch of land into a business park surrounded by green space, a river recreation area, and an amphitheater with miles of trails around, a place where businesses can thrive and residents and visitors can enjoy the outdoors right in the heart of town.

The irony in a community like ours is that we have focused below the surface of the land to find economic prosperity, yet the absolute best part of western Colorado is the access to public lands and wild spaces for recreation on the surface. In our community, you can hunt, fish, paddle the rivers, mountain bike, ski, rock climb and hike within minutes of your front door. Our community is now looking at outdoor recreation, a sustainable use for our lands, to drive the economy. The outdoor recreation industry brings pride and opportunities back to a community that has struggled for decades.

Essential to this transition is that we protect our public lands and act swiftly to combat climate change as the economy in these areas depends on it.

Thank you.

[The prepared statement of Ms. Shrader follows:]

PREPARED STATEMENT OF SARAH SHRADER, OWNER AND CO-FOUNDER, BONSAI DESIGN; PRESIDENT, OUTDOOR RECREATION COALITION OF THE GRAND VALLEY

Chairman Lowenthal, Ranking Member Gosar, and distinguished members of the Subcommittee, thank you for the opportunity to appear before you to discuss rural economic change in western Colorado. I live in Grand Junction, which is the largest community between Denver and Salt Lake City. This "Grand Valley," in Mesa County, Colorado—with Palisade to the east and Fruita to the west—is defined by

vast red rocks and high desert vistas, an 11,000-foot snow-capped mesa home to 300 natural lakes, with the mighty Colorado and Gunnison Rivers flowing through its heart. The Grand Valley has been on the leading edge of a change that is playing out in rural communities across the western United States.

ECONOMIC HISTORY ON THE WESTERN SLOPE

Like many other western communities, our area has had an unsteady economic history throughout the 20th century, driven largely by the extractive fossil fuels industry. Historically, this industry has been the core economic driver in our community. This sector of economic activity has included oil, gas, shale development, coal mining, and the mining and milling of uranium and vanadium. Each of these waves of extractive development has provided jobs and prosperity when commodity prices have been high. Each period of prosperity has been followed by the inevitable bust when commodity prices fall or policies change. The damage in lost jobs, income, and associated social problems puts a tremendous strain on the community. This boom-and-bust cycle of extraction has taken a toll on not only the economy, but also the psychology of our community. Bust cycles create a sense of hopelessness that persists even into boom cycles, because it trains us to believe that economic prosperity is temporary. Furthermore, the pollution and other impacts to public land from the extraction industry threaten the quality of life and environmental attributes that are so closely connected to our region's emerging economic success as a center for outdoor recreation and magnet for new industries such as tech or advanced manufacturing.

The results over time have been devastating. Mesa County's median household income is $13,000 below the state average. Fifty-six percent of jobs here pay less than $17.50 per hour. A full 22 percent of children here live in poverty, compared to 15 percent for the state. And the cycle is very hard to break. Without quality work force, it's hard to grow the economy, which makes it hard to improve schools, which makes it harder to improve the work force. Furthermore, an inadvertent consequence of dependence on an extraction economy is that it temporarily diminishes the importance of diverse skill sets and a post-secondary education. Over time, communities like these end up with significantly less of the work force having a higher education. Locally, the number of kids graduating high school who obtain any kind of post-secondary education is 20 percent below the national average. In a time when companies chase a skilled and educated work force, we are at a significant competitive disadvantage.

Like many states in the United States, Colorado's rural areas are struggling. Rural economies often depend on one industry. If that industry suffers economically, the entire community is left without a contingency plan. Sustainable economic success comes from a diversified economy, and many rural communities across the United States have not had these opportunities. Businesses are incentivized to grow and relocate to urban and suburban areas where there is a better work force and more infrastructure and commerce. But this has left large swathes of our country, mostly in rural areas, behind.

The economic reliance on extraction industries—and the inevitable boom-and-bust cycle accompanying it—has been changing here in the past few years. A new trend is emerging as the Grand Valley shifts toward an outdoor-centric identity and economy that has potential to break the insidious cycle of poverty described above.

BONSAI DESIGN

In 2004, my family relocated to Grand Junction when my husband was offered a job as an airline captain with a regional airline. Shortly after, we started Bonsai out of our basement, deploying a small crew in the field to build aerial adventures, from ziplines to challenge courses, playgrounds, and canopy tours all over North America. To date, we've installed more than 500 ziplines, drawing tens of thousands of adventure seekers each year. We are a turnkey operation, providing everything from concept design to engineering, installation, training, inspections and maintenance, and component manufacturing.

As our company grew and the North American aerial adventure industry flourished, we began innovating, testing, and manufacturing our own components like braking systems, trolleys, and other equipment. We also have been a part of developing and creating regulations for safety and participant experiences in the United States. Our company continues to grow, designing and constructing projects across the country, and becoming a leader in creating standards and efficiencies within the industry. Our notable projects include the Boy Scouts of America Jamboree site at the Summit Bechtel Reserve in Mt. Hope, West Virginia, where we built 26 courses between 2011–2013. To this day, that property has the most ziplines in one place

in the world. We also have built our courses in ski areas all over the country. Currently, we are working with several municipalities, including the city of Rocklin, California and the city of Farmington, New Mexico, as they work to rebrand their communities as outdoor adventure hubs in their regions. These communities, too, have long been dependent on extraction and are now diversifying.

Bonsai currently has over 50 people on the payroll, with 24 based at our headquarters in Grand Junction. Most of our employees are hired locally, with a talent pool emerging from outdoor enthusiasts as well as energy and construction workers. We are also proud to work with local fabricators, machinists, and engineers to create inspiring adventures for participants. Many highly skilled vendors, subcontractors, and workers who have historically worked for the oil and gas industry are now working with Bonsai.

And we are not alone in building an emerging growth company in the Grand Valley. From manufacturers like Leitner-Poma and MRP, to agritourism businesses like Rooted Gypsy Farms and Carlson Vineyards, to service providers like Powderhorn Mountain Resort—the outdoor recreation industry is a growing force in western Colorado. In the Grand Valley alone, the outdoor industry contributes more than $300 million annually to the local economy, providing thousands of jobs.

THE OUTDOOR RECREATION INDUSTRY IN COLORADO

The outdoor recreation industry is a $62.5 billion dollar industry in Colorado alone, employing about 511,000 Coloradoans.[1] Meanwhile, the entire energy sector generates about $14.9 billion and creates jobs for about 274,000 people.[2] In Mesa County, the oil, gas, and mining sector currently accounts for only about 3 to 4 percent of local employment.[3] There has been a statewide effort to develop our outdoor recreation economy, and Colorado was one of the first states in the Nation to establish an Office of Outdoor Recreation to nurture the industry. Now there are over 10 similar offices in other states, and they are working together nationally to develop best practices in helping states and communities diversify their economies with outdoor recreation. Parks and protected public lands form a critical infrastructure for this emergent sector.

In cooperation with and complementary to these statewide efforts, we developed a local Outdoor Recreation Coalition (ORC) to encourage and educate local elected leadership to the important role that the outdoor recreation industry could play in diversifying our economy and improving health and wellness. The ORC is a grassroots organization that represents a voice for not only outdoor recreation manufacturers, service and event providers, and retailers, but also for those who envision our valley developing into a thriving and vibrant economy for young families and growing businesses to relocate. Our mission is to expand and enhance the economy of the Grand Valley through collaborative support and promotion of outdoor recreation businesses and resources.

During the ORC's first year, we worked on recreational development along the Colorado River and efforts to increase world-class mountain bike trails, as well as the recruitment of new businesses into the area. We were the first coalition of this kind in the state, and almost immediately accrued statewide recognition. When we connected with Luis Benitez, Director of Colorado's Outdoor Recreation Industry Office, the ORC became an example of what we could do across the state in rural communities to promote the outdoor recreation industry and help rural economies grow and thrive. We have built relationships with then-Governor John Hickenlooper, Senators Michael Bennet and Cory Gardner, and current Governor Jared Polis, who have encouraged the promotion of the outdoor recreation industry and rural economic development.

A business climate analysis in 2015[4] found that Mesa County possesses qualities unique to its location that are hard to duplicate and highly valued by local businesses. These include a strong sense of place; unique physical region; and outdoor activities such as river sports, skiing, climbing, hiking, camping, road biking, and mountain biking. Further, 74 percent of the county is public land. The nearby opportunities for outdoor activities not only bring people and companies to the area, but also make Mesa County a unique place to live. Our public lands have fueled growth

[1] https://cpw.state.co.us/Documents/Trails/SCORP/Final-Plan/SCORP-AppendixF-Economic Contributions.pdf.

[2] https://www.colorado.gov/pacific/energyoffice/energy-colorado.

[3] https://www.coloradomesa.edu/business/documents/mesa-county-economic-newsletter-q4-2018.pdf.

[4] https://www.gjcity.org/contentassets/b29a975bdf804d5aa8ad258be6eb5b36/northstarreport.pdf.

in the outdoor recreation sector, and the access that we enjoy to the outdoors will continue to make our area a desirable place to live.

Outdoor recreation is not only a robust sector, but a growing one. Since 2014, total economic output and tax revenue from outdoor recreation in Colorado nearly doubled, and jobs increased by almost 200,000. Outdoor recreation is ingrained in Colorado's culture, landscape, and quality of life, as well as its economic stability.[5]

The irony in Grand Junction is that we have focused below the surface of the land to find economic prosperity. It has given some, yes; but as we have learned, it was a Faustian bargain. With a pivot to outdoor recreation, we are now looking at a sustainable use of our lands to drive the economy—without the punishing boom-and-bust vagaries of an extraction economy.

Parks and protected public lands form a critical infrastructure for this emergent sector. And the threat of climate change poses an existential risk to the outdoor recreation industry, with our winter recreation sports already significantly impacted, losing an estimated $154 million in lost revenue and 1,900 fewer jobs statewide in low snowfall years.[6]

This growth in the local outdoor recreation industry occurred in tandem with development in our local higher education opportunities. Our community is home to one of the Nation's fastest growing institutions of higher learning, Colorado Mesa University, which now serves over 11,000 students each year. Naturally, a thriving university plays a critical role in diversifying our economy, enhancing the vibrancy of our town, and helping employers like Bonsai have access to top-notch talent across a variety of academic programs. It's not a coincidence that students from all over the country choose CMU so they can paddle the river and bike our trails. Recreation has become increasingly important to such students, and our incoming work force in general. Doctors, executives, software developers, and business owners are now choosing communities with wild spaces ripe for recreation over higher paying jobs in urban areas. The quality of life an outdoor-centric community provides is compelling for the emerging work force.

A DIFFERENT PATH: RIVERFRONT DEVELOPMENT

In addition to providing local jobs, the outdoor recreation industry is leading efforts to redevelop and ignite Grand Junction's riverfront on the Colorado River. Long neglected and blighted, the riverfront was populated with junkyards, abandoned equipment, and an old uranium mill and Superfund Site. The community has worked hard to redevelop the riverfront, establishing a Riverfront Trail and encouraging parks and redevelopment.

A central piece of the transition for our river has been the Riverfront at Las Colonias Business Park. With the city of Grand Junction, Bonsai is working to turn a barren stretch of land that was once home to literally tons of uranium mill tailings into a 15-acre business park featuring outdoor industry businesses like Bonsai Design, along with an amphitheater, green space, river recreation area, and boat ramp. Soon, it will also have a zipline over the Colorado River. This public-private partnership will attract other outdoor businesses and provide a space for residents and visitors alike to come together and enjoy the outdoors right in the heart of town.

SUMMARY

Our community understands that the key to wealth is diversifying our economic base. Energy, tech, health care, and manufacturing jobs are crucial to economic vibrancy on the Western Slope. And these industries have a work force that demands access to recreation and the outdoors—both of which the Grand Valley has in abundance. We will continue building connections to our outdoor amenities and protecting the public lands that surround us in order to invest in our economy and the next generation. The outdoor recreation industry brings pride and opportunities back to a community that has struggled for decades. Even at a time when legacy industries, such as coal, are in decline, we are optimistic about what our future will look like.

Thank you for your time today.

Dr. LOWENTHAL. The Chair now recognizes Mr. Bissett.

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[5] https://cpw.state.co.us/Documents/Trails/SCORP/Final-Plan/SCORP-Executive-Summary.pdf.
[6] https://protectourwinters.org/take-action/pow-colorado/.

STATEMENT OF BILL BISSETT, PRESIDENT AND CEO, HUNTINGTON REGIONAL CHAMBER OF COMMERCE, HUNTINGTON, WEST VIRGINIA

Dr. BISSETT. Mr. Chairman, Ranking Member Gosar, members of the Committee, my name is Dr. Bill Bissett. I am the president and CEO of the Huntington Regional Chamber of Commerce. Please know that my chamber represents more than 550 businesses and more than 30,000 employees in our region.

It is also important to remember that West Virginia is the only state completely contained within Appalachia. And as an Appalachian, we like to think that where I am from is a gateway to a wonderful place that we call Appalachia.

Economically, I bring you good news today from West Virginia. Since my return home to my home state more than 2 years ago, we have gone from catastrophic job losses and declining state revenues to job growth in a state that is now stable and growing financially. Much of this previous economic downturn related to a severe decrease in the production of fossil fuels. But we are now witnessing a rebirth in both coal and natural gas production.

With coal, we continue to be concerned with our Nation's inability to build new coal-fired power plants. Until this fact changes, the domestic market for steam coal, coal used to create electricity, will continue to decrease as coal plants are retired.

However, the story is not often told that, in the southern coal fields of West Virginia, the economy is doing well due to metallurgical coal, or coal that makes steel, which is also known as met coal. This coal, which sells at a higher price and burns much hotter, is in great demand both in the United States and around the world.

As we Americans discuss not only new infrastructure but also the maintenance of roads, bridges, and other large structures, large amounts steel will be needed, and I would hope that that steel would be made in the United States. And to make that steel, I would want us to use met coal from West Virginia.

To the north in West Virginia, we see an expansion of natural gas production and tremendous investments in our state's future. From new wells to new pipelines, the jobs revenue and additional economic development related to this production of natural gas has spiked optimism and opportunity in our state.

While I bring you good news economically from West Virginia, it comes with a caveat. As I talk to business leaders and job providers back home, many of them are thrilled to see this uptick, but they also find it fragile. In West Virginia, in the heart of Appalachia, we worry that, as a global issue like climate change is addressed, we worry that it will damage our economy in West Virginia far greater than any other state.

My chamber is located outside the coal fields in West Virginia, but we are all too familiar what a downturn to coal production does to our regional. At a time when our country and the world needs steel and electric, met and steam coal production provides high-paying jobs not just for coal miners but engineers, lawyers, accountants, machinery workers, and numerous other service jobs that are dependent on the mining of coal for their existence.

While we have witnessed the last downturn, we worry that actions here in Washington will damage West Virginia's rebounding economy, job growth, and long-term economic development.

I believe and would suggest that many of my fellow West Virginians believe that we can produce coal and natural gas while also creating new economic opportunities for our citizens. We simply do not have to sacrifice one industry to create new opportunities.

Some final thoughts. As a person fascinated with how we electrify this country every day in a reliable, low-cost way, I would suggest to you that what works for one state might not work well for other states. What works for Arizona and its economy probably doesn't work well for West Virginia. We are very different places.

When the wind doesn't blow and the sun doesn't shine, we still need to power our homes and businesses, and fossil fuels, especially through combine cycle plants using both coal and natural gas, can provide this critical backbone of that electricity production.

In my opinion, we need all forms of energy production. To make windmills and solar panels, you are going to need a lot of materials that come from underground, and that involves extraction of minerals and the use of land. As a senior engineer told me early in my career, every form of energy production has an economic and environmental cost to it.

I think everyone in this room and on this panel would agree that no one wants to create poverty and hopelessness by their actions. As many of us Appalachians try to tell our stories beyond our borders, we worry that the future of our region and how impediments to our ability to produce natural resources will return us to what was a very dark period in my home state and in Appalachia.

As climate change is a global issue, we must consider its impact in a global way and with a global solution. Sacrificing the economic future of West Virginia and Appalachia will have little impact on global man-made carbon, but you will succeed in creating more poverty, more hopelessness, and an uncertain future for those of us lucky enough to call West Virginia home.

Thank you again for allowing me to share my thoughts with you today. It has been an honor.

[The prepared statement of Dr. Bissett follows:]

PREPARED STATEMENT OF DR. BILL BISSETT, PRESIDENT & CEO, HUNTINGTON REGIONAL CHAMBER OF COMMERCE

Mr. Chairman, members of the House Natural Resources Committee—my name is Doctor Bill Bissett and I am the President and C.E.O. of the Huntington Regional Chamber of Commerce in my hometown of Huntington, West Virginia.

Please know that my Chamber represents more than 550 businesses and 30 thousand employees in our region. It is also important to remember that West Virginia is the only state completely contained within Appalachia, and, as an Appalachian, we like to think that where I'm from is the gateway to this wonderful place we call Appalachia.

Economically, I bring you good news from West Virginia. Since my return to my home state more than 2 years ago, we have gone from catastrophic job loses and declining state revenues to job growth and a state that is now stable and growing financially. Much of this previous economic downturn related to a severe decrease in the production of fossil fuels, but we are now witnessing a rebirth in both coal and natural gas production.

With coal, we continue to be concerned with our Nation's inability to build new coal-fired power plants. Until this fact changes, the domestic market for steam

coal—coal used to create electricity—will continue to decrease as coal plants are retired. However, the story that is not often told is that, in the southern coalfields of West Virginia, the economy is doing well due to metallurgical coal, or coal that makes steel, which is also known as met coal. This coal, which sells at a higher price and burns much hotter, is in great demand both in the United States and around the world. As we Americans discuss not only new infrastructure but also the maintenance of roads, bridges and other large structures, large amounts of steel will be needed, and I would hope that we would use steel made in the United States. And to make that steel, I would want us to use met coal from West Virginia.

To the north in West Virginia, we see the expansion of natural gas production and tremendous investments in our state's future. From new wells to new pipelines, the jobs, revenue and additional economic development related to the production of natural gas have spiked optimism and opportunity in our state. While I bring good news to you economically from West Virginia, it comes with a caveat. As I talk to business leaders and job providers back home, many of them are thrilled to see this uptick, but they also find it fragile. In West Virginia, in the heart of Appalachia, we worry that, as a global issue like Climate Change is addressed, it will damage the economy of West Virginia far greater than any other state.

My Chamber is located outside of the coalfields in West Virginia, but we are all too familiar with what a downturn in coal production does to our region. At a time when our country and the world needs steel and electricity, met and steam coal production provides high-paying jobs, not just for coal miners, but engineers, lawyers, accountants, machinery workers, and numerous other service jobs that are dependent on the mining of coal for their existence. While we have withstood the last downturn, we worry that actions here in Washington will damage West Virginia's rebounding economy, job growth, and long-term economic development.

I believe, and would suggest that many of my fellow West Virginians believe, that we can produce coal and natural gas while also creating new economic opportunities for our citizens. We simply do not have to sacrifice one industry to create new opportunities.

Some final thoughts.

- As a person fascinated with how we electrify this country every day in a reliable and low-cost way, I would suggest to you that what works for one state might not work for other states. What works for Arizona and its economy probably doesn't work well for West Virginia. We are very different places. When the wind doesn't blow and sun doesn't shine, we still need to power our homes and businesses, and fossil fuels, especially through combined cycle plants using both coal and natural gas, can provide this critical backbone of electricity production.
- In my opinion, we need all forms of energy production. To make windmills and solar panels, you're going to need a lot of materials that come from underground. And that involves the extraction of minerals and the use of land. As a senior engineer told me early in my career, every form of energy production has an economic and environmental cost to it.
- I think everyone in this room and on this panel can agree that no one wants to create poverty and hopelessness by their actions. As many of us Appalachians try to tell our story beyond our borders, we worry about the future of our region and how impediments to our ability to produce natural resources will return us to what was a very dark time in my home state and in Appalachia. As Climate Change is a global issue, we must consider its impact in a global way, and with a global solution. Sacrificing the economic future of West Virginia and Appalachia will have little impact on global man-made carbon, but you will succeed in creating more poverty, more hopelessness, and an uncertain future for those of us lucky enough to call West Virginia home.

Thanks you again for allowing me to share my thoughts with you today. It has been an honor.

Dr. LOWENTHAL. The Chair now recognizes Mr. Hille.

STATEMENT OF PETER HILLE, PRESIDENT, MACED, THE MOUNTAIN ASSOCIATION FOR COMMUNITY ECONOMIC DEVELOPMENT, BEREA, KENTUCKY

Mr. HILLE. Mr. Chairman, Mr. Ranking Member, members of the Subcommittee, my name is Peter Hille. I am the president of MACED, and I am glad to be talking with you today about a just transition to a new economy for coal-impacted communities.

This is a map of Appalachia showing the economically distressed counties in red. They fall into the bottom 10 percent of all the counties in the Nation. And this map has remained largely unchanged for decades. The long history of coal mining in Appalachia did not create prosperous communities because, in the early days, these were not jobs that paid well. You load 16 tons, and what do you get? Another day older and deeper in debt. That is why Lyndon Johnson declared war on poverty from a front porch in eastern Kentucky.

By the end of World War II, we had 75,000 coal mining jobs in Kentucky. But in the 1950s, the jobs began to be mechanized. Over the next several decades, coal production went up and down, and mostly up. But as the jobs became more technical, they paid better. But with bigger machines, more coal could be produced with fewer workers.

On this chart, the upper line shows production. The lower line shows jobs declining. Then, in 2012, something unprecedented happened. For the first time, natural gas per BTU became cheaper than coal. When these lines crossed, the coal industry collapsed. Suddenly we lost 10,000 jobs, half the remaining jobs of mining in our state. This has been a very real tragedy for the miners, their families, their communities, and all the other businesses that relied on those earnings.

But this is a tragedy that sits on top of a disaster. The disaster is the fact that, even before we lost those 10,000 jobs, this region had been economically distressed for generations.

So, the question is not how do we replace those 10,000 mining jobs and get back to where we were; the question is, how do we go forward? How do we build a new economy for Appalachia, an economy that is more diverse, resilient, sustainable, and equitable, because the old economy was none of those things.

We call this just transition. And the justice we call for in this transition is based on the reality that these communities and communities like ours literally fueled the growth of this great Nation. And they sacrificed lives, families, health, water, prosperity, even as they gave us the timber that built our towns, the coal that fired our industries, and the steel that made our cars.

They are owed a debt, and we can repay that debt with the new investments that are needed to grow the new economy. We must reinvest in our communities, many of which have lost more than half of their population to out-migration. We must make them places where the young people growing up there want to stay, where those who went off to college or their first job want to come back, where people who left to find work and had successful careers somewhere else might come back to retire, and where the tourist who comes to visit decides they would like to stay.

All of the amenities and resources needed to revitalize these communities are themselves economic drivers, creating jobs and livelihoods: the local food restaurant, the coffee shop, the farmers market, the craft brewery, housing, health care, and the quality of life that many people are looking for today.

So, we envision an economic transition driven by entrepreneurs whose businesses create goods and services to drive diverse local economies and focus on sectors that not only generate economic activity but also generate benefits for the community.

For example, at the nexus of food and energy, Gwen Christon owns a grocery store at a crossroads in Letcher County, Kentucky. She invested half a million dollars in energy efficiency and now saves $40,000 a year in utility costs. The store looks so much better that her sales are up 7 percent, and she has hired two more full-time workers.

Here is Scott Shoupe. Scott is a fourth-generation coal miner. But after 22 years in the mines, he is now participating in our new energy interns program, which is funded by an ARC power grant. Scott is learning to do energy audits and retrofits and plans to start his own energy efficiency business.

This is Tim Robinson. He started a drug treatment program that now has facilities across eastern Kentucky. We financed one of those centers and also implemented energy efficiency measures that resulted in enough savings for them to buy a new van.

There are many more examples to share, but the important thing is this: There is hope in these communities, and there are people who are digging in hard to create a brighter future. Investments like the Appalachian Regional Commission's power grants, the AML pilot program, and the proposed RECLAIM Act represent important investments that can support these grassroots efforts.

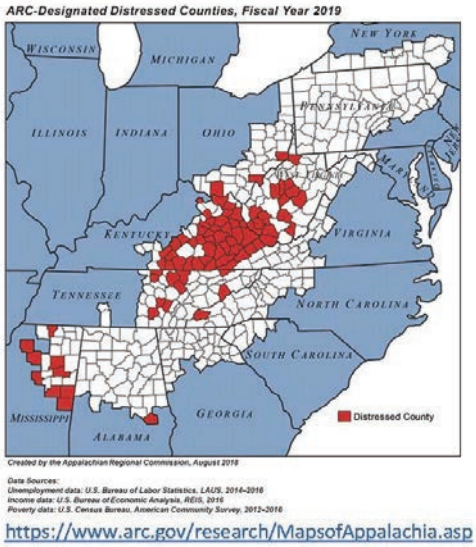
And as we build this new economy, we need to ensure that it creates a future with opportunities for all, meeting diversity with equity, and that we attend to the sustainability that is needed for our children and our grandchildren to thrive and for our planet to survive.

Thank you.

[The prepared statement of Mr. Hille follows:]

PREPARED STATEMENT OF PETER HILLE, PRESIDENT, MACED, THE MOUNTAIN ASSOCIATION FOR COMMUNITY ECONOMIC DEVELOPMENT, BEREA, KENTUCKY

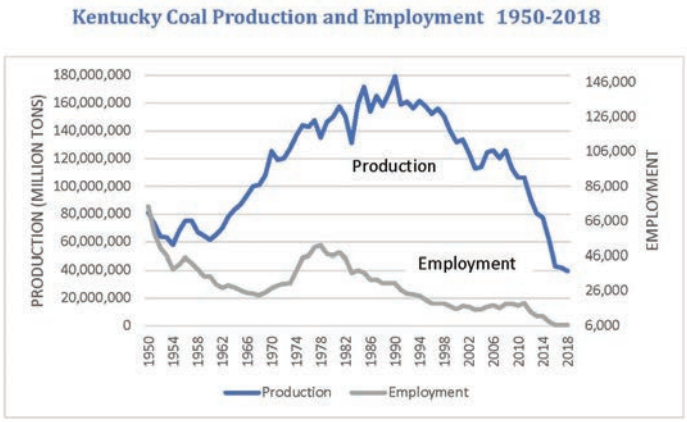
Mr. Chairman, Mr. Ranking Member, members of the Subcommittee, thank you for the opportunity to present this testimony about our work and the conditions in coal impacted communities. MACED is a Community Development Financial Institution certified by the CDFI Fund of the U.S. Treasury. We manage a loan portfolio of nearly $20 million invested in small business across Appalachian Kentucky. We are deeply engaged in a range of initiatives to advance a Just Transition to a new economy for coal impacted communities in Appalachia and beyond.



This is a map of Appalachia showing the economically distressed counties in red. They fall into the bottom 10 percent of all the counties in the Nation as measured by per capita income, poverty rate and 3-year average unemployment. Despite this map has remained largely unchanged for decades. That doesn't negate the value of vast investments that have been made—there have been many improvements and much work has been done. The Appalachian Regional Commission has been a key player ever since it was created and recent increases to its budget through the POWER Initiative have helped a lot. But we still have a long way to go.



The long history of coal mining in Appalachia did not create prosperous communities partly because in the early days these were not jobs that paid well—"You load 16 tons and what do you get, another day older and deeper in debt." That's why Lyndon Johnson launched the War on Poverty from a front porch in eastern Kentucky.



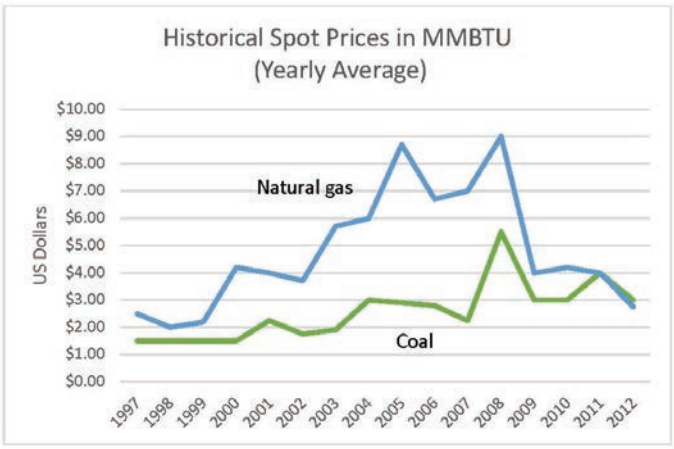
http://energy.ky.gov/Coal%20Facts%20Library/Kentucky%20Coal%20Facts%20-%2016th%20Edition%20(2016).pdf

At the end of WWII, we had 75,000 coal mining jobs in Kentucky. But in the 1950s the UMWA signed an agreement with the mine operators for the mines to be mechanized. Over the next several decades coal production went up and down, overall increasing significantly until recent years (blue line above). And as the jobs became more technical, they paid better, a high school graduate could make $60,000 to $80,000 per year, making these some of the best-paying jobs in the region. But with long-wall mining machines underground, then the advent of strip mining and finally mountaintop removal mining, more coal could be produced with fewer workers. On the chart above, lower line shows how jobs continued to drop relative to production. By 2011 we were down to fewer than 20,000 jobs.

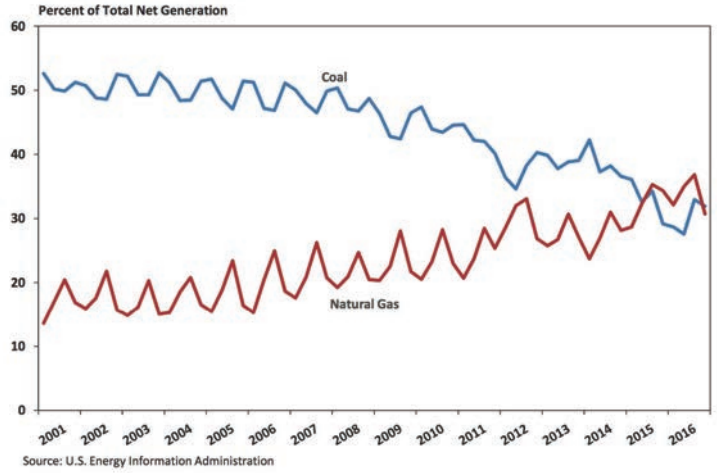
Meanwhile, the dominance of coal largely displaced other large scale approaches to economic development that would have created a more diverse and resilient economy. Through decades of boom and bust in the coal industry, it was too easy to believe, with each downturn, that coal would come back. There was little effort put into developing other sectors of the economy, not enough major investment in education, health care, child care, housing and civic infrastructure. To the extent we did see progress, it was often the result of relatively small local efforts or the work of regional non-profits supported largely by private philanthropy.

We also saw significant retrenchment on the part of both private philanthropy and the Federal Government in rural America in general and Appalachia in particular as attention and resources were redirected to pressing problems in urban areas. Disparities in essential new economy assets like broadband and cell service compounded the other problems cited above. All these factors contributed to a growing sense among rural people that they were being left behind.

Almost 20 years ago, then-Governor Paul Patton, himself a former coal operator, made this observation: "As much as coal has meant to us, it still has not built for us a self-sustaining economy. It's got to be more varied—got to be more broad. In the early 1970s we had an economic developer's dream come true. We had more high tech jobs than we could ever imagine in the coal industry, and it still didn't solve the chronic problems of the region. So we have to build that basic economic foundation." But we didn't do that, and it set the scene for what came next.



In 2012, something unprecedented happened. For the first time, natural gas, became cheaper than coal as a result of the boom in fracking. The graph above shows the prices for coal and natural gas in MMBTUs. When these lines crossed, the coal industry collapsed. Suddenly we lost 10,000 jobs, half of the remaining coal mining jobs in our state. Bankruptcies of several major coal companies followed as natural gas took on an increasing share of electrical generation.



The collapse of the coal industry has been a very real tragedy for the miners, their families, their communities and all the other businesses that relied on those earnings, from grocery stores to car dealers to home builders. It has also devastated local government budgets, as they saw reduced local tax revenues compounded by a sharp decline in coal severance taxes which they had come to rely upon as a significant source of revenue for local services.

The collapse of the coal industry is a tragedy, but it is a tragedy that sits on top of a disaster. That disaster is the fact that even before we lost those 10,000 jobs, this region had been economically distressed for generations. These economic realities have predictable correlates in other areas as well—low educational attainment, among the worst health statistics in the Nation, and demographic shifts due to outmigration because of a lack of good paying jobs, resulting in a population that is disproportionately made up of the very old, the very young, and many who are unable to participate in the labor force. We also face the same opioid epidemic that plagues many other rural areas. All of that was true before the collapse of the coal industry.

So the question is not how do we replace those 10,000 or more jobs, and get back to where we were. The question is how do we go forward, how do we build a new economy for Appalachia and for other coal impacted communities—an economy that is more diverse, resilient, sustainable and equitable. Because the old economy was none of those things.

A diverse economy will rely on many small businesses in different sectors. These provide the goods and services needed in the community and keep more money circulating in the local economy.

A resilient economy will be less reliant on a large single industry so we are not vulnerable to sudden shifts in that sector as we have been in the past.

A sustainable economy will be built on balance rather than unchecked growth, respecting the natural ecologies of place—air, land, water, people and culture.

An equitable economy will provide opportunities for all and, perhaps even more importantly, the benefits of the economy will be more widely shared. We need to address all the ways that people have been marginalized, including race, age, gender and gender identity, ethnicity and socio-economic status.

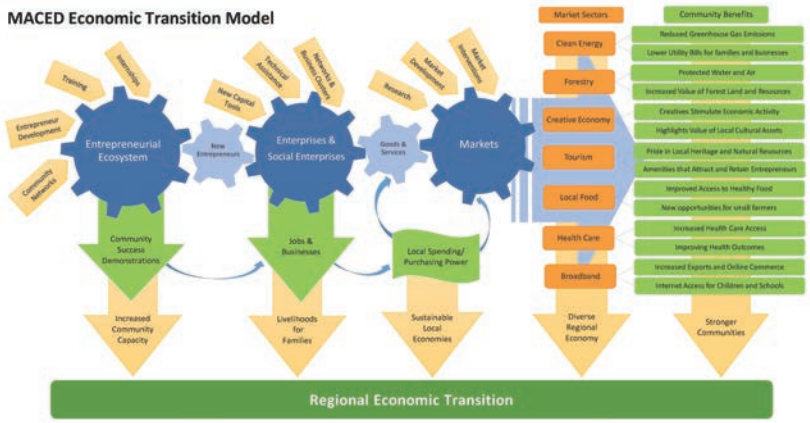
We call this **Just Transition**. And the justice we call for in this transition is based on the reality that our communities, and communities like ours, literally fueled the growth of this great Nation. And they sacrificed—lives, families, health, water, prosperity—even as they gave us the timber that built our towns, the coal that fired our industries, the steel that made our cars.

These communities are now bearing the brunt of global changes in the energy economy. They are owed a debt for the sacrifices they have made, and we can repay that debt with the new investments that are needed to grow the new economy. We must reinvest in our communities, many of which have lost more than half of their population to outmigration. We must make them places where the young people growing up want to stay; where those who went off to college or their first job want to come back; where people who left to find work and had successful careers elsewhere might come back to retire; and where the tourist who comes to visit decides they'd like to stay.

All of the amenities and resources needed to revitalize these communities and make them attractive and livable places are themselves economic drivers creating jobs and livelihoods—the farmers market, the local foods restaurant, the coffee shop, the music venue, the craft brewery, the retirement community, housing, healthcare, and recreation all contribute to a quality of life that many people are looking for today.

So we envision an economic transition driven by entrepreneurs whose businesses create goods and services to drive diverse local economies, and focus on sectors that not only generate economic activity but also generate benefits for the community.

The dynamic relationship between entrepreneurial ecosystems, enterprises, market sectors and community benefits are captured in MACED's Economic Transition Model (following page). This model recognizes that investment in key sectors cannot only generate economic activity but also results in additional benefits to the community and the people who live there. For example, local healthcare facilities provide jobs, but also make care more accessible if residents don't have to travel to get the care they need—and the dollars spent on health care remain in the community. Similarly, retrofits to increase energy efficiency create jobs for the installers while also making homes healthier, safer and more comfortable and make businesses more profitable. The reduction in carbon output benefits all of us. Similar multiple benefits apply to the other market sectors identified in the model.



The five gears in this model represent the dynamic relationship between the entrepreneurial ecosystem, enterprises and markets. The entrepreneurial ecosystem supports new entrepreneurs, who in turn create enterprises that produce goods and services, which feed into markets.

The small arrows pushing the gears represent active measures that can be implemented to accelerate the process and magnify the impacts. At the right-hand side of the model are promising market sectors that MACED has identified and the additional community.

A functioning entrepreneurial ecosystem generates new entrepreneurs and also builds models for success in communities, which raises local capacity. Enterprises create goods and services that feed into markets, but also produce jobs and local spending power that help support local markets.

The five arrows at the bottom (increased community capacity, livelihoods for families, sustainable local economies, diverse regional economy and stronger communities) are all results of the various

Examples

There are many examples of exemplary work that illustrate the potential to grow a new economy:



At the nexus of local food and energy, Gwen Christon owns a grocery store at a rural crossroads in Letcher County, Kentucky. She invested half a million dollars in energy efficiency and now saves $40,000 a year in utility costs. The upgrade was financed with a $100,000 USDA REAP grant and $400,000 in financing from MACED. The energy savings cover the debt service. The store looks so much better that her sales are up 7 percent and she has hired two more full-time workers.

The energy savings have also helped her cut some of her prices which also contributes to the increased sales. The next nearest grocery store is 10 miles away, so without this store the surrounding area would be a food desert. By including more local produce in her store, Gwen is also helping to support local growers, keeping more money circulating in the local economy.



Scott Shoupe is a fourth generation coal miner. After 22 years in the mines he is now participating in MACED's New Energy Interns program, funded by a 2016 ARC POWER grant. Scott is learning to do energy audits and retrofits, and plans to start his own energy efficiency business. Commercial energy retrofits can pay for themselves, often rapidly, by reducing both the energy usage and the demand charges on the utility bills. One grocery warehouse in Kentucky is now saving $100,000 per year after investing $200,000 in a lighting retrofit.

MACED'S New Energy Interns were recently featured in a video by Fortune Magazine:

https://maced.org/energy/new-economy-work-featured-by-fortune-magazine/

New Energy Interns in Yes! Magazine:

https://www.yesmagazine.org/planet/energy-conservation-jobs-come-to-coal-country-20181005





This is Tim Robinson, pictured here with Congressman Hal Rogers. Tim started a drug treatment program that now has facilities across eastern Kentucky. MACED financed one of those centers and also implemented energy efficiency measures that resulted in enough savings for them to buy a new van.

https://www.arccenters.com/

https://www.youtube.com/watch?v=hkiWwO3TFFY

MACED Program Innovations

How$martKY is a MACED program that provides residential on-bill financing for energy efficiency retrofits. The customer pays nothing upfront, the utility pays the contractor, and places a charge on the customer's bill to recover the investment, plus interest. The annual savings are greater than the charge on the bill, so the customer comes out ahead and the utility benefits from the demand reduction. Contractors get jobs and the customer gets a healthier and more comfortable home. Everybody wins.

Energy Efficient Enterprises (E3) provides energy efficiency for commercial enterprises as well as the financing needed to implement the measures. Payback for commercial efficiency is often much faster than residential retrofits due to reduction in demand charges alongside of the reduction in kWh usage. Currently MACED is developing a new financing tool to support solar installations for small commercial enterprises. Rising electric rates are increasing the interest in solar for these businesses in our region.

Creative application of capital is needed to support economic transition in economically distressed regions. MACED has been pioneering several tools designed

to allow us to finance start-ups and business. We have created a Venture Capital Loan Fund that can make higher risk investments and offer flexible repayments so as not to cash-starve the enterprise in the early stages. We have also created a collateral support fund as a donor-advised fund at a regional community foundation. Another innovation is our crowd-match loan through which we can match crowd-sourced capital (from platforms like Kiva or Kickstarter) one-to-one up to $10,000 with a loan that doesn't require credit score or collateral. We use the ability to crowd source the other funds as a proxy for the credit-worthiness of the enterprise. The CDFI Fund and the ARC POWER fund have provided important support for these innovations.

New Federal Investment

The Appalachian Regional Commission's POWER Initiative, the AML Pilot Grants and the proposed RECLAIM Act are important examples of how new Federal investment can support work on the ground in these communities. POWER has added capacity to organizations large and small across the coalfields of Appalachia and spurred new and expanded programs to support entrepreneurship and a range of innovative approaches to economic transition. A recently announced AML Pilot Grant for the town of Benham in Harlan County will upgrade and expand facilities there related to coal heritage tourism. We appreciate the fact that programs like this have gotten, and continue to get, support from both sides of the aisle.

There are many more examples to share, but the important thing is this—there is hope in these communities, and there are people who are digging in hard to create a brighter future.

Investments like the ARC POWER grants, the AML Pilot Program and the RECLAIM Act represent important investment that can support these grassroots efforts. And as we build this new economy, we need to ensure that it creates a future with opportunities for all, meeting diversity with equity, and that we attend to the sustainability that is needed for our children and grandchildren to thrive, and for our planet to survive.

Links for more information

Information about MACED programs

- https://maced.org/
- ACED Five-year Impact Report:
  https://maced.org/wp-content/uploads/MACED-ImpactReport_Nov2018_final_sm.pdf
- Fortune Magazine video featuring MACED's New Energy Interns:
  https://maced.org/energy/new-economy-work-featured-by-fortune-magazine/
- Strategies for Just Transition:
  https://maced.org/wp-content/uploads/2018/05/MACED_strategy_briefs_web.pdf

Appalachian Regional Commission reports

- Distressed Counties maps FY2002–FY2019:
  https://www.arc.gov/research/MapsofAppalachia.asp
- Appalachian Coal Industry Ecosystem:
  https://www.arc.gov/assets/research_reports/CIESummary-AppalachianCoalIndustryEcosystemAnalysis.pdf
- Entrepreneurial Ecosystems:
  https://www.arc.gov/research/researchreportdetails.asp?REPORT_ID=147
- Additional reports:
  https://www.arc.gov/research/ResearchReports.asp

Appalachia Funders Network

- https://www.appalachiafunders.org/

Kentucky Coal Data from the Kentucky Energy and Environment Cabinet

- http://energy.ky.gov/Pages/CoalFacts.aspx

Dr. LOWENTHAL. Thanks.

The Chair now recognizes Mr. Dennison to testify.

STATEMENT OF BRANDON DENNISON, FOUNDER AND CEO, COALFIELD DEVELOPMENT, HUNTINGTON, WEST VIRGINIA

Mr. DENNISON. Thank you, Mr. Chairman, Ranking Member, Committee members.

Investing in the economic revitalization of the communities that have been extraction-based, that have sacrificed the most to fuel, this country must be front and center in the shaping of policy addressing climate change. Doing so cannot be an afterthought.

As I think about this issue, I think about Wilburn. Wilburn is an on-the-job trainee with Coalfield Development. He was a miner for 17 years in Mingo County, West Virginia. And like so many other miners, in 2015, he was laid off when his mine shut down. He had to go on public assistance, something he would tell you he hated to do but had to do to feed his family.

Coalfield Development was able to put Wilburn back to work through a sustainable agriculture business that we incubated. This business converted a former mountaintop removal mine site into a sustainable farm where we sell fresh food products throughout the region.

Wilburn and his fellow crew members work by what we call our 33–6–3 model: 33 hours a week of paid work, just like you would for any other business; but 6 hours a week of higher education classroom time working toward an associate's degree; and 3 hours a week of personal life skill development.

At the end of their 2.5 year contract, crew members transition from being unemployed and in need of public assistance to being trained workers with an associate's degree. We have started new businesses in biobased manufacturing, solar, construction, arts and culture in retail sectors. We have helped start over 50 new businesses and retrained over 800 formerly unemployed people.

The farm where Wilburn works sits next to an active mountaintop removal site. And one morning, without trying to be profound, Wilburn was feeding the hens and the hogs. And you could see the active mountaintop removal happening just a couple acres away. And this is a process of huge equipment, equipment the size of a building moving just massive amounts of earth, what is called overburden. And the overburden tumbles down these steep ledges, and massive dust clouds go up.

And Wilburn looked up and watched this happening. And he said: Well, I reckon that there is the past, and this here is the future.

The coal industry will never again be the dominant industry it once was. And this fact creates deep pain for those of us living in Appalachia, especially our miners. The transition away from coal, which is already underway, by the way, isn't just creating an economic crisis. It is a social crisis directly related to the opioid epidemic. And it is an environmental crisis leaving massive scars on our landscape that have to be dealt with.

But the fact that coal isn't coming back doesn't mean that Appalachia has no future. The void left by coal's collapse is actually making room for new entrepreneurial spurts to grow up. And

Appalachia can be a vital contributor in the fight against climate change. And Appalachia is no more guilty of contributing to climate change than most people in this country who have had to flip on their lights at night.

With smart Federal policy and investment, our country can accelerate these new sprouts of entrepreneurship. We need a national just transition task force to give focus. We need to create a national program to support coal communities in transition. The power program is a great start. We can grow from there. And we need to pass Federal legislation, exactly what Peter mentioned, that improves conditions for former coal workers and distressed Appalachian communities especially relating to the black lung crisis.

If we don't pay attention to the economic hurt of extraction communities and invest in solutions that show there is a viable path forward, we will only deepen the division in our country. We in Appalachia need to know we are valued, and the country needs to know we have more to offer than just coal. Too often, when discussing economic transitions, policy makers announce: "Well, we can just retrain those people."

And I do need to say that that is always way easier said than done.

There are thousands of laid-off miners who have participated in Federal training programs. They got a new certificate. But it doesn't matter because there aren't businesses left to take that certificate and get employed in.

So, at Coalfield Development, we have had to be much more holistic. We have to create new businesses at the same time as training new employees to staff those businesses and have a modern work force. We need maximum flexibility at the ground level to pull this off.

Wilburn is one of thousands of miners whose life was rocked by the shutdown of his mine. But at age 45, he is about to become a college graduate. He has helped us start an entire new business that sells food products throughout the region. Wilburn has transformed a moment of crisis into a transformational opportunity for himself and his family. With your support, an entire region can do the same.

[The prepared statement of Mr. Dennison follows:]

PREPARED STATEMENT OF BRANDON DENNISON, CEO, COALFIELD DEVELOPMENT CORPORATION

Chairman, Ranking Member, and distinguished members of the Subcommittee, thank you for the opportunity to talk with you today.

My name is Brandon Dennison. I am the founder and CEO of Coalfield Development Corporation, As a non-profit, Coalfield serves as an umbrella for a family of social enterprises in southern West Virginia. Coalfield is working to rebuild the Appalachian economy from the ground up, trying to show what a healthier and more diversified economy can look like in a place long, long dominated by the coal industry.

The transition from coal is happening. And it has to happen. For economic, environmental, and social reasons, our communities must make this transition. But while there's lots of talk about "greening our economy" and "transitioning off coal," there's much less understanding about how hard this really is. Today, I want to provide concrete examples of what a just transition can and should look like.

THE VIEW FROM APPALACHIA



Wilburn is an on-the-job trainee, a crew member with Coalfield Development. Wilburn worked for 17 years as a coal miner in Mingo County, West Virginia. Like so many other coal miners, Wilburn was laid off in 2015 and had to be placed on public assistance.

Coalfield was able to put Wilburn back to work on a sustainable agriculture project, which converted a former mountaintop removal mine into an active farm. Today, local farmers sell fresh and healthy food products from this site throughout West Virginia. Wilburn and his fellow crew members work by our 33–6–3 model each week: 33 hours of paid work, 6 hours of higher education, and 3 hours of life-skills development.

At the end of their 2.5 year contract, crew members transition from being unemployed and in need of public assistance, to trained workers with an Associate's Degree. Many have even developed business plans for new start-ups. This model has been proven to work. It's been used to start new businesses in the bio-based manufacturing, solar, construction, arts and culture, and retail sectors. Coalfield Development has helped start over 50 new businesses and created 190 new jobs. We've retrained over 800 formerly unemployed people.

The farm where Wilburn worked sits next to an active mountaintop removal mine. As we fed hogs and chickens each morning, equipment the size of buildings moved massive amounts of dirt (called over-burden) off of high, steep ledges, as dust clouds ballooned up into the sky. One morning as he worked, without meaning to be profound, Wilburn watched as this over-burden tumbled down. He then looked over at new crops growing up on our site and said, "I reckon that there is the past, and this here is the future."

THE DECLINE OF COAL

I'm here today as a young man born and raised in West Virginia. My wife and I are raising our 2-year-old son in West Virginia, and we're expecting another boy in a matter of weeks. Coalfield Development was born out of much love by West Virginians for West Virginians. And my view from the ground—deep in coal country—is this: Coal is not coming back.

The coal industry will never be the dominant industry in Appalachia that it was for generations. This fact creates deep pain for those of us living in Appalachia, especially for our miners. The transition away from coal is creating an economic crisis, causing high unemployment and low labor participation. It's creating a social crisis, leading to an addiction epidemic. And it's creating an environmental crisis, as closed coal mines leave scarred and polluted landscapes in their wake.

We know the coal industry is shrinking, and institutions from the government's own Energy Information Administration to Standard and Poors—and more—all agree:

1. **The U.S. coal-mining industry is in a permanent structural decline.** The industry is facing a new market order, and it can't compete with less expensive and more flexible rival fuel sources. For these reasons, it won't likely regain its once-predominant market position. This shift in markets is

occurring because the economics of coal-fired generation no longer make the same sense they once did. A decade and a half ago, coal provided more than 50 percent of all fuel for U.S. power generation. Today that share is less than 30 percent. Renewables have taken a bite out of coal's traditional hold on power markets. In an outlook published just last month,[1] the Energy Information Administration sees 24 gigawatts of new, renewable generation capacity coming on-line this year, 46 percent from wind, 18 percent from solar, the rest from natural gas—and none from coal.

2. **Initiatives to reverse coal's decline are unlikely to succeed.** The structural changes in the U.S. domestic coal market have caused the industry to scramble to regain its footing by promoting expansion of exports and by embracing the potential of "clean coal," or carbon capture and sequestration (CCS) projects. Neither the export nor the CCS initiatives have a very good chance of succeeding. In addition, hoped-for regulatory relief in the guise of Federal policy reversals has been realized only theoretically. While the Trump administration has moved to ease emissions restrictions on power plants and environmental rules on mining, neither activity has slowed the decline of coal. There are still far fewer coal-mining jobs today than there used to be—the overall trend is toward fewer and fewer—and coal-fired power generation is less competitive than it was 2 years ago.
3. **More plants and mines will close as the economics of coal-fired power generation no longer make sense.** According to research from the Institute for Energy Economics and Financial Analysis, a leading energy markets think tank, at least 36.7GW of coal-fired capacity stand to be retired from 2018 through 2024—117 units in total—and that is a highly conservative estimate.[2] Announced retirements will cut coal-fired capacity by at least 15 percent through 2024, a figure that very likely understates the trend. Fully two-thirds of 2018's retirements were only announced in 2017, a clear indication that utilities have shortened their lead time on closures.
4. **A resurgence in coal mining is unlikely.** Further restructuring of the coal mining industry appears inevitable in the face of a shrinking customer base, fleet overcapacity, and intense competition—mainly from natural gas and renewables. The structural decline of the coal industry will drive more coal-fired power plants out of business. A resurgence in coal production—regionally or nationally—is unlikely. Domestic demand for coal will continue to drop, export strategies will not save producers, carbon capture and storage schemes meant to sustain the industry are not viable, and regulatory relief will continue to prove ineffective. Without a robust customer base of the type it has historically had, the U.S. coal industry will continue to contract and consolidate. As demand for coal continues to shrink, so too will production.

AN ACTION AGENDA FOR CONGRESS

But hidden in the pain and fear is opportunity and renewal. Like Wilburn converting a former surface mine into a sustainable farm, we can find the solutions to our problems within these very problems themselves. The national attention on Appalachia—and the plight of former coal workers and the economic hurt of coal communities—presents an opportunity. Congress should immediately act to:

1. **Create a national just transition task force.** A smart, just, and fair transition away from coal will be difficult, and the transition will affect the entire country, in places where coal mining and coal plants are closing. While Appalachia has been first and hardest hit, other regions aren't far behind. We could and should learn from other countries, like Canada and Germany, and create a national just transition task force, which could comprehensively assess this energy and economic transition, and work with leading public and private sector partners to identify relevant regional solutions. This effort should put grassroots organizations and for-profit innovators in leadership positions.
2. **Create a national program to support coal communities in transition.** In 2015, President Obama introduced his POWER + program, a portion of which made economic and work force development grants available to help support coal communities in transition. POWER focused on economic development and diversification; the effort wasn't just about creating new jobs, but

[1] https://platform.mi.spglobal.com/web/client?auth=inherit#news/article?id=49528076&key productlinktype=2.
[2] http://ieefa.org/ieefa-report-u-s-likely to-end-2018-with-record-decline-in-coal-fired-capacity/.

it focused on diversifying and strengthening local economies, so they could more resilient. While pieces of this original program still exist, total funding allocations are small. Congress could immediately put resources to work, and build off of the excellent work of the Appalachian Regional Commission, which has awarded more than $120M since 2015 to innovative strategies, like Coalfield, that have the potential to scale and be replicated.

The Appalachian Regional Commission is a particularly effective Federal agency and represents the kind of "place-based" policies that can have an outsized impact.[3] Regional entities such as Appalachian Regional Commission are more in touch with the on-the-ground complexities and nuances in ways national agencies just can't be.

POWER funding created opportunities that allowed people to stay—being Appalachian is our culture and our identity. We just have to make sure that jobs exist for the miners and affected community members that have been trained. That's why Coalfield Development has worked closely with a solar company, Solar Holler, which has recently hired eight of the workers we've trained. These programs work if the private sector (and other potential job creators) are engaged from the beginning.

In places like West Virginia, we put all our eggs into one basket—ironically made of coal. When the bottom fell out, we were stuck in black slurry. Now, many ask, "What's the next big thing? What can replace coal?" But I believe this is the wrong question. Relying too heavily on one industry is how we ended up with some of the highest poverty rates in the country. **The right solution isn't to find one new industry, but to support entrepreneurs and new businesses in a *diversified* number of financially, environmentally, and socially sustainable fields.** At Coalfield Development, we're pioneering what these diversified sectors can look like. Federal investment in solutions and communities like ours can help us scale create solutions to our economic challenges.

3. **Pass Federal legislation that improves the conditions of former coal workers and distressed Appalachian communities.** The most important efforts focus on helping miners suffering from black lung disease, promoting reclamation by stimulating economic development, and connecting rural and urban areas by improving broadband access.

Black Lung

There is another issue related to addressing the legacy cost of coal mining as we work through this economic transition. Rates of black lung disease have hit a 25 year high in Appalachian coal mining states.[4] One in five veteran working coal miners in Central Appalachia now has this fatal and incurable disease. **Since 2000, the rate of black lung disease has doubled across the United States.** The Black Lung Disability Trust Fund pays for benefits to coal miners disabled by black lung and their surviving spouses in cases where the miners' employer has gone bankrupt or not been found responsible. But because of congressional inaction, this Trust Fund is in jeopardy. The Trust Fund is supported by a small excise tax paid on coal sold domestically, at a rate that was unchanged for more than three decades. But Congress failed to extend the tax rate before the end of 2018, and it has now been cut by more than half. This will create a long-term financial crisis for the Black Lung Disability Trust Fund unless it's corrected. A May 2018 Government Accountability Office report projected that, if the tax rate were to be slashed, the Trust Fund's revenue would be unable to cover beneficiary payments and administrative costs as soon as 2020 and Trust Fund debt would balloon to over $15 billion by 2050.[5] I urge members of this Committee to work toward extending the black lung excise tax immediately.

The RECLAIM Act

We must restore the lands degraded and polluted by the coal mining industry. As we've found at Coalfield, there's economic opportunity in reclamation. The RECLAIM Act, which would open up $1B for reclamation, has the potential to create thousands of new jobs, and stimulate millions more in local economic development activity across the country. According to the Department of the Interior's Office of Surface Mining Reclamation and Enforcement, the RECLAIM Act could

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[3] https://www.brookings.edu/bpea-articles/saving-the-heartland-place-based-policies-in-21st-century-america/.

[4] https://www.npr.org/2018/07/19/630470150/black-lung-rate-hits-25-year-high-in-appalachian-coal-mining-states.

[5] https://www.gao.gov/products/GAO-18-351.

create 4,600 direct jobs in areas hard hit by losses in the coal industry. Reclamation of abandoned mine lands generate thousands of other jobs in agriculture, recreation, tourism, renewable energy, and retail. The RECLAIM Act doesn't use a cent of taxpayer money. It imposes no new fees or taxes.

Miners can be put back to work restoring the land they love. As Wilburn's fellow crew member, himself a former surface miner, remarked one day: "I just blow the mountains up, and now I'm putting them back together." And importantly, these sites, if properly restored, can help mitigate climate change by capturing carbon and connecting diverse ecosystems. Indeed, over 1,200 miles of streambed have been permanently destroyed by mountaintop removal mining in Appalachia alone. More than 1 million acres of mountaintop have been blown up. Enough mountaintop has been removed in West Virginia alone to bury all of Manhattan.[6]

The RECLAIM Act uses existing funds to create jobs and clean up dangerous mines. The RECLAIM Act was originally introduced in February 2016, then again introduced last Congress as H.R. 1731 and reported out of the House Natural Resources Committee in October 2017. Still, largely because of industry opposition, it has not progressed despite its bipartisan support in both chambers. The AML Fund has an explicit purpose to clean up dangerous and polluting mines that were left behind by coal operators over 40 years ago and continue to burden surrounding communities. The RECLAIM Act simply releases these funds so that long overdue cleanup can happen now.

I'd like to extend my thanks to the House Natural Resources Committee for passing the bipartisan RECLAIM Act in the 115th Congress. Chairman Lowenthal, I know you were a co-sponsor of that legislation, as were a number of other members of this Subcommittee. RECLAIM would also catalyze longer term economic growth in coal communities by helping to lay a foundation for the building new industries in parts of the country that badly need a broader economic base.

AML Pilot Program

The flexibility and innovation aspired to by RECLAIM has been tried out through the AML Pilot program, launched in 2015. This program chose six states in which AML funds were allowed to be used on projects having a "nexus" between mine-cleanup and economic development. For example, in West Virginia we've been able to kick-start an aquaponics facility, solar installations, and quality housing development on former minelands.

Coalfield Development recently worked with partners throughout Central Appalachia to identify and develop 20 development projects in communities plagued by abandoned mine lands.[7] Projects would cost over $38 million; however, if these projects were funded, total economic output from project spending would be valued at nearly $84 million. These projects would provide over $22 million in wages to employees, support nearly 543 full- and part-time jobs across the region, and improve regional GDP (value-added) by over $44 million. Further, most projects plan for direct/on-site employment after construction/development. See the Reclaiming Appalachia report for more info.

These proposals (as well as projects that have already been funded) demonstrate the potential for jobs and broader community benefits through innovative mine reclamation. Importantly, restoring these lands can contribute significantly to reductions in greenhouse gases. The Nature Conservancy reports:

> A study by The Nature Conservancy and others showed that "natural climate solutions"—such as growing taller trees, improving soil health, protecting grasslands and restoring coastal wetlands—can amount to 37 percent of the removal of carbon dioxide from the atmosphere needed in the next few decades.
>
> In West Virginia, the third most forested state in the United States, there is massive potential to contribute to these natural climate solutions. And the Central Appalachians is one of the most critical landscapes in the country for this important work.
>
> In 2012, The Nature Conservancy completed a study of all the forests on the East Coast, identifying the areas predicted to withstand the growing impacts of climate change and help ensure nature's survival. Among the most resilient landscapes were highland forests in West Virginia.[8]

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[6] https://pubs.acs.org/doi/abs/10.1021/acs.est.5b04532.

[7] http://appvoices.org/resources/AML-RAC/AML_RAC_report_Many_Voices_Many_Solutions-11-13-18-lo-res.pdf.

[8] https://www.nature.org/en-us/about-us/where-we-work/united-states/west-virginia/stories-in-west_virginia/natural-climate-solutions-in-west-virginia/.

While AML Pilot and other Federal programs have been helpful, there is a need for improvement in execution. In many places, implementation of the program should increase public awareness and outreach, increase transparency in application criteria, review, and decision making, and increase emphasis on projects including a mine reclamation component. It's important that Federal dollars not be allowed to go to politician's pet projects, but rather engage community members and advance truly worthy projects that actually have that key "nexus" mentioned above.

National Rural Broadband

Finally, we must connect our communities. Integral to stimulating economic development, particularly in rural places, is access to broadband. While the F.C.C. and Rural Utilities Service provide broadband subsidies, and private sector companies like Microsoft are rolling out programs, a coordinated, national broadband plan could go a long way in helping creating new opportunities in economically distressed areas like Appalachia.

A group in West Virginia called Generation West Virginia has launched an important new program called NewForce. NewForce is a tuition-free, in-person, team-based intensive tech training program in Huntington, West Virginia.[9] It was created by employers, community colleges, and non-profits to ensure West Virginians have the right tech skills for companies who are ready to hire in the Mountain State. Through the intensive 6-month curriculum, NewForce students work together, receive mentorship, and graduate with in-demand software development skills and direct connections to jobs. The program finishes with a Job Interview Day where the program's employer partners interview NewForce graduates for open positions. But a robust broadband infrastructure is needed for this to really take off. A coordinated, national broadband initiative targeted at rural areas could jump start economic development. Congress can make that happen.

THE NEED FOR A NEW WAY OF DOING ECONOMIC DEVELOPMENT

You must understand just how deep and real the pain and hardship is that has been caused by the coal industry's decline. Usually, when discussing economic transitions, policy makers announce: "Well, we can just retrain those people." The reality is this is so much easier said than done. There are hundreds of laid-off miners who got certified in new trades, but it doesn't matter because there are not many businesses outside the coal industry and therefore not many jobs to be entered with that new certification. Some ask, "Why can't those people just move away?" Well, for one that questions totally ignores that value of community and culture and identity. But that question also ignores the economic realities of "land-poor" homeowners and the unaffordability of relocating to high-cost urban areas.

The right question isn't, "How do we retrain those people?" The right question is, "How we strengthen these places which have given our country so much and have so much more to give?" There are smart and much-needed government investments that we'll need to answer this question, but we aren't asking for handouts. Ultimately, we need market-driven solutions that are financially sustainable. We haven't lost sight of this, and it's why creating new businesses is central to our strategy.

A question that drives me crazy is, "Why do those people vote against their own interests?" By "own interests" the questioner usually means government programs. Well, we don't want to have to depend on government programs to feed our families. We are proud to have powered this country's development for generations, and we want to keep doing so.

The problem has never been our work ethic. The problem is that we put all our eggs in to one basket made of coal, and when the bottom of that basket fell out we found ourselves stuck. Now, many ask, "What's the next big thing? What can replace coal?" This is the wrong question. Relying on one industry too heavily is how we got some of the highest poverty rates in the country. So, the solution is not to find one new industry, but to support entrepreneurs and new businesses in a diversified array of sustainable fields. By sustainable, I mean financially sustainable, environmentally sustainable, and social sustainable. At Coalfield Development, we're pioneering what these diversified sectors can look like. We and our partner organizations are not asking for charity. We're pitching an investment opportunity.

[9] https://globenewswire.com/news-release/2018/10/16/1622190/0/en/Generation-West-Virginia-Mountwest-Jobcase-Partners-Launch-Training-Program-to-Build-Tech-Talent-Pipeline.html.

Poverty in our region is complex. Even when coal was booming, we were still one of the poorest regions in North America.[10] Such socio-economic challenges are wrapped up in issues of power, equity, and fairness. For example, huge swaths of West Virginia land is owned by corporate land holding companies.[11] It's very difficult for fresh investment and redevelopment to occur when this is the case. Strategies for our region can't just be about one industry at one point in time. Strategies for our region have to be about justice and opportunity.

Simply using government dollars to "retrain" people is not enough. There has to be a broader place-based strategy which simultaneously creates new businesses and provides the wrap-around support needed by workers to overcome poverty.

In developing such programs, much flexibility will be needed for local innovation to flourish. By local I do not mean state governments, I mean place-based, grassroots organizations. Program income requirements should be loosened. More general operating funds should be granted to organizations trying to survive in extremely distressed economic environments. Public/private partnerships should be encouraged, not discouraged. In many ways, this work is more like early phase, basic research and development. This is economic research and development to test what is possible and what isn't in this complex places. Put more directly, those of on the ground trying to improve conditions for our place need to be allowed to be as innovative and entrepreneurial as is necessary for real opportunity to flourish.

SUMMARY

While I'm here to say that coal is not coming back, I'm also here to say that doesn't mean Appalachia has no future. In fact, the void left by coal's collapse has made room for new sprouts of entrepreneurship and innovation. While the short-term prognosis is a painful transition off coal, if we can approach this transition smartly and fairly, the long-term outlook is really bright.

Appalachia has important assets the rest of the country needs: large swaths of forests that are carbon sinks, a dedicated and creative work force, a unique and distinctive culture, and a good quality of life within driving distance of a significant portion of the country's population. We can realize our bright future, albeit with a little help and outside investment. But our leaders hold us back from realizing our bright future when they promise coal will return. This only dampens the latent entrepreneurial spirit that lies dormant among our hills and hollers. But that spirit is there.

Wilburn is one of thousands of former miners whose life was rocked by the shut down of his mine. But at age 45 he's about to become a college graduate. He's helping us start a sustainable business called Refresh Appalachia, which is selling fresh, healthy produce throughout the region. Wilburn has transformed a moment of crisis in his life into a transformational opportunity.

Now you have the opportunity to do the same.

Please don't ignore the economic hurt in Appalachia—or in any other coal communities across the country. To ignore us would only mean deepening the fissures that are breaking our country apart.

I hope you'll consider Wilburn, as you consider my suggestions. Thank you for your time.

Dr. LOWENTHAL. Thank you.

And now the Chair recognizes Dr. Mason to testify.

STATEMENT OF JOSEPH MASON, PROFESSOR, DEPARTMENT OF FINANCE, LOUISIANA STATE UNIVERSITY, BATON ROUGE, LOUISIANA

Dr. MASON. Good morning.

Thank you, Chairman Lowenthal, Ranking Member Gosar, and members of the Committee for holding this hearing to discuss this very crucial transition.

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[10] For a thorough analysis poverty in Appalachia and the Federal Government's role in it, read *Uneven Ground: Appalachia Since 1945* by Ronald D. Eller (2008) University of Kentucky Press.

[11] https://www.wvgazettemail.com/news/special_reports/w-va-still-owned-by-absentee-companies-report_says/article_f3dd4a64-19a1-59b7-bc6d-ee2b49d6bd9b.html.

The Green New Deal resolution seeks, among other things, to achieve net-zero greenhouse gas emissions through a fair and just transition for all communities and workers while ensuring clean air and water, a sustainable environment, and justice and equity. While laudable, those objectives conflict in dimensions that just can't be reconciled.

In recent years, wind turbine and transmission line sites located far from population centers have largely been developed. Further development will require working with communities and citizens to ensure a fair and just balance of access and resource generation closer to cities and homes.

Such a process takes time, and jobs will not be created until that process comes to a conclusion. A fair and just process will take many years. There will be jobs dealing with batteries and generation technology, but those will be environmentally dirty in different ways. Rechargeable batteries, including lead acid, nickel, metal hydride, nickel cadmium and lithium ion batteries, all contain toxic materials that are hazardous to human health and the environment if disposed of inappropriately.

Wind turbines use considerable amounts of rare earth elements to build permanent magnets and electric generators; solar photovoltaic installations use similar ingredients. All of those are either valuable, in short supply, or both.

Rather than mining those from conflict areas of the world like the Democratic Republic of the Congo, they can be obtained through recycling. But jobs and industries related to that recycling will require handling concentrated quantities of heavy metals and other carcinogenic and mutagenic materials risking humans lives as well as soil and groundwater contamination.

Without occupational safety rules, we risk exposing workers in those new jobs to both new and known safety hazards like we did when exposing miners to black lung disease, construction workers to asbestos exposure, and workers and residents of nearby neighborhoods to birth defects and cancer arising from chemical and heavy metals.

Residential solar contracts already involve terms similar to those that caused the recent real estate bubble, bust, and recession. Without consumer protection from rampant development, mandating green energy without protecting consumers violates the notion of a just and fair transition.

While the green bond sector is booming, there is no assurance that investments funded in the sector are really green in any meaningful sense. Bonds and funds selling on the popularity of the green moniker usually underperform their benchmarks and charge high investor fees. Like the tech bubble glamour stocks in the 1990s, a green investment bubble could arise that, when popped, could devastate the sector and forestall needed development, hurting both jobs and the environment.

If the proposed mandate of carbon neutrality cannot be met with production cuts, then achieving that goal will have to rely upon offsets. But offsets aren't locally green and sometimes arise from poor policy making and fraud. It is not clear that the United States should accept other countries' offsets, but there is currently no mechanism by which to accept or reject their fiat permits.

Diplomacy will be necessary to establish eligibility requirement, and that will take time.

The proposed mandate will alter international patterns of trade and strategic resources and disrupt global supply chains. As markets adapt to the new patterns of energy resource trade, market failures will occur. Because energy affects every consumer and business in the Nation, such failures may be even more disruptive than the recent credit crisis. Even without market failures, the mandate will impose widely varying effects upon states and their citizens as some states pay more of the price for the adjustment than others.

Because those costs are a complex function of existing fossil fuel use as well as energy imports from other states, the sponsors of this resolution cannot today say which states will suffer worse losses and which others will not. And they cannot, therefore, guarantee the social or distributional justice that they claim, or even the basis by which such justice will be meted out.

The New Deal created jobs in an economy with more than 20 percent unemployment. We don't have 20 percent unemployment. According to Federal Reserve Chairman Jerome Powell, unemployment is low, and prices are near 2 percent inflation. We are in a good place.

The proposed resolution is not a New Deal, nor do we necessarily need a New Deal. A better historical roadmap might be the National Monetary Commission. Following the financial panic of 1907, Congress convened the Commission to study in depth best central banking practices around the world in order to make recommendations for meaningful reform. The result of that investigation, the Federal Reserve System, still stands as a major innovation that is one of the leading central banks in the world in terms of both effectiveness and stability. Our environment deserves the same thought and consideration.

In closing, I would like to note I was first included in the congressional greenhouse gas debate almost 10 years ago now. I agree that the issue is more important 10 years on, absolutely. I applaud Chairman Lowenthal's remarks about the need to begin a meaningful discussion here to lead this process forward.

Thank you.

[The prepared statement of Dr. Mason follows:]

PREPARED STATEMENT OF DR. JOSEPH R. MASON, LOUISIANA STATE UNIVERSITY AND THE UNIVERSITY OF PENNSYLVANIA

Economics is built upon comparative statics. Statics is the comparison of one economic equilibrium with another. While it is easy to say that one equilibrium is better than another, the question of how we make the transition is important. Thus, I want to acknowledge that this hearing is crucial to the Nation's economic well-being.

According to the proposed resolution, the Green New Deal seeks:

(A) to achieve net-zero greenhouse gas emissions through a fair and just transition for all communities and workers;

(B) to create millions of good, high-wage jobs and ensure prosperity and economic security for all people of the United States;

(C) to invest in the infrastructure and industry of the United States to sustainably meet the challenges of the 21st century;

(D) to secure for all people of the United States for generations to come——

(i) clean air and water;

(ii) climate and community resiliency;

(iii) healthy food;

(iv) access to nature; and

(v) a sustainable environment; and

(E) to promote justice and equity by stopping current, preventing future, and repairing historic oppression of indigenous communities, communities of color, migrant communities, deindustrialized communities, depopulated rural communities, the poor, low-income workers, women, the elderly, the unhoused, people with disabilities, and youth (referred to in this resolution as "frontline and vulnerable communities")

Mandating "net-zero greenhouse gas emissions" over a 10-year period alone, however, will not ensure a smooth transition. Mandates will not curtail CO_2 emissions and encourage the push to renewables. Often, in fact, mandates instead produce perverse incentives.

The proposed mandate also runs counter to the other resolution goals regarding fairness and equality. The tension arises because the only way to achieve the mandate in such a short period of time will be to take rights and property from some citizens and reallocate that to others.

I. Green Jobs Will Take a Long Time to Develop and Will Involve Handling Toxic Metals That Are the Dirty Foundation of Green Energy

A. Rapid Development and Planning for Wind Turbines, Solar Farms, and High-Voltage Lines Will Alienate Local Citizens and Violate Distributional Justice

Jobs related to green technologies will take a long time to develop. For instance, jobs related to wind turbine installations and high-voltage electrical infrastructure can only be made available after a long planning process.

A 30-year old research agenda regarding opposition to wind projects by local citizens yields interesting insights into citizens' thinking. A recent academic paper summarizing such research suggests that while, "North American support for wind has been consistently high," the strict interpretation of opposition cannot be tied solely to NIMBY behavior by local residents or lack of concern for the environment.[1] Distance from turbines obviously matters, but its effect is unclear, and sound and visual impacts are tied to annoyance and opposition.

Less obvious, however, are conclusions that suggest that the strongest influences on successful placements relate to the process by which wind turbine sites are selected. Sound and visual impacts can be overcome if those aspects are not ignored, but are acknowledged. "Issues of fairness, participation, and trust during the development process influence acceptance," and "[v]iewing opposition as something to be overcome prevents meaningful understandings and implementation of best practices."[2]

All that said, however, the authors note that "[i]mplementation of research findings into practice has been limited."[3] Similar research finds nearly identical intricacies to citing high-voltage transmission lines required for green energy installations.[4]

Those points are important because, "the 'low hanging fruit' wind sites (those that have good wind resources and are close to loads and transmission, yet far from communities) have largely been developed, implying that future wind development likely will happen increasingly near communities."[5]

Up to now, considerations regarding reactions of local citizens to wind turbine placements and high-voltage infrastructure have not been a significant concern. The Green New Deal 10-year mandate, therefore, means that wind turbine installations and needed transmission towers will be coming to residents' neighborhoods soon, regardless of local concerns. The proposed policy is almost *designed* to alienate local citizens in the name of unfunded federalism. The costs of such policies—like those

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[1] Rand, Joseph and Hoen, Ben. "Thirty years of North American wind energy acceptance research: What have we learned?" *Energy Research & Social Science* 29 (2017), 135–148.

[2] Id.

[3] Id.

[4] Cain, Nicholas L. and Nelson, Hal T. "What drives opposition to high-voltage transmission lines?" *Land Use Policy* 33 (2013), 204–213.

[5] Rand and Hoen (2017). For a more complete review of constraints to wind power development, see the U.S. Department of Energy, *Wind Vision: A new era for wind power in the United States.* 2015.

incurred by locals in the Camp Fire—will be borne by locals while the benefits will be enjoyed elsewhere. Such dispersion violates concerns of distributional justice and fairness, counter to the bill's own stated goals.

B. Green Energy Curtails CO_2, but Increases Concentrations of Other Pollutants That Damage Soil and Water

While it is obvious that wind turbines don't produce when the wind doesn't blow and solar doesn't produce when the sun doesn't shine and many have suggested batteries as a solution, few have thought about where the batteries come from or the batteries' own impact on the environment.

Batteries pollute. Rechargeable batteries, including lead-acid, nickel-metal hydride, nickel-cadmium, and lithium-ion batteries, all contain toxic materials. "Spent rechargeable batteries contain heavy metal elements, including nickel (Ni), cobalt (Co), and [lead] Pb, which are hazardous to human health and the environment if disposed of inappropriately. . . . Ni, Co, and Pb are all classified as carcinogenic and mutagenic materials. In addition to heavy metals, the organic and strong acid/alkaline electrolytes of rechargeable batteries are also polluting." [6]

So, while the Green New Deal promises clean air, little attention is being paid to increased concentration of *other* pollutants in the quest to decrease CO_2.

C. Resources Needed for Green Energy Will Require Transportation and Handling of Toxic Materials in High Concentrations in Trade With Conflict Nations Worldwide

Large-scale battery production also consumes other scarce resources. Among the above-mentioned elements, "Co is considered strategically important because it is widely used in industry and by the military." [7] Yet, Co, in particular, is in short supply and some two-thirds of that comes from one of the poorest countries in the world, the Democratic Republic of Congo, under contract to Glencore. Illustrating the Democratic Republic of Congo's global influence, the *Financial Times* reported last week that Co prices "hit their lowest level in 2 years after a supply surge from the Democratic Republic of Congo," after falling some 40 percent since November 2018.[8] The Democratic Republic of Congo's uncertain political environment, demanding increased royalties and taxes on international mining companies, has led mining companies such as Glencore to reduce their exposure to the sector.[9]

Resource pressures have led to increased concerns about materials recycling. Yet U.S. battery recycling programs are lax in comparison with those in the EU and China.[10]

It is important to recognize further that such recycling concerns are not only about the environment. The needs span all manner of green technologies not just batteries. "Wind power demands important amounts of rare earth elements (REE) like neodymium and dysprosium to build permanent magnets for electric generators and some studies have shown that demand of both elements might increase by 700 percent and 2600 percent, respectively, in the next decades. Additionally, solar photovoltaic demands high quantities of silver for electrical connections, and other materials like cadmium, tellurium, or indium are used for manufacturing p-n junctions in solar thin film technologies like CIGS or CdTe. Solar thermal power (STP) also requires silver for manufacturing reflectors or nickel and molybdenum for manufacturing high strength steel alloys needed in structures." [11]

All of those are in short supply, but little of those are recycled. "[C]urrent recycling rates of some of these materials are almost negligible because more often than not the specific required recycling processes do not pay off. [Even where recycling is profitable], current recycling rates are still very low. For instance, less than 3 percent of the lithium contained in a battery is currently recycled. . . . [Still] only 42 percent of the total battery waste mass can be recycled with current available technology. . . . As a result, the concern regarding the impact of green technologies

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[6] Renjie Chen et al. "Toward sustainable and systematic recycling of spent rechargeable batteries." *Chemical Society Reviews*, 47 (2018), 7239–7302.

[7] Id.

[8] Sanderson, Henry. "Cobalt hits 2-year low as DRC ramps up supply." *Financial Times*, February 5, 2019.

[9] Sanderson, Henry and Hume, Neil. "Glencore to cut workers at key DR Congo copper and cobalt mine." *Financial Times,* February 8, 2019.

[10] Renjie Chen et al. (2018).

[11] Valeroa, Alicia; Valerob, Antonio; Calvob, Guiomar; and Ortegoa, Abel. "Material bottlenecks in the future development of green technologies." *Renewable and Sustainable Energy Reviews* 93 (2018), 178–200. (Citations omitted.)

on raw material availability is becoming an important issue for countries aiming at guaranteeing their sustainability and for the development of green technologies." [12]

There will be jobs. But these will be no better (and arguably, worse) than those in the existing fossil fuels sector. Those jobs will deal with the new pollutants from green energy sources. Even recycling programs—to the extent that those are mandated—will require handling concentrated quantities of heavy metals and other carcinogenic and mutagenic materials, risking human lives and soil and groundwater contamination. It would only make sense to put in place occupational safety rules to deal with new environmental hazards before mandating energy goals. Otherwise, we may repeat prior problems like those arising from black lung disease, asbestos exposure, birth defects and cancer arising from chemical and heavy metals disposal, and the failed remediation efforts of the EPA's Superfund, all in the name of CO_2 reduction.

II. The Green Brand Is Already Being Co-Opted

The Green New Deal sets as a goal "net-zero greenhouse gas emissions," but does not define what that means. Green is already a marketing tool in many sectors and even where the term is defined, it leads people to charge high fees and do bad things in the name of "green."

A. Solar Installations Face a Complex Web of Laws and Regulations That Are Not Being Taken Into Account in the Mandate

Take, for instance, the residential solar industry. Many homes have installed solar panels. But a large number of those have been bad deals for consumers and investors alike.

Solar contracts are causing a variety of frictions in the real estate industry, some of which may turn out to be systemic. For instance, the contractual arrangements surrounding the installations—often in the form of loans or leases and contracts to provide energy to the grid via net metering arrangements—may not transfer with the home because they are technically independent of the property upon sale. Ancillary negotiations can be necessary to effectuate such transfer, but those negotiations can delay closing and raise the costs of real estate transactions.

Consumer and business solar installation contracts are sold and securitized just like subprime mortgages, with the cash-flows "sliced and diced" and sold to investors so that the company can sell more solar installations. In 2017, solar securitizations topped $1.5 billion and in 2018, they topped $2 billion.[13] The sector continues to grow rapidly.

In January 2019, Mosaic—which has over $1 billion in securitizations outstanding—completed its largest solar securitization to date. Mosaic's consumer loans are regulated by, "CFPB, FTC and various state agencies. Loans originated by Mosaic must comply with applicable Federal and State law including (but not limited to): Truth in Lending Act ("TILA"); Truth in Advertising; Fair Credit Reporting Act ("FCRA"); Fair Debt Collection Practices Act ("FDCPA"); Equal Credit Opportunity; [and] Privacy and Data Security Laws." [14] While securitization is not in and of itself bad, one of the key risk factors noted in Mosaic's securitization is that the loans and leases can contain unique features like payments that rise over time, which "may potentially invite the scrutiny of consumer protection regulators." [15]

Green energy installations, therefore, intertwine with consumer protections and energy transmission regulations in a web of Federal and state combinations whose interaction will be affected by the proposed mandate. Mandating green energy without protecting consumers in those sectors, therefore, violates the notion of a "just and fair transition."

B. Green Bond Funds Sell at a Premium and Charge High Fees for the Brand

Although there is no established formal criteria for the qualification of a green bond, the development of the International Capital Market Association "green bond principles" has promoted a modicum of agreement in the sector.[16] Those principles, while voluntary, have formed a process around transparency and disclosure with

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[12] Valeroa et al. (2018). (Citations omitted.)

[13] Mendelsohn, Mike. "Raising capital in very large chunks: The rise of solar securitization." *PV Magazine,* November 16, 2018.

[14] ABS New Issue Report, "Mosaic Solar Loan Trust 2019–1," *Kroll Bond Rating Agency*, February 6, 2019.

[15] Id.

[16] https://www.icmagroup.org/green-social-and-sustainability-bonds/green-bond-principles-gbp/.

four specific components, namely Use of Proceeds, Process for Project Evaluation and Selection, Management of Proceeds, and Reporting.

While green investment funds have proved popular with special interests they ignore simple marketing realities: when something is more popular it can be sold for a higher price. Existing fossil-free funds' demonstrated performance history shows that the funds usually underperform even their own chosen benchmarks and charge high fees to investors. Like the tech bubble "glamour stocks" in the 1990s, a green investment bubble could arise that—when popped—could devastate the sector and forestall needed development of green technologies.

Despite such concerns, green bond issuance is growing rapidly. The World Bank reported that green bond issuance grew from almost nothing in 2012 to over $150 billion in 2017.[17] After being initially led by supra-nationals like the World Bank and International Monetary Fund, volumes have shifted to "a wide range of issuers including corporates, banks and local authorities. While 50 percent of supply has come in Euro-denominated format, other bonds have been issued in USD, GBP, SEK, CAD, AUD and others including PEN" (Malaysia).[18] Issue currency is dominated in some regions by USD because the United States is the largest investor country worldwide. For instance, over 85 percent of Latin American green bonds issued since the inception of the green bond market were denominated in USD.[19]

C. Green Power Isn't Always Green: Offsets Cannot be Relied Upon to Decrease Global CO_2 Emissions

The troubling aspect of the USD concentration is that the United States is the key market for many of the green products produced by some nations. One of those products is CO_2 offsets.

If the proposed mandate of carbon neutrality cannot be met with production cuts, then achieving that goal will have to rely upon offsets. But offsets, at best, aren't locally green (merely reflecting somebody else's green achievements) and, at worst, merely reflect unjust enrichment and outright fraud.

For instance, in February 2016, the New York State Public Service Commission issued its "Order Resetting Retail Energy Markets and Establishing Further Process," which, in part, required that companies selling renewable energy packages to consumers actually obtain such energy from such sources rather than just using offsets purchased from the market.[20] While the issue remains unsettled, the point is that green energy should actually come from green energy sources, not just offsets purchased from somewhere else.

The reasoning behind the requirement is sound, because it is often not clear where the offsets come from or whether they are meaningful. For instance, EU Clean Development Mechanism ("CDM") projects are granted carbon credits based on the extent to which the project is expected to result in fewer emissions than would otherwise have occurred. "Companies, therefore, have an incentive to either inflate the estimate of emissions that would have occurred without the project or claim that the project will reduce emissions by more than it actually does."[21]

According to Mason (2018):

> *In order to constrain firms from mischaracterizing their projects, the CDM mechanism requires third-party validation and verification before a project receives carbon credits. Third-party verification is carried out by Designated Operation Entities ("DOEs") certified by the CDM Executive Board. Even*

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[17] The World Bank at https://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/perspectives/perspectives-i1c2.

[18] Reichelt, Heike and Keenan, Colleen. *The Green Bond Market: 10 years later and looking ahead.* Washington, DC: The World Bank, December 2017.

[19] Mullin, Keith. " LatAm green bonds—Building Momentum." *Environmental Finance* (supported by the World Bank and the Swiss Federation).

[20] Giannasca, N. "New York Public Service Commission's ESCO order set for preliminary injunction hearing." *Energy and Environmental Law Blog.* May 4, 2016. ". . .to ensure that these products contribute to greater renewable energy achievement . . . energy labels are based on the environmental attributes of the energy purchased by the load serving entity *and are not affected by the separate purchase of Renewable Energy Certificates ("RECs").* Currently, to meet this requirement the ESCO must guarantee that at least 30 percent of the energy provided to the customer will be generated by deliverable renewable energy resources, including biomass, biogas, hydropower, solar energy, and wind energy, and will include renewable attributes." [Emphasis added.]

[21] Mason, Joseph R. "Financial regulation and fraud in CO2 markets." *Research Handbook of Investing in the Triple Bottom Line,* Sabri Boubaker, Douglas Cummings and Doc Nguyen, eds., Cheltenham: Edward Elgar, 2018, 9–28.

independent third-party auditors, however, may be susceptible to bribes or collusion to manipulate the results.

In 2008 and 2009, respectively, the U.N. temporarily suspended two independent organizations—Norwegian company Det Norske Veritas and Swiss firm SGS—after 'spot checks found flaws in their methodologies'. At the time, these two companies were dominating the validation/verification market (see Szabo, 2008). Investigations showed that both companies had approved projects without sufficient review.

The U.N. inspection found one company had a flawed review process, inadequate preparation and training of their auditing staff, and an overall failure to assign auditors with the proper technical skills. The other was suspended after an inspection raised concerns about staff qualifications and the quality of its internal reviews.

In a follow-up review in 2009, the five largest DOEs' validation processes were scored on an A-to-F scale. None received a score higher than a D. [22]

Even when they are valid, offsets are usually issued as part of a political process to spur economic development. Using offsets judged as a valid tradeoff for development in one country as a basis for achieving carbon neutrality in another runs the risk of "robbing Peter to pay Paul," with no net decrease in global emissions.

III. Energy Is Provided in a Complex International Marketplace

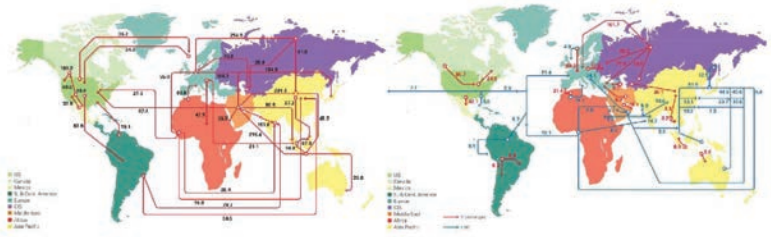
The point of the above is that setting a mandate before setting the rules of the game—or even some of the rules of the game—is a recipe for disaster. That disaster will relate to highly complex markets that supply inputs to every home and business in America and the world. Such a disruption could have far larger effects on economic growth and green development than even the recent credit crisis. Sound rules, therefore, are more important than a blanket mandate.

The production and delivery of energy takes place within a complex system of three interacting layers: (1) the physical layer consisting of the hard assets used for production, transportation, and storage of primary energy sources, and for the transformation of one form of energy into another; (2) markets for energy that consist of interacting spot, forward, option and long-term structured transactions; and, (3) the system of national laws, regulations, and international treaties. Federal energy policy, market policy, and infrastructure policy, therefore, go hand in hand so that policies in one area affect the others.

A. Infrastructure Policy Will Involve Not Just Local, But Global, Decisions

Changes to Federal policy will affect not just local, but global energy infrastructure. Energy markets have evolved through history into a highly integrated, global system. In any such system, shocks such as the proposed energy mandate propagate across different geographic locations and specific commodity markets through very complicated and constantly evolving channels of transmission.

Major Oil (left) and Gas (right) Trade Movements, 2017



Source: BP Statistical Review of World Energy 2018

For instance, the graph above shows global oil and natural gas trade routes in 2017. If the United States uses less oil, those trade routes will change as other countries use the oil we produce as well as that which we choose not to import. Nearly every country views energy as a strategic resource. As a result, global

[22] Id. (Citations omitted.)

treaties and trade relationships will affect such flows, necessitating negotiations and international diplomacy regarding such changes.

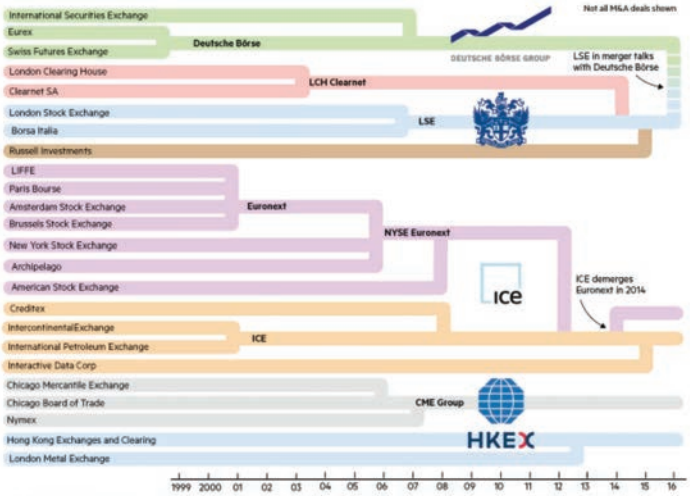
B. Market Trading Will Require Policy, Too

Energy products are actively traded, in which the market transactions can be financial or physical. Financial transactions are settled in cash, while physical contracts are settled in delivery of the related commodity. Infrastructure is crucially related to delivery, in that delivery cannot occur without scheduling necessary infrastructure well in advance. Thus, there exists a fundamental inter-relationship between infrastructure and markets.

In addition, there exist several market layers of derivatives products, including futures, options, and swaps that may be combined with each other in a wide variety of combinations. Those often trade in conjunction with a wide variety of weather derivatives that are associated with resource demand.

Such products are traded on organized markets around the world. Many such markets have consolidated in recent years, providing financial market efficiency by virtue of centralized trading that can more efficiently drive out price anomalies.

Market Consolidation, 1999-2016



Source: Stafford, Phillip. "Rationale behind LSE-Deutsche Börse deal finally works." *Financial Times*, February 23, 2016.

Such consolidation, however, does not prevent market failures. Electricity markets, for instance, use complex arrays of products to trade around probable shortfalls in production and infrastructure.

Sometimes traders and markets get things wrong. For instance, last fall a trader on NASDAQ's Nordpool electricity market left the exchange holding over €100 million in trading losses.[23]

> *Nasdaq said the size of his positions blew through several layers of safeguards designed to protect the clearing house from hefty losses.*
>
> *The catalyst for the trading loss was a series of backfiring bets on the price difference between German and Nordic power markets, according to multiple sources in the industry. Mr Aas's trades were positioned for the gap between the two to narrow, but instead it widened sharply to a level 17 times larger than normal.*
>
> *That move was triggered, in part, by a jump in the price of carbon allowances in Europe that have been the best performing commodity so far this year and a source of bumper profits for hedge funds and investment banks.*

[23] Stafford, Philip and Sheppard, David. "Trader blows €100m hole in Nasdaq's Nordic power market," *Financial Times*. September 13, 2018.

Rising carbon prices, which are trading at a decade high, have dragged up natural gas and electricity markets in continental Europe.

At the same time, a forecast of wetter than previously anticipated weather in the Nordic region, where hydropower is a big contributor to electricity supplies, pushed prices on the so-called Nordpool market far lower. [24]

There will be high-stakes trading in energy around the transition. Policy uncertainties, weather uncertainties, and market risks will commingle to create risky conditions in the very energy markets that U.S. consumers and businesses rely upon every day for their energy needs. A disruption to those markets can devastatingly cripple U.S. prosperity and economic security, two of the main goals of the resolution.

C. Different States Will Be Affected Differently

Disruptions to trade and costs will also be felt differently across the United States. The mandate will require states to reduce fossil fuel use by 55 percent to 150 percent of their current consumption (see below). Such wide differentials will have varying effects upon states and their citizens, with states facing costlier transitions paying more of the price than others.

Percent of Energy from Fossil Fuels, by State (2016)

Alabama	86.84%	Illinois	76.60%	Montana	86.41%	Rhode Island	88.45%
Alaska	96.75%	Indiana	89.00%	Nebraska	103.17%	South Carolina	62.23%
Arizona	83.47%	Iowa	68.50%	Nevada	75.11%	South Dakota	59.34%
Arkansas	84.30%	Kansas	80.25%	New Hampshire	87.17%	Tennessee	64.74%
California	73.52%	Kentucky	95.12%	New Jersey	70.12%	Texas	90.15%
Colorado	87.09%	Louisiana	88.99%	New Mexico	80.21%	Utah	100.42%
Connecticut	76.74%	Maine	63.87%	New York	104.04%	Vermont	70.86%
Delaware	82.23%	Maryland	61.86%	North Carolina	72.92%	Virginia	66.99%
Dist. of Col.	28.53%	Massachusetts	71.82%	North Dakota	68.17%	Washington	58.45%
Florida	81.64%	Michigan	81.86%	Ohio	113.88%	West Virginia	149.00%
Georgia	70.11%	Minnesota	73.37%	Oklahoma	79.82%	Wisconsin	77.70%
Hawaii	88.90%	Mississippi	94.87%	Oregon	91.45%	Wyoming	148.42%
Idaho	54.99%	Missouri	86.41%	Pennsylvania	61.57%	United States	80.89%

Source: U.S. Energy Information Administration at
https://www.eia.gov/state/seds/data.php?incfile=/state/seds/sep_sum/html/sum_btu_1.html&sid=US

The costs imposed upon individual states in the transition are a complex function of fossil fuel production, fossil fuel reliance, and infrastructure that supports the transition in any chosen geographical region. Any one state should not be penalized if sufficient regional infrastructure does not exist to support its own transition.

Because those costs are a complex function of local fossil fuel use as well as energy imports from other states, the sponsors of this resolution cannot, today, say which states will suffer worse losses than others and cannot, therefore, guaranty social or distributional justice (or even the basis by which such justice will be meted out).

IV. Summary and Conclusion

The New Deal created jobs that left a lasting imprint on American infrastructure, such as the San Francisco Bay Bridge, the Lincoln Tunnel, and the Hoover Dam. Those projects provided jobs in an environment of more than 20 percent unemployment, nationally. We don't have 20 percent unemployment today. According to Fed Vice Chairman Jerome Powell, "The U.S. economy is now in a good place. At the moment, unemployment is low, prices are near 2 percent inflation, so we' re in a good place now." [25]

While unemployment may be high in some areas, those areas are not necessarily where any new jobs will be. Moreover, the skills required for any new jobs are not guaranteed to be associated with any skills possessed by workers displaced in the transition. Even assuming enough new jobs are created to make up for the old jobs, new jobs requiring different skills will render workers in the old sectors obsolete and leave a "lost generation" behind.

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[24] Id.

[25] Condon, Christopher; Oguh, Chibuike; and Boesler, Matthew. "Fed's Powell Says Economy in 'Good Place' With Low Unemployment," *Bloomberg*, February 6, 2019.

The proposed mandate is no foundation for a New Deal. The funding and aid provided in the real New Deal took place in a very different institutional environment.

The RFC—created by President Hoover as the main means of New Deal funding—was a flexible mechanism that ultimately allocated more than $50 billion in stimulus money (about $900 billion in 2017 dollars using a CPI-based inflator, $2.1 trillion using the value of a consumer bundle, or $13.2 trillion using the relative share of GDP[26]).

Such flexibility was crucial for success in a time of economic emergency. The flexibility was achieved by making the RFC part of the Executive branch of the U.S. Government so that changes in the scale or scope of RFC powers could be enacted by Executive Order.

The "operation was too large to fund directly out of Federal budget allocations, so the RFC was founded as a government-owned corporation with an initial appropriation from Congress and the right to borrow more money from the public at large."[27] Because it was not part of the government, it was not required to adhere to Civil Service regulations for hiring and promotion and was not subject to congressional General Accounting Office audits.[28]

RFC decisions were largely made at local levels. Field office managers had authority to approve loans up to $100,000 (about $1.8 million in 2017 dollars using a CPI-based inflator, $4.3 million using the value of a consumer bundle, or $26 million using the relative share of GDP[29]). In practice, each field office was almost completely independent and only major problems were taken up with Washington."[30]

Like a private equity firm, there were, two guiding principles. First, RFC programs only gave credit or other assistance to "reasonably sound institutions."[31] Second, successful RFC programs often "took a measure of control over institutions to calm junior creditors and nurse firms to profitability and recovery over the long run. . . . If a field office showed a profit, everything was fine; if not, someone would be detailed from Washington to see what was the matter, and possibly a new field office manager would be appointed."[32]

The government didn't just give money away in the New Deal. It made money.

Maybe, if we give the environment the attention that the President and Congress gave the New Deal back in the 1930s, we could come to a more meaningful solution. The current mandate does not show sufficient depth of thought to set a foundation upon which to move forward.

In order to establish such a foundation, a better historical analogy might be the National Monetary Commission. Following the Financial Panic of 1907, Congress convened the Commission to study best central banking practices around the world in depth in order to make recommendations for meaningful reform. The result of that investigation, the Federal Reserve System, still stands as a major innovation that is one of the leading central banks in the world in terms of both effectiveness and stability.

Our environment deserves the same thought and consideration.

Dr. LOWENTHAL. Thank you very much.

And I want to thank the panel for their testimony. I remind the members of the Committee, as a Committee Rule, we impose a 5-minute limit on questions.

I am going to now begin to recognize Members for any questions they may wish to ask.

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[26] The change in the value of the dollar is measured from 1935 to the most recent year available, 2017. See https://www.measuringworth.com/calculators/uscompare/result.php?year_source=1935&amount=1&year_result=2018.

[27] Id.

[28] Mason, Joseph R. "Reconstruction Finance Corporation Assistance to Financial Institutions and Commercial & Industrial Enterprise in the U.S. Great Depression, 1932–1937." *Resolution of Financial Distress,* Stijn Claessens, Simeon Djankov, and Ashoka Mody, eds., Washington: World Bank Press, 2001, 167–204.

[29] The change in the value of the dollar is measured from 1935 to the most recent year available, 2017. See https://www.measuringworth.com/calculators/uscompare/result.php?year_source=1935&amount=1&year_result=2018.

[30] Mason (2001).

[31] Id.

[32] Id.

I am going to defer my questions and begin with Congressman Levin for the first set of questions.

Mr. LEVIN. Thank you, Chair Lowenthal. I appreciate you holding today's hearing. And I am pleased that our Committee continues to discuss the broad impacts of climate change.

This month so far, we have held hearings highlighting both the incredibly important science that underpins our understanding of climate change as well as the way our communities have been directly affected by the changing climate.

Dealing with climate change in a bold and aggressive way is no fairytale. Doing nothing and expecting this problem to take care of itself is the real fairytale. Our discussions have clarified the urgent need to accelerate the country's clean energy production in order to reduce greenhouse gas intensive fossil few use. I would also add that the carbon footprint of renewables is negligible when compared to fossil fuels. As an example, the carbon emissions per unit of PV electricity is one-tenth or less of even the most efficient natural gas power plant.

A change to renewables is absolutely essential. However, we must account for the way that this change will affect communities across the Nation and ensure a just transition. Clean energy production is an incredible economic opportunity that should be shared by all, especially those that have been dependent on fossil fuel production.

Further, we need to account for communities of color, rural communities, and others who haven't historically been afforded equal economic opportunities. In California, our economy has grown because of the clean energy revolution.

I look forward to working with my colleagues and friends on this Committee to ensure as many communities as possible can share these benefits.

With that, I do have a couple of questions for Mr. Dennison and Mr. Hille. And I would be interested to get both of your perspective on this.

Mr. Dennison and Mr. Hille, in his written testimony, Dr. Mason says, and I quote, "Even assuming enough new jobs are created to make up for the old jobs, new jobs requiring different skills will render workers in the old sectors obsolete and leave a 'lost generation' behind."

Mr. Dennison and Mr. Hille, what is wrong with this mentality? Should we, as a society, just write off coal miners or oil and gas workers as a "lost generation"?

Mr. DENNISON. No. The solar energy already employs more than the oil industry and the coal industry combined in our country. That is a key point. At Coalfield Development, we incubated the first solar installation company in southern West Virginia. Our first crew chief was a former underground miner whose skills parlayed actually quite well. He was already a licensed electrician. Because of the nature of the equipment that he worked in, it only took 2 months to get him trained up. And the work ethic is phenomenal. Work ethic is not our problem. And because we can be adaptive and creative and we have that gumption and grit, I don't think the current work force has to be obsolete, no.

Mr. HILLE. I would add that, because of the technical nature of these jobs, as Brandon said, there is a very fast adoption curve. There is also a lot of work in addition to the work in renewables in energy efficiency, and that can also be picked up very quickly.

The former miners that we have been working with in our new energy interns program go through 6 months of training at the end of which they are certified by the Business Professionals Institute, BPI certified, in order to do this same work. Some of them have been placed with housing organizations working on some of the deficient housing stock that we have in Appalachia. And also, some of them are interested in starting their own new businesses, which, as you know, is the path to prosperity and the great American Dream.

I will just mention too that this is an investment that pays for itself. When you do energy efficiency, particularly commercial energy efficiency, that can pay for itself very quickly, because commercial energy meters charge both a demand rate and a usage rate. And when you implement efficiency measures, you reduce both of those. Often the demand rate is half of a commercial energy bill.

As an example, we helped a grocery warehouse in London, Kentucky, do a lighting retrofit. It was a $200,000 investment. They are saving $100,000 a year on their utility costs. It paid for itself in 2 years, and they are now seeing that as a direct add to their bottom line.

A lot of this new investment can pay for itself.

Mr. LEVIN. Mr. Hille and Mr. Dennison, I thank you both very much for your work to accelerate our transition to a sustainable economy and for your work on a just transition.

With that, Mr. Chair, I will yield my time.

Dr. LOWENTHAL. Thank you.

I now recognize the Ranking Member, Mr. Gosar, for 5 minutes.

Dr. GOSAR. Thanks, Mr. Chairman.

First of all, I would like to enter into the record two articles from the *Financial Times*, ironically today, "China's demand for electric vehicles charges copper." That is always great for my state because we are known as the Copper State, one the five C's. And "Australia hopes to cash in on new cobalt rush."

I would like to have those entered in the record.

By the way, for everybody that is wondering why I have this up there, anybody want to gather what that is? That is a nodule of rare earth that comes from the Mojave Desert in my district. It is particularly high in nvidium, by the way. OK.

Mr. Dennison, you made some comments, that we need to correct the record. You said that there were by far more solar jobs in the country. That is not correct. The oil and gas natural industry supports 10.3 million U.S. jobs and nearly 8 percent of the U.S. economy. As of 2017, 250,271 American workers worked in the solar industry. This is 9,000 jobs fewer than in 2016. AWEA has or this wind area has 105,000. So, be careful with the facts.

And, by the way, this is from the Solar Foundation, so these are facts from yours.

And I am really glad that you brought up the overburden area because it is very pertinent to these things, these rare earths,

because overburden has been found to have lots of rare earths that are attainable here.

I mean, repurposing miners for the new advent of that mining industry is very, very important to me, particularly when we are so dependent on these.

Dr. Mason, you mentioned in your testimony that renewable technology, such as wind farms and solar panels, require various critical minerals and rare earth elements to function. The Green New Deal calls for the United States to run exclusively on clean and renewable energy in 10 years.

Can you remark how the global market for critical minerals may respond to a surge in demand of this magnitude? And, also, talk to me about who controls the marketplace for these rare earths.

Dr. MASON. Well, the article in the *Financial Times* this morning was very, very interesting in that regard. It named zero American companies involved in the Democratic Republic of Congo. If you are familiar with the results of their elections that were kind of muscled through last week, you will note they are not democratic at all.

It also focused on the artisanal mining, people just digging in the ground to get this valuable cobalt to sell it to make more money than they can make from anywhere else. You can call that small business if you want and entrepreneurial, but it is tremendously dirty. There are no safety regulations. We have children working in these artisanal mines, just as we had in West Virginia many, many years ago, and tried to regulate out the United States and did so ultimately successfully with safety regulations.

These metals are extremely valuable. They are in demand throughout the world. China is beating us to the rush, as are European mining conglomerates operating in these countries with virtually no safety regulations or environmental protections, and those need to be calculated in to the overall environmental footprint, not just carbon footprint, of these technologies.

And I would also like to note, even with regard to the carbon footprint of solar, that doesn't factor in what is called the rejected energy, as long as we keep wasting energy and having it go out in the form of unused heat, which is where 66 percent of energy goes, according to the Lawrence Livermore National Laboratory. We are going to be in the same problem for a long time.

Dr. GOSAR. Well, in fact, you bring it up, that we are going to be 100 percent dictated. I mean, China has this policy, One Belt, One Road, and they are actually extorting much of the discipline and oversight and control of these rare critical minerals. You bring up the causticness of particularly smeltering these rare earths. They are bound, so current technology uses high concentrations of sulfuric acid, in which China is very lackadaisical. The United States is much more disciplined within it.

In fact, a good friend of mine right now is experimenting with high concentrations of citric acid in order to extract it. So, we do these better than anybody else in the world, and if new technology is so predicated upon it, we ought to be investing in this. And overburden is one of those areas, if I am not mistaken. Am I not correct, Dr. Mason?

Dr. MASON. Yes, absolutely. All energy is dirty. We need to conserve energy.

Dr. GOSAR. I am running out of time, but I have always been one of those that believes in all of the above. In fact, my good friend actually has a power company in north Scottsdale that runs on solar during the day and gas at night, utilizing that baseload principle. Not all energy is the same. You have to be able to have a continual output, wattage, along those lines, to make sure that everybody—when they flip the switch, they can actually have power.

With that, I will yield back and wait for a second round.

Dr. LOWENTHAL. Thank you, Mr. Gosar.

Before I recognize Mr. Brown, I would like to say, my staff has just supplied me—at the risk of just taking it to another level, this discussion between Mr. Dennison and Mr. Gosar, in terms of exactly the jobs that are impacted—and my understanding, if we are talking about direct jobs, that is, jobs where people are hired in or by the oil and gas industry, versus direct jobs in solar, there are approximately 150,000, at this moment, direct jobs where people are hired by the industry in oil and gas, and 50,000 direct jobs where they are hired by the industry in coal, which is still less than the 242,000 which are directly hired by solar at this moment.

But there is a discussion, and I think it is a reasonable one, in terms of the impact and those are the direct jobs.

Dr. GOSAR. If the gentleman would yield.

Dr. LOWENTHAL. Certainly.

Dr. GOSAR. A lot of those jobs are for the construction of solar fields, so they are temporary. They are not long lasting.

Dr. LOWENTHAL. I appreciate that. It is important that we kind of clarify and we realize how complex these issues really are.

Representative Brown, you have 5 minutes.

Mr. BROWN. Thank you, Mr. Chairman. In the spirit of Representative Bishop who is not here today, I am not going to read my statement, yes, indeed. Although I may make reference to it, or refer to it, I should say.

So, for the record, this hearing is not about the Green New Deal. This hearing is about what are some of the things we need to do to account for, make adjustments—as the energy sector continues a kind of conversion or transition to renewable energy sources and whether we are on the same pace that we are on or whether we, through legislation and policy changes, accelerate that pace. It is important for us to ask and answer the questions, what does it mean for the labor force; what does it mean for poor and communities of color; and how does everyone benefit from this conversion, regardless of the rate in which it occurs.

My question, which I think almost anyone can speak to—but, Mr. Dennison, I certainly would like to hear your thoughts; Ms. Farley, yours; and Ms. Shrader, yours—what are some specific, and, Mr. Dennison, you mentioned the 33–6–3 model. What are some specific Federal authorizations or appropriations, whether in higher education, work force development, or Federal procurement, that can assist the development of that work force as we convert from carbon-based to renewable energy sources, or that assist the creation of businesses, that might replace a coal industry in a particular community? What are some of the specific Federal authorizations and appropriations that we might consider?

Thank you.

Mr. DENNISON. I would be happy to answer that. For the record, I am quoting a *Forbes* article from January 25, 2017, with my figures. It is specific to electricity generation, specific to that process, but also a lot of pipeline jobs, a lot of gas jobs——

Mr. BROWN. Mr. Dennison, are you responding to——

Mr. DENNISON. Yes, sir.

Mr. BROWN. Not on my time, please.

Mr. DENNISON. The 33–6–3, the Appalachian Regional Commission has been indispensable. It is an example of a place-based Federal policy that I think is really important to this transition, rather than broad policies that treat every region the same. I will also say the RECLAIM Act is a really important piece of legislation for our region, and so is the reauthorization of the Abandoned Mine Lands Program in the first place.

Something that happened a few years back was the AML Pilot Program for my lands, which allowed for much more local flexibility, to be innovative and to help start some new businesses. I think that level of flexibility really is critical.

Mr. BROWN. Thank you.

Ms. FARLEY. Thank you. I would also offer—we talked a lot about energy efficiency today, and just like reduce, reuse, and recycle, that first R is reduce. I think when we have conversations about the energy transition, we must remember the importance of energy efficiency and the role energy efficiency plays in reducing our demand and consumption for energy first.

And there are many opportunities on the national, state, and local level to support energy policies, specifically focused on increasing energy efficiency programs, as well as weatherization assistance programs that have often suffered from reduced Federal funding. These programs are specifically tied to increased job opportunities in the energy efficiency sector. As we have heard a couple of times today from Mr. Dennison and Mr. Hille, energy efficiency can reduce high-energy burdens on working families, which, in turn, supports community wealth-building.

Energy efficiency improves economic stability by increasing entrepreneurship and thriving wage/job opportunities. Energy efficiency also increases health by reducing harmful carbon emissions that pollute our air. And also again, energy efficiency promotes economic development and community wealth-building——

Mr. BROWN. Thank you, Ms. Farley. I am sorry for interrupting, but I do want to hear from Ms. Shrader. These 5 minutes go real fast.

Ms. FARLEY. Sure thing.

Ms. SHRADER. The outdoor recreation economy is really important in this piece, because I think a lot of rural communities can transition to this outdoor recreation economy and then build a diversified economy with manufacturing companies and tech companies and health care right in their communities, in these rural places. So, one of the things that is really important to us is to take a lead on protecting public lands.

The reauthorization of the Land and Water Conservation Fund, and the public lands package, and also the CORE Act that was just introduced by Congressman Neguse and Senator Bennet, is really

important in making sure that we have a diversified economy that is going to be a great place for families to thrive.

Mr. BROWN. Thank you, Mr. Chairman.

Dr. LOWENTHAL. Thank you. And next, Mr. Westerman.

Mr. WESTERMAN. Thank you, Mr. Chairman. Thank you to the witnesses for being here today.

As the gentleman said, this isn't about the Green New Deal, but obviously everything about energy would play into this idea of a Green New Deal. So, I have been trying to look at the scope of what we are talking about. If we truly are trying to replace all fossil fuels in 10 years, and if we are looking at world energy production or world energy use, the data that I found shows—and this was 2006 data, so it is a little bit old—but the world used 471 quads of energy—a quad is 1 with 15 zeros after it—a quadrillion BTUs of energy, and the world use is projected in 2020 to use 500 quads of energy.

Of those 471 quads, 408 of it were produced from fossil fuels, and only 63 quads of the energy consumed in the world came from renewables. So, if you look globally, that is quite a challenge to replace 408 quads—actually, more than that now—of fossil fuels in a 10-year time frame.

But if we look at it just here in the United States—in 2017, the United States used 98 quads of energy. And of that, 77 percent of it, or 76 quads, came from fossil fuels. And the highest rate was from natural gas, about 32 percent; petroleum, about 28 percent; and coal, about 18 percent. So, here in the United States, we still only have a little over 20 percent of our energy that comes from renewables, and that includes nuclear.

And I know a lot of people don't like to include nuclear in it. If you take the nuclear out, it is only less than 13 percent of all of our energy comes from renewables right now.

So, we are talking about a huge transition to go to 100 percent renewables, no fossil fuels in 10 years, especially if we don't like nuclear, which is a very clean form of energy as well.

But I was interested in what Mr. Dennison said about the number of jobs in solar versus coal and petroleum. He contends that there are more jobs in solar now than coal and petroleum combined, which creates a bit of a conundrum, because we are trying to figure out what to do with displaced coal workers. And since solar is only a tiny fraction of the renewables that are out there now, yet there are more people in that field than in coal and petroleum combined, it seems like there would be a huge demand and jobs available for these displaced coworkers, if you just train them to be in the solar field.

Can any of our panelists tell me why there is not a huge demand for workers in the solar field and why we are having to come up with tourism and other forms of employment to help these displaced workers?

Mr. DENNISON. There is demand. We just certified 20 of them last year, and although renewables still make up a small piece of the pie, renewables have been the fastest growing piece of the pie. There is lots of innovation and investment in renewables.

Mr. WESTERMAN. Dr. Mason, can you address, from an economic standpoint, the manpower per million BTUs it takes to do renew-

able energy versus fossil fuel energy? And would there be a lot more workers required in the renewable field?

Dr. MASON. Now you are getting into math that makes more sense. From an economic perspective, it is not just number of jobs, it is the value of those jobs, whether denominated in dollars or denominated in energy production, as you just did with your mathematics.

The examples quoted here, one required 6 months of additional training. It is wonderful that that is provided. I come originally from Gary, Indiana, and have faced a severe transition in that region of the country through the 1980s and 1990s. Retraining is absolutely crucial. We can overcome some of these humps, but currently, none of the legislation plans for that. We have programs in place in small places of the country. We do need to expand those to make this a meaningful transition.

Mr. WESTERMAN. If it takes more workers per unit of output, won't that drive the price extremely high?

Dr. MASON. Well, either the price has to be high or the payment to workers has to be low, but we are not neutral with respect to price.

Mr. WESTERMAN. I am out of time.

Dr. LOWENTHAL. Representative Case, you have 5 minutes.

Mr. CASE. Thank you, Mr. Chair, and thank you for the courtesy of letting me join you today.

Dr. Bissett—did I say that right?

Dr. BISSETT. Yes, sir.

Mr. CASE. OK. Thank you. My questions to you have two big assumptions built into them, that I am asking you to get beyond for a little bit. Number 1, climate change is real; Number 2, energy transition is inescapable, it is just when and how we do it. That is my working assumption. You may not agree with what I just put forward, but I want to focus on, if I am correct, and if Congress as a result, a majority of Congress, enacts policies that are purposely designed to move us to renewable energy at the expense of coal, and if there is, therefore, a tremendous consequence to the businesses and communities that you represent, how do we best transition those communities?

That is my critical question. I am not asking you whether we have to transition or not. I am just asking you, for now, how do we do it? How do we best do it?

And as a prelude, just tell me a little bit more about your chamber. You have 550 businesses. How many of those businesses are directly or indirectly dependent on coal?

Dr. BISSETT. When I took the job, Congressman, I didn't think many were, and I quickly learned I was wrong. Again, my chamber is outside of the coalfields and a great many are. And again the lawyers, engineers, and accountants like I talked about, land holding company, barges, all those things kind of, not the coal mining jobs, but the indirect jobs.

As to your question, my big concern would be that you can't just look at those direct jobs that direct impact, you have to look beyond that.

Mr. CASE. OK.

Dr. BISSETT. Because when the downturn occurred, Congressman, it really affected us there, and we don't really mine coal where my chamber is located.

Mr. CASE. I see. So, has your chamber institutionally considered the best form of transition for a post-coal energy world? Have you actually undertaken the worst-case scenario discussion, from your perspective, of how do we best transition?

Mr. Dennison, in his testimony, had three bullets. His bullets were: (1) create a national just transition task force; (2) create a national program to support coal communities to include the POWER Act; and (3) pass Federal legislation to improve the conditions of former coal workers in distressed communities, to include the RECLAIM Act. Is that a good program, from your perspective? Do you think that will get the job done? How do we plan for a transition in a way that will best assist other communities that will be negatively impacted if we don't get ahead of the transition now?

Dr. BISSETT. It is a great question. It will take time to do that. Coalfield Development is a dues paying member of my chamber. Brandon is a board member of my chamber, and we support a lot of his work force development programs and recently adopted a resolution in support of it.

We may disagree on the position we are in, and I am not trying to move away from your assumptions, but Appalachia needs more educational team and Appalachia needs livelihoods. And that goes back to my concern. When we saw the downturn previously, we were wondering when it would stop. Seeing it return now, our concern again is that there are going to be votes made here that will put us back in that jeopardy.

It is a very tenuous time, a fragile time, like I was talking about. But, no, we are supportive of other economic development. I think we can do both, Congressman. I think we can mine coal, I think we can have a new economy. I think we can do it all. Because that new economy will benefit from low-cost, reliable electricity generated by natural gas and coal.

Mr. CASE. I am not sure I agree with your assumption over the long term. I think you are taking a bit of a short- to mid-term view of it. I am looking out not 10, but 20-plus years. If you had the time to plan for some kind of a transition where coal would be not acceptable anymore in any major scale, how do we get ahead of that? That is really my question, how do we together plan the best possible transition here? Going back to one question, you haven't undertaken that scenario within the chamber or anything like that, like, how do we actually move beyond this?

Dr. BISSETT. We haven't currently, because right now, there has been this expansion, this growth, especially in the southern coalfields. Northern coalfields have not been that way in West Virginia, but they have had the natural gas——

Mr. CASE. Has anybody in the coal industry done this transition thinking and planning in the coal communities? Has anybody actually come together for a larger picture, how do we transition out of this, if, in fact, we do have to have an energy transition away from fossil fuel——

Dr. BISSETT. I am sure as they look at long-term investments in their coal mines and wells, I am sure there is concern about that.

But at the same time, the market is currently there and they are feeding that market. If they don't feed it in the United States, they are going to feed it internationally.

Mr. CASE. No, I understand that. That is currently.

Dr. BISSETT. Yes, sir.

Mr. CASE. And I am trying to think out into the future for the most orderly way of doing this as opposed to having circumstances thrusted upon you, which is not a very good time to do emergency transition planning.

Dr. LOWENTHAL. Thank you.

And now we turn to Representative Graves for your 5 minutes of questions.

Mr. GRAVES. Thank you, Mr. Chairman. I appreciate you holding this hearing, and I appreciate all of your testimony and appreciate you being here today.

Ms. Farley, I represent south Louisiana, and I was looking at your testimony where you made mention that Birmingham, Atlanta, New Orleans, and Memphis hold the greatest—and I am quoting your testimony—hold the greatest energy burdens for low-income households.

I pulled some data that we had used last week in a hearing showing the different energy prices per kilowatt hours in the states. Alabama, for example, is 12.41 per kilowatt hour; Georgia is 12.26; Tennessee is 10.79; and Louisiana, coming in at the lowest cost in the Nation, is 9.37. Whereas other states—we had the governor of Massachusetts here last week who was here advocating for renewable policies. The state of Massachusetts is 21.11 cents per kilowatt hour, more than double that of Louisiana and nearly double that of the other states.

Other states that are fun to pick on sometimes, Mr. Huffman and Mr. Lowenthal, just for fun, 19.9 cents per kilowatt hour. So, I guess I am just trying to understand, it seems like lower prices would——

Mr. HUFFMAN. Would the gentleman yield for a correction?

Mr. GRAVES. Can I get an answer first?

Mr. HUFFMAN. On California? Well, we will get back to that.

Mr. GRAVES. All right. Does that make sense? It seems like lower prices would be helpful versus the higher prices that other states have. I just wonder if you could respond to that.

Ms. FARLEY. Yes, absolutely. Rates alone do not equal bills. When we are talking about energy burden, we are talking about the fully burdened cost of a bill to households and ratepayers. So, yes, there are some states in the South that do boast lower rates, but that does not make a bill.

Mr. GRAVES. It doesn't, but so if we had Massachusetts rates more than doubled, do you think that would make it easier to afford?

Ms. FARLEY. I am not familiar with the numbers of Massachusetts. I do applaud their efforts in their shift to renewable energy and saw that testimony last week. But in the South, again, while many states and investor-owned utilities boast lower than average national rates, rates alone do not equal utility bills. There are many fees and sometimes punitive in regards to solar

across many states in the South that do equal higher bills and, ultimately, higher burdens on lower income households.

Mr. GRAVES. Mr. Chairman, I would ask to submit for the record the documents showing the various rates. I am not sure that I understand how energy efficiency would be the burden of, how actions of a state could prevent an individual from pursuing energy efficiency improvements in their own homes, but again——

Dr. LOWENTHAL. That will be accepted without objection.

[The information follows:]

Submission for the Record by Rep. Graves

January 2019 Electricity Prices

STATE	JUNE 2018	JUNE 2017	MOVEMENT	CHANGE (%)
Alabama	12.41¢ / kWh	12.79¢ / kWh	DOWN	-2.971 %
Alaska	22.54¢ / kWh	22.14¢ / kWh	UP	1.806 %
Arizona	13.16¢ / kWh	12.65¢ / kWh	UP	4.031 %
Arkansas	9.99¢ / kWh	10.73¢ / kWh	DOWN	-6.896 %
California	19.90¢ / kWh	19.39¢ / kWh	UP	2.630 %
Colorado	12.28¢ / kWh	12.75¢ / kWh	DOWN	-3.686 %
Connecticut	21.62¢ / kWh	20.47¢ / kWh	UP	5.617 %
DC	13.21¢ / kWh	13.40¢ / kWh	DOWN	-1.417 %
Delaware	12.05¢ / kWh	12.59¢ / kWh	DOWN	-4.289 %
Florida	11.37¢ / kWh	12.02¢ / kWh	DOWN	-5.407 %
Georgia	12.26¢ / kWh	12.53¢ / kWh	DOWN	-2.154 %
Hawaii	32.76¢ / kWh	30.45¢ / kWh	UP	7.586 %
Idaho	10.58¢ / kWh	11.42¢ / kWh	DOWN	-7.355 %
Illinois	12.56¢ / kWh	12.95¢ / kWh	DOWN	-3.011 %
Indiana	12.02¢ / kWh	12.05¢ / kWh	DOWN	-0.248 %
Iowa	13.81¢ / kWh	13.92¢ / kWh	DOWN	-0.790 %
Kansas	11.56¢ / kWh	13.56¢ / kWh	DOWN	-14.74 %
Kentucky	10.56¢ / kWh	10.68¢ / kWh	DOWN	-1.123 %

Louisiana	9.37¢ / kWh	10.19¢ / kWh	DOWN	-8.047 %
Maine	16.16¢ / kWh	16.17¢ / kWh	DOWN	-0.061 %
·yland	13.92¢ / kWh	14.22¢ / kWh	DOWN	-2.109 %
Massachusetts	21.11¢ / kWh	18.56¢ / kWh	UP	13.73 %
Michigan	16.07¢ / kWh	15.86¢ / kWh	UP	1.324 %
Minnesota	14.09¢ / kWh	13.96¢ / kWh	UP	0.931 %
Mississippi	11.55¢ / kWh	11.40¢ / kWh	UP	1.315 %
Missouri	13.23¢ / kWh	13.25¢ / kWh	DOWN	-0.150 %
Montana	11.85¢ / kWh	11.73¢ / kWh	UP	1.023 %
Nebraska	11.31¢ / kWh	12.06¢ / kWh	DOWN	-6.218 %
Nevada	11.67¢ / kWh	11.64¢ / kWh	UP	0.257 %
New Hampshire	19.63¢ / kWh	19.30¢ / kWh	UP	1.709 %
New Jersey	15.64¢ / kWh	15.96¢ / kWh	DOWN	-2.005 %
New Mexico	13.37¢ / kWh	13.41¢ / kWh	DOWN	-0.298 %
·· ·· York	19.30¢ / kWh	18.76¢ / kWh	UP	2.878 %
North Carolina	11.24¢ / kWh	11.07¢ / kWh	UP	1.535 %
North Dakota	12.07¢ / kWh	12.34¢ / kWh	DOWN	-2.188 %
Ohio	12.64¢ / kWh	12.67¢ / kWh	DOWN	-0.236 %
·klahoma	10.72¢ / kWh	10.53¢ / kWh	UP	1.804 %
Oregon	11.02¢ / kWh	10.97¢ / kWh	UP	0.455 %
Pennsylvania	14.38¢ / kWh	14.52¢ / kWh	DOWN	-0.964 %
Rhode Island	18.64¢ / kWh	16.65¢ / kWh	UP	11.95 %
South Carolina	12.91¢ / kWh	13.07¢ / kWh	DOWN	-1.224 %
South Dakota	12.39¢ / kWh	12.57¢ / kWh	DOWN	-1.431 %
Tennessee	10.79¢ / kWh	10.93¢ / kWh	DOWN	-1.280 %
Texas	11.36¢ / kWh	11.15¢ / kWh	UP	1.883 %
Utah	10.63¢ / kWh	11.48¢ / kWh	DOWN	-7.404 %
Vermont	18.50¢ / kWh	18.02¢ / kWh	UP	2.663 %
Virginia	12.40¢ / kWh	11.91¢ / kWh	UP	4.114 %
Washington	9.79¢ / kWh	9.95¢ / kWh	DOWN	-1.608 %
·Vest Virginia	11.57¢ / kWh	11.69¢ / kWh	DOWN	-1.026 %
Wisconsin	14.28¢ / kWh	15.05¢ / kWh	DOWN	-5.116 %
Wyoming	12.30¢ / kWh	12.21¢ / kWh	UP	0.737 %

Trends & Observations from State Data

From this data, we can see the state with the lowest electric rates is Louisiana. On average, homes in Louisiana pay 9.53 cents per kWh. Residential customers in Texas, the country's largest deregulated market for electricity, pay a relatively low price for electricity as well of 11.68 cents per kWh.

The state that saw the great increase in prices for electricity is Rhode Island. Rhode Island customers are paying nearly 20% more for electricity in 2018.

Mr. GRAVES. Thank you. And secondly, Mr. Chairman, I would ask, while I am doing UCs for fun, this is a document, May 2018, from the National Association of State Energy Officials, showing that the jobs from coal, natural gas, oil, as compared to solar, aren't even kind of close. As a matter of fact, when you add them up quickly, it looks like you are about three times more jobs in those fields than in the solar market.

Dr. LOWENTHAL. Without objection.

Mr. GRAVES. Thank you.

Last, Dr. Mason, I understand you have worked for the Office of the Comptroller of the Currency, Federal Reserve, European Union, and other impressive places and, of course, also professor at LSU. So, thank you very much for being here. I just want to quickly ask you to comment on the Green New Deal or other concepts where the United States unilaterally takes aggressive actions to reduce emissions, just comparatively talking about the low kilowatt hour in Louisiana that largely is a natural gas fuel source for electricity generation. What happens globally when you squeeze the United States in terms of emissions, what happens globally when you do something like that?

Dr. MASON. Well, these are strategic resources recognized worldwide, and just socioeconomically, when you start redistributing strategic resources around the world, countries will fight for strategic resources. They will fight through negotiating processes, through international relations processes, and sometimes even physically fight for those resources.

So, when we start moving around the distribution of those resources, we really put the world at risk in a lot of different ways. I am not saying that that should prevent us from doing so.

Mr. GRAVES. Sure.

Dr. MASON. I am merely saying that we need to look at this problem in a holistic, multi-dimensional way to even try to understand the multiple tentacles that reach out.

I want to point out that the jobs issue, for instance, is really not just an energy jobs issue. It is relating to the hollowing out of the middle of America, and that hollowing out is occurring fundamentally through access to education, which isn't equally attainable in the middle of the country right now. We need to develop this country overall, and this is a much larger problem than energy, although it kind of starts with energy, because if we have efficient energy from a variety of sources, we can better develop.

So, these things are what we call endogenous process. There are various feedback loops involved with them. It is very complex. There are sciences dealing with analyzing these. And I think, Chairman Lowenthal, please begin those discussions, respectful discussions, so that we can work out some of these feedback mechanisms and put in place meaningful policies to not just help coalfields, but expand some of these programs nationwide to the core of America, and think about how much that is going to take, where the money is going to come from, and let's get moving.

Mr. GRAVES. I yield back. Thank you.

Dr. LOWENTHAL. Thank you.

Now, Representative Huffman.

Mr. HUFFMAN. Thanks.

And, Mr. Graves, the witness gave part of my correction that I wanted to send your way, but we have to look at energy bills and not just rates. That is super important when you look at a state like California that has invested tremendously in energy efficiency. Because of those investments, bills have come way down, even though if you look at the unit cost of energy in rates, it would appear to be higher. So, I would really urge you to take a look at that and then let's see where the states compare with each other.

Mr. GRAVES. Thank you. And we will also take your moderate temperatures.

Mr. HUFFMAN. Right. We can do all kinds of interesting cultural exchanges. I want some of your gumbo.

I was interested in the discussion that I just caught involving Mr. Bissett. And, Mr. Hille, I noticed you shaking your head a little bit during some of the testimony regarding this coal renaissance that I would argue is kind of a temporary thing. The Trump administration has gone out of its way, engaged in herculean efforts to breathe life into what I think most other objective observers would say is a dying industry, coal.

One of the many indications of this huge effort across the aisle to prop up coal against all of the other forces that are causing it to be a declining industry involves the zombie coal earmark that Mr. McClintock and I even worked on in prior years. There was actually this earmark from the height of the cold war that required U.S. military bases in Germany to buy a specific type of coal from Pennsylvania, and it was not efficient. It was absolutely corporate cronyism of the worst order, and Mr. McClintock and I worked together to eliminate that from the Defense budget.

It is back in this year. And once again, American military bases in Germany are buying Pennsylvania coal because Congress says they have to and the Trump administration says they have to. So, there is an incredible effort to prop up coal for a little while longer. I would argue it is a little bit like these warm days in February we have here in Washington. The cherry blossoms will kind of start to come out, but it is not really spring.

I want to hear your thoughts, Mr. Hille, because you were shaking your head.

Mr. HILLE. I think what is important to understand about what has been a fairly small uptick in coal production is that it is largely in metallurgical coal. And I think Bill would agree with me on that. And it is important to understand, metallurgical coal is geologically a different type of coal that doesn't exist everywhere. There is some in southern West Virginia. There is some in Virginia. There is a very narrow band of it in far eastern Kentucky, but most of Kentucky's coal is thermal coal or steam coal, which is used to generate electricity, and that has simply not come back.

We had a minor increase in 2017 of about 30 jobs in Kentucky, and then in 2018, we lost another 200. So, the thermal coal is not coming back in Appalachia. And to the extent that it will continue to be a part of our energy mix—and it will for some time—it is not going to come from Appalachia, because our coal is harder to get. It is more expensive to mine. The good accessible seams have been mined out, and it is not cost effective to blow off the top of a

mountain when you can go somewhere else and scoop it off the surface of the ground.

So, Appalachia is not going to be competitive, and that is why this work of creating a just transition for these communities is critical, and we have the means and the processes to do that.

Mr. HUFFMAN. And to not do that long-term transition planning just because there appears to still be a market right now, how would you characterize that?

Mr. HILLE. I think short-sighted would be a good way to describe it. And, in fact, there are a lot of significant efforts going on. Congressman Rogers and then Governor Beshear in Kentucky created the SOAR initiative, which has been a large planning process, recognizing that thermal coal wasn't going to come back, that Kentucky coal wasn't going to come back.

We have the largest concentration of distressed counties in Appalachia, and there is broad recognition that we need to do this. And the plan that SOAR has put together is a broad plan and it has a strong emphasis on entrepreneurship, as does the Appalachian Regional Commission.

Mr. HUFFMAN. All right, so while I have you, I know you have been a huge supporter of solar deployment in Appalachia. Do you see a future for broader adoption of solar in the region, and can you describe some of the ways the Federal Government can help with solar deployment in the region?

Mr. HILLE. We are actually seeing an interesting uptick in demand for solar in small commercial enterprises. MACED is a CDFI. We are a small business lender. We work with our clients to do energy efficiency first because that is the low-hanging fruit, but many of them are now coming to us first saying, no, I want solar. We say, OK, but if you do the efficiency, you don't have to put as much solar on your roof. But they see it as part of marketing. They also see it as a way to respond to rising energy bills. I think there are probably a lot of things the Federal Government could do to support and encourage that.

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

Dr. LOWENTHAL. Thank you.

I now recognize Ms. Cheney for 5 minutes of questions.

Ms. CHENEY. Thank you very much, Mr. Chairman.

Mr. Chairman, I would like to ask unanimous consent to enter a document into the record that is titled, "Overview and Frequently Asked Questions" that initially appeared on Congresswoman Ocasio-Cortez's website and was submitted to NPR.

Dr. LOWENTHAL. Without objection.

[The information follows:]

LAUNCH: Thursday, February 7, at 8:30 AM.

Overview

We will begin work immediately on Green New Deal bills to put the nuts and bolts on the plan described in this resolution (important to say so someone else can't claim this mantle).

This is a massive transformation of our society with clear goals and a timeline.

- The Green New Deal resolution a 10-year plan to mobilize every aspect of American society at a scale not seen since World War 2 to achieve net-zero greenhouse gas emissions and create economic prosperity for all. It will:
  - Move America to 100% clean and renewable energy
  - Create millions of family supporting-wage, union jobs
  - Ensure a just transition for all communities and workers to ensure economic security for people and communities that have historically relied on fossil fuel industries
  - Ensure justice and equity for frontline communities by prioritizing investment, training, climate and community resiliency, economic and environmental benefits in these communities
  - Build on FDR's second bill of rights by guaranteeing:
    - A job with a family sustaining wage, family and medical leave, vacations, and retirement security
    - High-quality education, including higher education and trade schools
    - Clean air and water and access to nature
    - Healthy food
    - High-quality health care
    - Safe, affordable, adequate housing
    - Economic environment free of monopolies
    - Economic security for all who are unable or unwilling to work

There is no time to waste.

- IPCC Report said global emissions must be cut by by 40–60% by 2030. US is 20% of total emissions. We must get to 0 by 2030 and lead the world in a global Green New Deal.

Americans love a challenge. This is our moonshot.

- When JFK said we'd go to the by the end of the decade, people said impossible.
- If Eisenhower wanted to build the interstate highway system today, people would ask how we'd pay for it.
- When FDR called on America to build 185,000 planes to fight World War 2, every business leader, CEO, and general laughed at him. At the time, the U.S. had produced 3,000 planes in the last year. By the end of the war, we produced 300,000 planes. That's what we are capable of if we have real leadership.

This is massive investment in our economy and society, not expenditure.

- We invested 40–50% of GDP into our economy during World War 2 and created the greatest middle class the US has seen.
- The interstate highway system has returned more than $6 in economic productivity for every $1 it cost.
- This is massively expanding existing and building new industries at a rapid pace—growing our economy.

The Green New Deal has momentum.

- 92 percent of Democrats and 64 percent of Republicans support the Green New Deal.
- Nearly every major Democratic Presidential contender say they back the Green New deal including: Elizabeth Warren, Cory Booker, Kamala Harris, Jeff Merkeley, Julian Castro, Kirsten Gillibrand, Bernie Sanders, Tulsi Gabbard, and Jay Inslee.
- 45 House Reps and 330+ groups backed the original resolution for a select committee.
- Over 300 local and state politicians have called for a federal Green New Deal.
- New Resolution has 20 co-sponsors, about 30 groups (numbers will change by Thursday).

FAQs

Why 100% clean and renewable and not just 100% renewable? Are you saying we won't transition off fossil fuels?

Yes, we are calling for a full transition off fossil fuels and zero greenhouse gases. Anyone who has read the resolution sees that we spell this out through a plan that calls for eliminating greenhouse gas emissions from every sector of the economy. Simply banning fossil fuels immediately won't build the new economy to replace it—this is the plan to build that new economy and spells out how to do it technically. We do this through a huge mobilization to create the renewable energy economy as fast as possible. We set a goal to get to net-zero, rather than zero emissions, in 10 years because we aren't sure that we'll be able to fully get rid of farting cows and airplanes that fast, but we think we can ramp up renewable manufacturing and power production, retrofit every building in America, build the smart grid, overhaul transportation and agriculture, plant lots of trees and restore our ecosystem to get to net-zero.

Is nuclear a part of this?

A Green New Deal is a massive investment in renewable energy production and would not include creating new nuclear plants. It's unclear if we will be able to decommission every nuclear plant within 10 years, but the plan is to transition off of nuclear and all fossil fuels as soon as possible. No one has put the full 10-year plan together yet, and if it is possible to get to fully 100 percent renewable in 10 years, we will do that.

Does this include a carbon tax?

The Green New Deal is a massive investment in the production of renewable energy industries and infrastructure. We cannot simply tax gas and expect workers to figure out another way to get to work unless we've first created a better, more affordable option. So we're not ruling a carbon tax out, but a carbon tax would be a tiny part of a Green New Deal in the face of the gigantic expansion of our productive economy and would have to be preceded by first creating the solutions necessary so that workers and working class communities are not affected. While a carbon tax may be a part of the Green New Deal, it misses the point and would be off the table unless we create the clean, affordable options first.

Does this include cap and trade?

The Green New Deal is about creating the renewable energy economy through a massive investment in our society and economy. Cap and trade assumes the existing market will solve this problem for us, and that's simply not true. While cap and trade may be a tiny part of the larger Green New Deal plan to mobilize our economy, any cap and trade legislation will pale in comparison to the size of the mobilization and must recognize that existing legislation can incentivize companies to create toxic hotspots in frontline communities, so anything here must ensure that frontline communities are prioritized.

Does a GND ban all new fossil fuel infrastructure or nuclear power plants?

The Green New Deal makes new fossil fuel infrastructure or nuclear plants unnecessary. This is a massive mobilization of all our resources into renewable energies. It would simply not make sense to build new fossil fuel infrastructure because we will be creating a plan to reorient our entire economy to work off renewable energy. Simply banning fossil fuels and nuclear plants immediately won't build the new economy to replace it—this is the plan to build that new economy and spells out how to do it technically.

Are you for CCUS?

We believe the right way to capture carbon is to plant trees and restore our natural ecosystems. CCUS technology to date has not proven effective.

How will you pay for it?

The same way we paid for the New Deal, the 2008 bank bailout and extended quantitative easing programs. The same way we paid for World War II and all our current wars. The Federal Reserve can extend credit to power these projects and investments and new public banks can be created to extend credit. There is also space for the government to take an equity stake in projects to get a return on investment. At the end of the day, this is an investment in our economy that should grow our wealth as a nation, so the question isn't how will we pay for it, but what will we do with our new shared prosperity.

Why do we need a sweeping Green New Deal investment program? Why can't we just rely on regulations and taxes and the private sector to invest alone such as a carbon tax or a ban on fossil fuels?

- The level of investment required is massive. Even if every billionaire and company came together and were willing to pour all the resources at their disposal into this investment, the aggregate value of the investments they could make would not be sufficient.
- The speed of investment required will be massive. Even if all the billionaires and companies could make the investments required, they would not be able to pull together a coordinated response in the narrow window of time required to jump-start major new projects and major new economic sectors. Also, private companies are wary of making massive investments in unproven research and technologies; the government, however, has the time horizon to be able to patiently make investments in new tech and R&D, without necessarily having a commercial outcome or application in mind at the time the investment is made. Major examples of government investments in "new" tech that subsequently spurred a boom in the private section include DARPA-projects, the creation of the internet—and, perhaps most recently, the government's investment in Tesla.
- Simply put, we don't need to just stop doing some things we are doing (like using fossil fuels for energy needs); we also need to start doing new things (like overhauling whole industries or retrofitting all buildings to be energy efficient). Starting to do new things requires some upfront investment. In the same way that a company that is trying to change how it does business may need to make big upfront capital investments today in order to reap future benefits (for e.g., building a new factory to increase production or buying new hardware and software to totally modernize its IT system), a country that is trying to change how its economy works will need to make big investments today to jump-start and develop new projects and sectors to power the new economy.
- Merely incentivizing the private sector doesn't work—e.g. the tax incentives and subsidies given to wind and solar projects have been a valuable spur to growth in the US renewables industry but, even with such investment-promotion subsidies, the present level of such projects is simply inadequate to transition to a fully greenhouse gas neutral economy as quickly as needed.
- Once again, we're not saying that there isn't a role for private sector investments; we're just saying that the level of investment required will need every actor to pitch in and that the government is best placed to be the prime driver.

Resolution Summary

Created in consultation with multiple groups from environmental community, environmental justice community, and labor community

5 goals in 10 years:

- Net-zero greenhouse gas emissions through a fair and just transition for all communities and workers
- Create millions of high-wage jobs and ensure prosperity and economic security for all
- Invest in infrastructure and industry to sustainably meet the challenges of the 21st century
- Clean air and water, climate and community resiliency, healthy food, access to nature, and a sustainable environment for all
- Promote justice and equity by stopping current, preventing future, and repairing historic oppression of frontline and vulnerable communities

National mobilization our economy through 14 infrastructure and industrial projects. Every project strives to remove greenhouse gas emissions and pollution from every sector of our economy:

- Build infrastructure to create resiliency against climate change-related disasters
- Repair and upgrade U.S. infrastructure. ASCE estimates this is $4.6 trillion at minimum
- Meet 100% of power demand through clean and renewable energy sources

- Build energy-efficient, distributed smart grids and ensure affordable access to electricity
- Upgrade or replace every building in US for state-of-the-art energy efficiency
- Massively expand clean manufacturing (like solar panel factories, wind turbine factories, battery and storage manufacturing, energy efficient manufacturing components) and remove pollution and greenhouse gas emissions from manufacturing
- Work with farmers and ranchers to create a sustainable, pollution and greenhouse gas free, food system that ensures universal access to healthy food and expands independent family farming
- Totally overhaul transportation by massively expanding electric vehicle manufacturing, build charging stations everywhere, build out high-speed rail at a scale where air travel stops becoming necessary, create affordable public transit available to all, with goal to replace every combustion-engine vehicle
- Mitigate long-term health effects of climate change and pollution
- Remove greenhouse gases from our atmosphere and pollution through afforestation, preservation, and other methods of restoring our natural ecosystems
- Restore all our damaged and threatened ecosystems
- Clean up all the existing hazardous waste sites and abandoned sites
- Identify new emission sources and create solutions to eliminate those emissions
- Make the US the leader in addressing climate change and share our technology, expertise and products with the rest of the world to bring about a global Green New Deal

Social and economic justice and security through 15 requirements:

- Massive federal investments and assistance to organizations and businesses participating in the green new deal and ensuring the public gets a return on that investment
- Ensure the environmental and social costs of emissions are taken into account
- Provide job training and education to all
- Invest in R&D of new clean and renewable energy technologies
- Doing direct investments in frontline and deindustrialized communities that would otherwise be hurt by the transition to prioritize economic benefits there
- Use democratic and participatory processes led by frontline and vulnerable communities to implement GND projects locally
- Ensure that all GND jobs are union jobs that pay prevailing wages and hire local
- Guarantee a job with family sustaining wages
- Protect right of all workers to unionize and organize
- Strengthen and enforce labor, workplace health and safety, antidiscrimination, and wage and hour standards
- Enact and enforce trade rules to stop the transfer of jobs and pollution overseas and grow domestic manufacturing
- Ensure public lands, waters, and oceans are protected and eminent domain is not abused
- Obtain free, prior, and informed consent of Indigenous peoples
- Ensure an economic environment free of monopolies and unfair competition
- Provide high-quality health care, housing, economic security, and clean air, clean water, healthy food, and nature to all

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Ms. CHENEY. Thank you very much, Mr. Chairman.

Mr. Chairman, I appreciate very much the opportunity to discuss this issue today of how we transition our communities to a so-called green economy. My state of Wyoming, as I am sure our witnesses know, is the Nation's largest coal-producing state, and we also know in Wyoming that coal is going to continue to be a

crucially important source of baseload power for the Nation, that the reliability is something that simply cannot be replaced, and it is a national security issue in addition to an economic issue.

My constituents are obviously very concerned about this notion that we are somehow going to transition over the course of 10 years here to an economy that is entirely run on green energy. And certainly, they have concerns about the fossil fuel aspect of that, but I have to say, one of the issues that people are particularly concerned about is the extent to which we are no longer going to have air travel, apparently, according to some of the frequently asked question answers we have seen.

So, I guess I would like to start by asking each witness to tell me exactly how they arrived in Washington, DC, for this hearing. And it is just a one-word answer, and I will start with you, Ms. Farley.

Ms. FARLEY. On a plane.

Ms. SHRADER. On a plane.

Dr. BISSETT. A big white pick-up truck.

Mr. HILLE. A truck.

Mr. DENNISON. Plane.

Dr. MASON. Air and Metro.

Ms. CHENEY. Thank you very much. I would assume that each of the witnesses who believes that we should, in fact, move toward net zero emissions, would say that we ought to do so gradually, not suddenly. So, I would ask—and again I will start with you, Ms. Farley—if you could describe for me, perhaps, exactly how we will do that gradually? I would assume we are not just going to wait 10 years and then all of a sudden tell people they can't fly, but that we will be in a situation where, over the course of 10 years, we would somehow gradually work our way out of air travel. And I would also have to guess that that would involve some sort of prioritization.

I assume even my colleagues on the other side of the aisle who support the Green New Deal and perhaps the witnesses who support the Green New Deal wouldn't advocate, for example, that we cancel things like life flights. They wouldn't advocate that we immediately move away from being able to transport people who have life-threatening illnesses by plane, but that there would be some other prioritization there.

So, Ms. Farley, could you tell me exactly how the government should prioritize air travel and the gradual move away from all air travel?

Ms. FARLEY. I would depend on the FAA and other Federal agencies that focus on air travel to tackle that question. The Green New Deal is a sweeping collection of recommendations and policies——

Ms. CHENEY. Thank you very much, Ms. Farley.

So, the FAA then, I would assume, I guess we are going to set up a situation where the FAA then can tell individual citizens which of their air travel is worthy and important and which isn't? And it would seem to me, I guess we would then have a situation where the FAA could say, for example, you know what, vacation travel, that is not essential. We have to make sure that we can do the air travel for the people that really need it, so no vacation travel.

Would you say we are going to have some sort of a vacation commissar set up in the government to determine what kind of air travel makes sense and what kind doesn't? Ms. Shrader, maybe I will go to you on that question.

Ms. SHRADER. With all due respect, I came here to talk about my community and how we have transitioned——

Ms. CHENEY. So, you don't support the Green New Deal then?

Ms. SHRADER. I haven't, I am not an expert on the Green New Deal.

Ms. CHENEY. OK.

Mr. HUFFMAN. Will the gentlelady yield for a correction on how she is badly mischaracterizing the resolution on the Green New Deal?

Ms. CHENEY. No, I won't yield, Mr. Huffman. Mr. Huffman, you had plenty of time——

Mr. HUFFMAN. This is fiction. This entire line of questioning is fiction.

Ms. CHENEY. I would like to have my time restored, please, Mr. Chairman.

Let me ask you then, are there any other witnesses on the panel who do support the Green New Deal?

Nobody supports the Green New Deal on this panel? Interesting.

Ms. FARLEY. I support many of the policies and recommendations in the Green New Deal, specifically the support to make sure that any climate solution strategy is centered in equity. I do not see anything about——

Ms. CHENEY. Thank you very much. I appreciate that.

Reclaiming my time, I would just say that I think it is going to be crucially important for us to recognize and understand, when we outlaw plane travel, we outlaw gasoline, we outlaw cars, I think actually probably the entire U.S. military because of the Green New Deal, that we are able to explain to our constituents and to people all across this country what that really means. And even when it comes down to something like air travel, which the frequently asked questions say they want to eliminate within the next 10 years, that means that the government is going to be telling people where they can fly to and where they can't. And I would assume I guess that means our colleagues from California are going to be riding their bicycles back home to their constituents.

Thank you very much. I yield back.

Dr. LOWENTHAL. Thank you. I am going to yield the first 1 minute of my 5 minutes to Representative Huffman.

Mr. HUFFMAN. Thank you. It is not really enough time to fully fact check what we just heard, which was an entire line of questioning based on absolute hooey. I am co-sponsor of the Green New Deal resolution, and you have to read the resolution, OK? Not take extrapolations from some unofficial FAQs that actually were taken off an individual Congress Member's website, because they do not reflect what is actually in the resolution. But the notion that any of us who are supporting the actual resolution, which you need to read, that we want to ban all air travel, that is crazy. That is absolutely crazy. None of us want to do that.

I was just listening as the gentlelady said that we want to outlaw cars and get rid of the military. There comes a point where this

type of questioning is so disingenuous and so completely disconnected from anything factual that there ought to be a mechanism to strike it from the record.

So, with that, I yield back.

Dr. LOWENTHAL. Thank you. And I will resume the rest of my time.

My first question is for Ms. Farley. I am trying to understand or for you to help us reconcile some differences. In your written testimony, you talked about, and I will just read the first sentence: "We know that with data-informed certainty that systemically disenfranchised, under-resourced communities and communities of color in the South bear a disproportionate burden of the negative impacts of climate change and carbon-based energy production."

How do you reconcile that statement with a statement that we heard in last week's presentation, which you indicated you also listened to, where this Committee heard testimony from a witness who argued that the increased use of fossil fuels is the best way to address high-energy costs in low-income African American communities? This is completely at odds. Can you kind of help us reconcile that difference?

Ms. FARLEY. Yes, absolutely. I agree that is completely at odds. And similar to the rates versus bills question, I believe that it is imperative that we understand that costs of energy are not just about the energy costs. The disproportionate burdens that people in the South and communities of color bear when located within 30 miles of coal-fired power plants—approximately 68 percent, actually, of African Americans live within 30 miles of a coal-fired power plant—suffer from low property values, increased accounts of lung disease, asthma, and asthma-associated attacks.

These asthma-associated attacks also impact the healthcare and education sectors as emergency room visits, hospitalizations, and missed school days from children lead to missed work and job insecurity for their parents. All of these things are increased due to the harmful, life-threatening emissions of fossil fuel-based energy production.

So, that is where I would say there is no reconciliation between the ability of fossil fuels to provide benefit to under-resourced communities or communities of color.

Dr. LOWENTHAL. Thank you.

Ms. Shrader, you mentioned in your testimony, how economies that are dependent upon commodities such as oil and gas and coal are highly vulnerable, repeated cycles of boom or bust. Not the image that we hear today, but that has really been what the history has been. And then you offer to us another alternative—outdoor recreation and others, in terms of protection of public lands, how to use public lands. Does outdoor recreation have the similar boom-or-bust cycles? Or can you talk to us about that? Because you are offering a different view of the economy year to year also. If you can explain that to us.

Ms. SHRADER. Yes, that is a great question. We have not seen a boom-bust cycle on outdoor recreation because it is an industry that is so important, engrained in the quality of life. So, what we are seeing in a community like Grand Junction is that we are attracting manufacturing, aviation, tech businesses, to relocate to our

community because they want the quality of life and the investments we have made in outdoor recreation, and so it is sort of this broad scope.

The other thing that I heard at the beginning was that these outdoor recreation jobs are underpaid and we are just coffee shop workers. I would tell you that my company pays 130 percent of the Mesa County average salary, and there are other outdoor recreation companies like this, like Leitner-Poma, like Mountain Racing Products, I mean, product companies, manufacturers, that do the same. So, we are not seeing that boom-bust cycle that is so decimating and devastating for a community in oil and gas. And this has been happening for 70 years in Mesa County, so it is really important to transition to this sustainable, diversified economy.

Dr. LOWENTHAL. Thank you.

Now I ask Representative Kevin Hern from Oklahoma, you have 5 minutes to ask questions. And thank you for being so patient.

Mr. HERN. Thank you, Mr. Chairman. This is great.

Thank you all for your testimony today, and your honesty, how you got here, is good.

As an engineer and a business person, I strongly believe in data and budgets, and I wish we all did. At some point in time, we have to pay for this. I am also a member of the Budget Committee, by request, because I want to know where all the money goes. Currently we are at $22 trillion in debt, and it is forecast, the next 10 years, if we don't do anything, we are going to be at $35 trillion. And U.S. small business people appreciate the fact that I am concerned about our national debt, which I think is a travesty. We don't have to have much science to look at that.

Bloomberg—since we are talking about New Green Deal, Bloomberg estimates it is going to cost roughly a trillion dollars a year over the next 10 years, the implementation of the New Green Deal. But I am a person, as you all are, that believes that in business, nothing operates in a silo onto itself. Whatever you do affects other things. It affects our ability to take money and help other issues, whether it is our needy, our poor.

So, we have a real opportunity here to try to figure out how we are going to pay for this. One of the things that is interesting, I also talked to the OMB Director the other day, we had a hearing, and asked him how much it cost to pay for this. And it would be almost doubling of the income tax on every individual in America to pay for the initiatives that my friends across the aisle want to implement.

The other thing is, I don't look at static numbers, and I am sure you don't either. You look at trends. And when you look at the trends, the population is growing in this country, the GDP is growing, and our emissions per GDP and per capita are declining, which is the direction we want them to go, in a national free market way, which is a great sign that my colleagues across the aisle should love that we are going. All of our debate is causing free market ideas, and demands for renewables is being met with free enterprise, development supply without exacerbating our national debt issue.

So, that should be something that we all like in here and we all should be applauding, we all stand up and all just leave, that we are all accomplishing our mission.

Ms. Farley, you did say something, and my colleague from California mentioned this a minute ago, which was from my colleague, Mr. Graves, about that a bill is more than just a cost per kilowatt hour. And we talked about Massachusetts, who was pushing renewables, that their costs are going up.

And, Mr. Huffman, I think you said that there are a lot of energy efficient things that are driving up costs. I find that a little bit ironic, and I would ask you to quote on this, how when we are driving efficiency it is costing the individual more. How does that work, how do the American people get excited about that?

Ms. FARLEY. Thank you. I don't think I understand the question.

Mr. HERN. Well, Mr. Chairman, it goes back to Mr. Lowenthal's question of how we reconcile what Mr. Hollie said last week, that renewables actually cost Americans more, not less. I grew up very poor. When I was young, I grew up with food stamps, so you have to make a decision, do I feed my family or pay my electric bill.

So, how do you reconcile when you get more efficient that it costs you more to have energy?

Ms. FARLEY. I don't believe that the more efficient you are that it costs you more. The whole point of efficiency is to reduce your utility bills.

Mr. HERN. Well, I was just mentioning what Mr. Huffman said, the more efficient we got——

Mr. HUFFMAN. Will the gentleman yield for 5 seconds?

Mr. HERN. Sure.

Mr. HUFFMAN. It is the difference between unit cost and out-of-pocket cost to the consumer on their bill. The unit cost may go up, but the bill itself does not go up and in some cases can go down.

Mr. HERN. But somebody is paying for that, correct? I mean, it is not free.

Mr. Mason, can I ask you a question? In your testimony, you state the concerns we have is energy curtails CO_2, it increases the concentration of other pollutants, such as, if you have no wind, you can't have wind energy; if you have no sun, you have no sun energy, so in those times you have to store it by batteries, or issues of that. Would you agree that we need to have some analysis on the impact of an environment before we just take off down this road?

Dr. MASON. Absolutely, though analysis will not get us there. There are going to be substantial uncertainties with regard to the environment and substantial uncertainties with regard to the interaction of different energy products with regard to that environment.

A point in case that I made in my written testimony was that a trader that posed the electricity exchange in Northern Europe with a hundred million euro loss in September 2018, because while Europe was experiencing a drought, Northern Europe, who is based primarily on hydro, experienced excess rainfall.

So, you can't understand, no matter how much analysis you do, a meteorologist won't tell you what the——

Mr. HERN. Dr. Mason, if you don't mind. We tried to get into the rules so that we had not had an analysis of impact—economic impact on anything that we did related to the transition, and that rule was struck down, was not allowed to enter into the rules of this Congress or this Committee.

I appreciate everyone being here. It has been a long day, a lot longer than you thought. Thank you for your witness.

I yield back, Mr. Chairman.

Dr. LOWENTHAL. Yes, I would like to kind of bring the hearing to a close, but I would like to follow up on something that Mr. Gosar, when he was the chair of the Subcommittee and I was the Ranking Member, he used to, at the end of the hearing, ask all the panelists if there is one question they would have liked to have been asked and what their answer would be. Now this is very brief. I am not asking for another 5 minutes—just what question would you like to have been asked or we should have, and how would you quickly and simply answer that question.

Let's begin again across with the first witness, Ms. Farley. What would you like to have been asked? And if you don't have anything, if you think you have been asked everything, Ms. Farley, that is fine too.

Ms. FARLEY. I would have liked to have been asked how we ensure that the same business model used in the fossil fuel industry, which hurts communities, doesn't simply get placed by the same system that will be used to run the renewable energy industry. And I believe, as many do, and have access to data that proves it, that any solution meant to mitigate the impacts of climate change on lower income under-resourced communities must be centered in equity and must be centered in a reckoning with the reasons that these disparities exist.

Dr. LOWENTHAL. Thank you.

Ms. Shrader, what question?

Ms. SHRADER. The question I would have liked to have been asked is, how can Grand Junction be sort of a template for other rural communities in the United States that have diversified to outdoor recreation? And I would say that we in the Grand Valley, we have built a lot of partnerships. The oil and gas industry has supported so much of our trail infrastructure. Our government leaders, from the commissioners in the county, to the city officials, to our state representatives, have really focused on rebuilding and rebranding our community. And this has been a community that has been really long entrenched in oil and gas, and that culture change has created a lot of pride and excitement for the community and for the state. And we are becoming sort of this template for other communities in Colorado, but also in the rural West that have really suffered economically.

And bringing that kind of prosperity back to a community is extremely gratifying, and I hope we can do that across the United States.

Dr. LOWENTHAL. Thank you.

Dr. Bissett?

Dr. BISSETT. Mr. Chairman, it would be very simple. We talk a lot about cost of energy production, but we rarely talk about reliability, or more importantly, scope. And I think the question of

scope has to be in there, because when you look at what a hundred coal miners can do, or a hundred people that are installing solar panels or windmills, you have to look at that energy produced. And I think a lot of times that is the last thing we talk about. Thank you.

Dr. LOWENTHAL. Thank you.

Mr. Hille?

Mr. HILLE. Mr. Chair, first I need to clarify my response to Ms. Cheney's question. I did arrive here by car this morning. I flew to DC. I wanted to be transparent about that. I wasn't intentionally misleading, but that was going pretty fast.

The question that I wish had been asked is, what is the role of the electric utilities in this transition? And the electric utilities can play a transformative, positive role as they have when we have partnered with them for an on-bill financing program for residential energy efficiency so that the customer pays nothing upfront. The utility pays for the retrofit and recovers that investment, plus interest, from a charge on the customer's bill.

They can also play a negative role when they try to reverse statutes that support things like our solar net metering statute in Kentucky.

So, the role of the utilities is really important. They do have a monopoly on the service, and they need to be held accountable for their role in the transition.

Dr. LOWENTHAL. Thank you.

Mr. Dennison?

Mr. DENNISON. I wish there was more time on the how. The transition is already happening. We have seen the trend in coal employment since the 1970s. We need to be into detailed problem-solving and have focus on creating opportunity for people in Appalachia and elsewhere. I wish I had time to provide other examples.

There is a honey business that is also helping to pollinate reforestation on mine lands, how reforestation of mine lands can contribute to climate change mitigation and create thousands of jobs.

And the role of the market, that was a great discussion we almost got to there at the end. Fantastic market innovation, for-profit entrepreneurs with social and environmental triple bottom line really leading the way.

Dr. LOWENTHAL. Thank you.

And, finally, Dr. Mason?

Dr. MASON. I think the question would be, do we all believe that all green is clean? Because the answer is no. There are a lot of green albatross players out there. A good example is mining young, or cutting down young growth cypress in Louisiana, forests that were devastated years ago, in order to pelletize it and send it on ships over to Europe to burn it as environmentally friendly biofuel over there, encouraged by subsidies. That is just wrong. And there are many other examples.

I think if we can drop the notion that all green is clean, and we need to define our terms to begin with, we can start with that meaningful conversation that you started with today.

Dr. LOWENTHAL. Thank you. Thank you to all the panelists for your valuable testimony, Members for their questions, and for the

climate that we created. I think people felt like they were listened to and at least got their chance. I mean, we are just beginning, and I think it was a great beginning.

If members of this Committee have additional questions for the witnesses, we will ask you to respond to these in writing. Under Committee Rule 3(o), members of the Committee must submit witness questions within 3 business days following the hearing, and then the hearing record will be open for 10 business days for these responses.

If there is no further business, without objection, this Committee stands adjourned.

[Whereupon, at 11:59 a.m., the Committee was adjourned.]

[ADDITIONAL MATERIALS SUBMITTED FOR THE RECORD]

PREPARED STATEMENT OF THE HON. JOE CUNNINGHAM, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF SOUTH CAROLINA

Thank you, Chairman Lowenthal, for holding this hearing today, to discuss an issue that's been on the minds of my constituents and is near and dear to my heart.

South Carolina's 1st District is home to most of the state's nearly 3,000 miles of serpentine coastline and barrier islands. Having lived near the coast, I've witnessed the impacts of rising sea levels firsthand. Folks in my district aren't even able to get across town to get to work when it's high tide and the city is flooded. So this is clearly something that affects the Low Country, which is why on my fourth day on the job, I introduced my bipartisan bill—H.R. 291, the Coastal Economies Protection Act, which would place a 10-year moratorium on oil and gas preleasing, leasing, and related activities on the Outer Continental Shelf in the North Atlantic, Mid-Atlantic, South Atlantic, and Straits of Florida planning areas and in the Eastern Gulf of Mexico. I've made protecting the coast of South Carolina from the risk of offshore drilling my highest priority, and I intend to continue advocating on behalf of this issue.

In addition to the environmental impacts (sea level rise, coastal erosion, ocean acidification), the energy transition that the country needs to make to address climate change will impact certain communities that have relied on fossil fuel jobs.

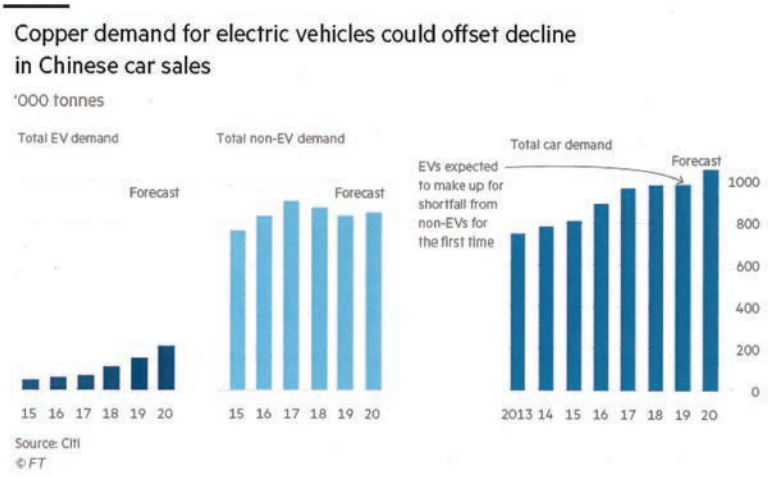
And with that, I want to turn to some questions.

1. Mr. Dennison or Mr. Hille, what advice would you give to leaders in coal-reliant communities in western states that are only now beginning to confront the recent downturn in coal production?
2. Ms. Shrader, a lot of people argue that recreation and tourism jobs pay a lot less than oil and gas, so they're not nearly adequate replacements. How do you respond to that?
3. Mr. Dennison and Mr. Hille, we've heard testimony that jobs produced by the clean energy transition will be more harmful to worker health and the environment than jobs in fossil fuel industries. Do you agree with this conclusion?

———

Submissions for the Record by Rep. Gosar

China's demand for electric vehicles charges copper, *Financial Times*, February 12, 2019 by Henry Sanderson

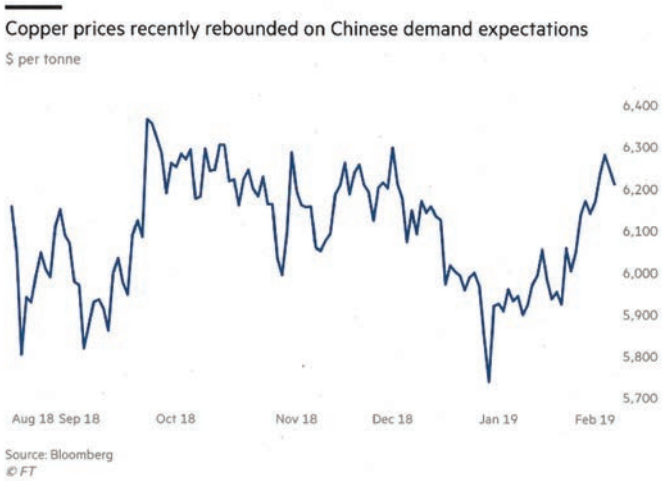


Copper is a very ordinary building material that has become entwined in every facet of our lives, from the wires in our homes to our smartphones and, critically, electric cars, which use three times the amount of the metal as those in a conventional vehicle.

The start of a long-term demand trend is occurring in China, where copper in electric cars is set to offset a sharp fall associated with sales of petrol cars this year, according to analysts at Citigroup.

The number of petrol cars made in China this year is expected to drop by 9 per cent, according to Citi, while electric car production is set to rise by 53 per cent. That results in net copper demand growth of 0.3 per cent for the sector.

"[For copper] it's an EV story into the 2020s and we're just getting a really early taste of that now," said Oliver Nugent, of Citi. "Thanks to the higher intensity of copper in EVs we're going to sail through that very weak auto demand number this year."



Over the longer term, the bank said copper for electric cars would make up two-thirds of demand growth for the metal between 2018 and 2030.

Copper prices have rallied by 5 per cent this year to trade at $6,139 a tonne, suggesting that investors have become less fearful of the impact of a slowdown in China, the world's largest consumer.

Citi expects copper prices to hit $6,700 in 2019 driven by an overall 2 per cent growth in Chinese demand and a resolution to the trade dispute between the US and China.

Australia hopes to cash in on new cobalt rush,
Financial Times, February 12, 2019 by Jamie Smyth and Henry Sanderson



It is one of Australia's oldest mining towns that has built its wealth from a huge deposit of silver, lead and zinc. Now, Broken Hill is aiming to tap into the fast growing electric vehicle market by becoming a vital source of cobalt.

Mining groups in the outback town, 1,000km from Sydney, are lured by forecasts that demand for cobalt—the main power source for mobile devices and electric vehicles (EVs)—will quadruple by 2029.

Supply concerns have further stoked their interest as two-thirds of the world's cobalt is mined in the Democratic Republic of Congo, a poor country that suffers

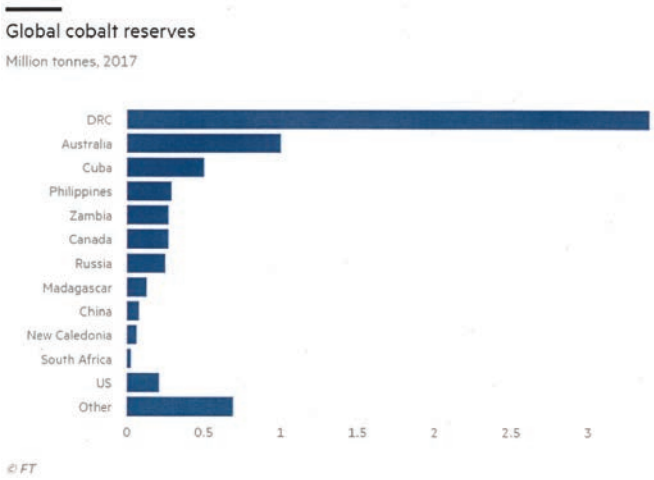
from political instability and corruption and which has been criticised for the use of child labour in its artisanal mines.

"No one can predict politics in the DRC, the country presents logistical challenges and there is a question mark over the efficacy of the 10 to 15 per cent of cobalt produced there from artisanal sources," said Joe Kaderavek, chief executive of Cobalt Blue, an ASX-listed miner with an operation in Broken Hill.

"Increasingly, Asian battery makers are looking for the stability that Australian sources of cobalt can offer."

Cobalt Blue is one of dozens of small miners in Australia, Canada and elsewhere that are rushing to explore cobalt deposits and raise funds to develop new mines and processing plants to produce the blue-grey metal.

Last year Kinshasa's dominance over the cobalt supply chain rose above 70 per cent as Chinese-owned mines in the DRC and new entrant Eurasian Resources Group, a Luxembourg-based miner, ramped up production. It is expected to hit 75 per cent this year, according to Darton Commodities.



"The DRC is to the cobalt world what Saudi Arabia is to oil when it comes to availability of supply, there's nowhere else where you can get large volumes like you can in the Congo," said George Heppel, an analyst at consultancy CRU.

This leaves battery makers, electric vehicle manufacturers and western miners exposed to sudden shifts in DRC government policy and consumer boycotts focused on child exploitation. Last year a new mining code imposed a series of taxes on western miners and Glencore was forced to write off $5.6bn in debt to safeguard its joint venture with Gécamines, the DRC's state mining company.

The London-listed miner is embroiled in a separate dispute with the DRC government over plans to build a new plant to remove uranium from its cobalt ore. This month Katanga Mining, a subsidiary of Glencore which owns a large cobalt and copper mine in the DRC, warned it may not be able to sell any cobalt until 2020 due to governmental concerns.

Analysts at Darton Commodities recently warned that increased resource nationalism in the DRC continued to present a significant supply risk.

"Continued stability in the DRC will therefore be of vital importance, ensuring a secure and transparent cobalt supply chain which in turn is critical for the global transition to EVs to materialise," they added.

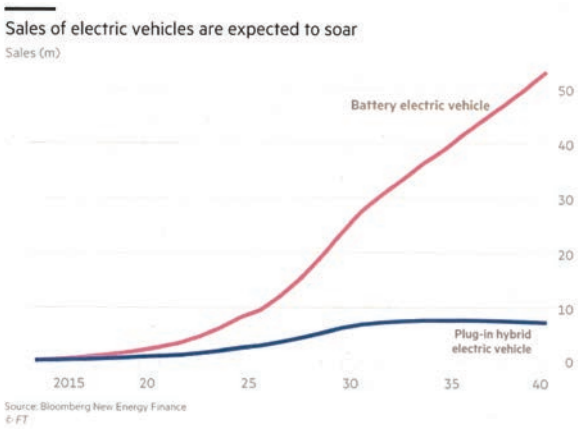


Camla Rochat, a Cobalt Blue geologist, examines core samples at the company's site in Broken Hill

Due to these concerns, Asian battery makers are now building alliances with miners in Australia.

Last year LG International, the investment arm of the South Korean battery maker, bought a 6 per cent stake in Cobalt Blue. Shanghai Pengxin, a Chinese conglomerate, paid A$81m ($57m) for a 16 per cent stake in Clean TeQ, an ASX-listed company also aiming to develop a nickel-cobalt-scandium mine about 350km west of Sydney.

"International NGOs are focused on the issue of child labour in DRC and they are likely to single out multinational companies, the battery makers and the car companies, to clean up their act," said Sam Riggall, Clean TeQ's chief executive. "Australia will play an important role in the diversification of the cobalt supply chain," he said.



However, there are currently no large new cobalt mines in the pipeline outside of the DRC.

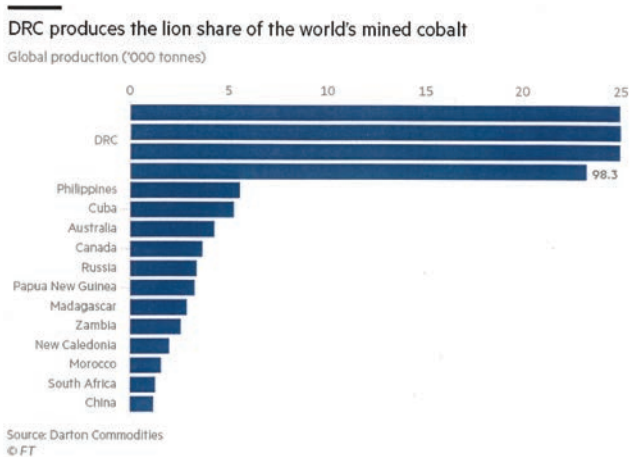
Canadian-listed First Cobalt aims to build a North American supply of cobalt by developing a mine in Idaho and processing the metal at a refinery it has reopened in Ontario.

Trent Mell, chief executive of First Cobalt, said the publication by US president Donald Trump of a "critical minerals" list last year had helped the company gain political support for US-based cobalt supply.

"With the US putting cobalt on the critical minerals list, we have a lot of friends in Washington," Mr Mell said. "If you picture a boxing ring, you've got Glencore in one corner and China in the other; it's a small market, it's a tight market. I don't think cobalt prices really reflect the structural outlook that many of us see."

Another country that could be a source of cobalt is Kazakhstan. Kenes Rakishev, a Kazakh businessman and entrepreneur, is aiming to mine cobalt and nickel in eastern Kazakhstan, using low-cost leaching techniques already used to mine uranium in the country. The company, KazCobalt, aims to eventually list on the stock market.

"If this technology can work for nickel and cobalt, it will be the lowest cost in the world," Mr Rakishev said. "You need to just dig—that's it."



Cobalt is mined alongside copper in the DRC, while outside the country it is mostly a byproduct of nickel mining. Brazilian miner Vale is spending $2bn on an underground expansion of its mine at Voisey's Bay, Canada , which will also produce cobalt.

"There will be no shortage of cobalt but we're going to have better cobalt and nickel prices to get the mines [outside the DRC] built," said Anthony Milewski, chief executive of Cobalt 27, which has acquired the right to buy future cobalt production from the Vale mine.

FT Archive

Echoing this view, Gavin Montgomery, an analyst at Wood Mackenzie, said companies outside of the DRC would struggle to raise finance in the face of falling cobalt prices, which are down more than 40 per cent since mid-November.

Prices are likely to fall further given there was a "tsunami" of new cobalt supply coming online in the DRC over the next few years, Mr Montgomery said.

"In the medium-term it is all DRC," Mr Montgomery added. "There's no shortage of supply."

Outside of the DRC the most promising project is a giant $700m nickel-processing project being built in Indonesia by a consortium of investors including Chinese stainless steel giant Tsingshan and China 's largest battery maker CATL.

As well as nickel, the Indonesian project hopes to produce about 20,000 tonnes of cobalt sulphate for batteries a year and has already secured financing.

"We're probably more bullish about Indonesia becoming the new frontier for cobalt and nickel supply than Ontario or Zambia or Australia," Mr Montgomery said.

Submission for the Record by Rep. Lowenthal

Energy Jobs—Bureau of Labor Statistics, February 13, 2019

Current Employment Statistics - CES (National)

ESTABLISHMENT DATA

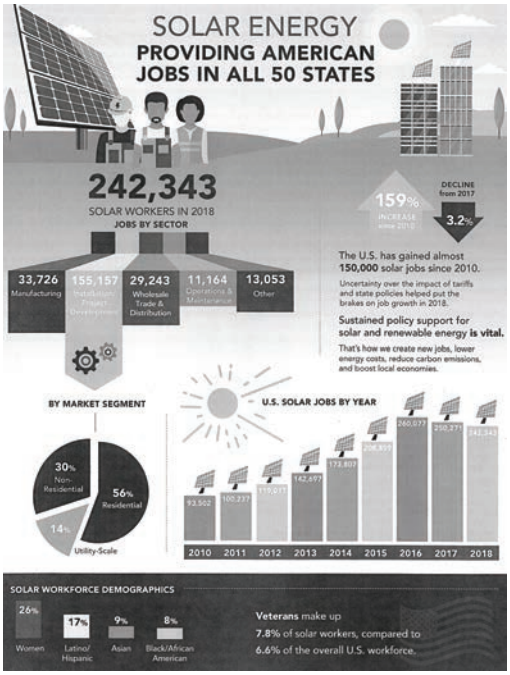
Table B-1a. Employees on nonfarm payrolls by industry sector and selected industry detail, seasonally adjusted

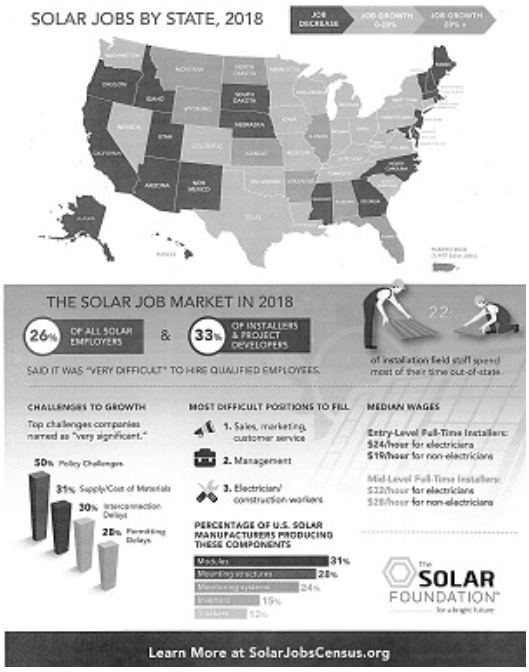
[In thousands]

Industry	2017 NAICS code	Seasonally adjusted						Change from:
		Jan. 2018	Sept. 2018	Oct. 2018	Nov. 2018	Dec. 2018(P)	Jan. 2019(P)	Dec.2018 - Jan.2019(P)
Total nonfarm		147,767	149,575	149,852	150,048	150,270	150,574	304
Total private		125,393	127,081	127,366	127,566	127,772	128,068	296
Goods-producing		20,386	20,832	20,892	20,921	20,974	21,046	72
Mining and logging		699	745	751	748	753	760	7
Logging	1133	50.6	47.4	47.2	46.5	47.4	47.5	0.1
Mining	21	648.8	697.7	703.6	701.0	705.4	712.3	6.9
Oil and gas extraction	211	141.2	145.8	146.5	147.9	148.3	149.9	1.6
Mining, except oil and gas	212	188.3	193.6	194.6	194.1	195.1	195.8	0.7
Coal mining	2121	50.9	51.8	51.9	52.3	52.8	52.7	-0.1
Bituminous coal and lignite surface mining(1)	212111	23.9	23.3	23.4	23.5	23.6	-	-
Bituminous coal underground mining and anthracite mining(1)	212112,3	27.1	28.4	28.5	28.7	29.0	-	-
Metal ore mining	2122	40.7	41.6	41.6	41.0	41.0	41.1	0.1
Nonmetallic mineral mining and quarrying	2123	96.7	100.3	101.1	100.8	101.3	102.1	0.8
Stone mining and quarrying(1)	21231	42.2	42.2	42.3	42.4	42.9	-	-
Crushed and broken limestone mining(1)	212312	21.6	21.7	21.8	21.8	21.8	-	-
Other stone mining and quarrying(1)	212311,3,9	20.6	20.6	20.5	20.5	20.7	-	-
Sand, gravel, clay, and refractory mining(1)	21232	43.1	46.6	47.4	46.9	47.1	-	-
Construction sand and gravel mining(1)	212321	30.0	31.2	31.2	30.9	30.8	-	-
Other nonmetallic mineral mining(1)	21239	11.5	11.4	11.7	11.1	11.6	-	-
Support activities for mining	213	319.3	358.3	362.5	359.0	362.0	366.6	4.6
Support activities for oil and gas operations(1)	213112	245.5	282.3	285.7	282.1	284.1	-	-
Construction	23	7,126	7,354	7,379	7,384	7,412	7,464	52
Construction of buildings	236	1,581.4	1,640.9	1,641.5	1,648.1	1,652.7	1,660.7	8.0

Footnotes

(1) Seasonally Adjusted Independently. See https://www.bls.gov/web/empsit/cestn.htm#SA_ind for details.
(2) Includes motor vehicles, motor vehicle bodies and trailers, and motor vehicle parts.
(3) Excludes nonoffice commissioned real estate sales agents.
(4) Includes ambulatory health care services, hospitals, and nursing and residential care facilities.
(5) Includes rural mail carriers.
(P) Preliminary


SOLAR ENERGY
PROVIDING AMERICAN JOBS IN ALL 50 STATES
242,343
SOLAR WORKERS IN 2018
JOBS BY SECTOR
33,726 Manufacturing
155,157 Installation, Project Development
29,243 Wholesale Trade & Distribution
11,164 Operations & Maintenance
13,053 Other
159% INCREASE since 2010
DECLINE from 2017
3.2%
The U.S. has gained almost 150,000 solar jobs since 2010.
Uncertainty over the impact of tariffs and state policies helped put the brakes on job growth in 2018.
Sustained policy support for solar and renewable energy is vital.
That's how we create new jobs, lower energy costs, reduce carbon emissions, and boost local economies.
BY MARKET SEGMENT
30% Non-Residential
56% Residential
14% Utility-Scale
U.S. SOLAR JOBS BY YEAR
93,502
100,237
110,021
142,897
173,807
208,899
260,077
250,271
242,343
2010 2011 2012 2013 2014 2015 2016 2017 2018
SOLAR WORKFORCE DEMOGRAPHICS
26% Women
17% Latino/ Hispanic
9% Asian
8% Black/African American
Veterans make up 7.8% of solar workers, compared to 6.6% of the overall U.S. workforce.


SOLAR JOBS BY STATE, 2018
JOB DECREASE
JOB GROWTH 0-20%
JOB GROWTH 21%+
THE SOLAR JOB MARKET IN 2018
26% OF ALL SOLAR EMPLOYERS
&
33% OF INSTALLERS & PROJECT DEVELOPERS
SAID IT WAS "VERY DIFFICULT" TO HIRE QUALIFIED EMPLOYEES.
22%
of installation field staff spend most of their time out-of-state.
CHALLENGES TO GROWTH
Top challenges companies named as "very significant."
50% Policy Challenges
31% Supply/Cost of Materials
30% Interconnection Delays
28% Permitting Delays
MOST DIFFICULT POSITIONS TO FILL
1. Sales, marketing, customer service
2. Management
3. Electrician/ construction workers
PERCENTAGE OF U.S. SOLAR MANUFACTURERS PRODUCING THESE COMPONENTS
Modules 31%
Mounting structures 28%
Monitoring systems 24%
Inverters 15%
Controllers 12%
MEDIAN WAGES
Entry-Level Full-Time Installers:
$24/hour for electricians
$19/hour for non-electricians
Mid-Level Full-Time Installers:
$32/hour for electricians
$28/hour for non-electricians
The SOLAR FOUNDATION
Learn More at SolarJobsCensus.org

Submissions for the Record by Mr. Dennison

Solar Employs More People In U.S. Electricity Generation Than Oil, Coal And Gas Combined

Niall McCarthy, Contributor, Data journalist covering technological, societal and media topics
Forbes—January 25, 2017

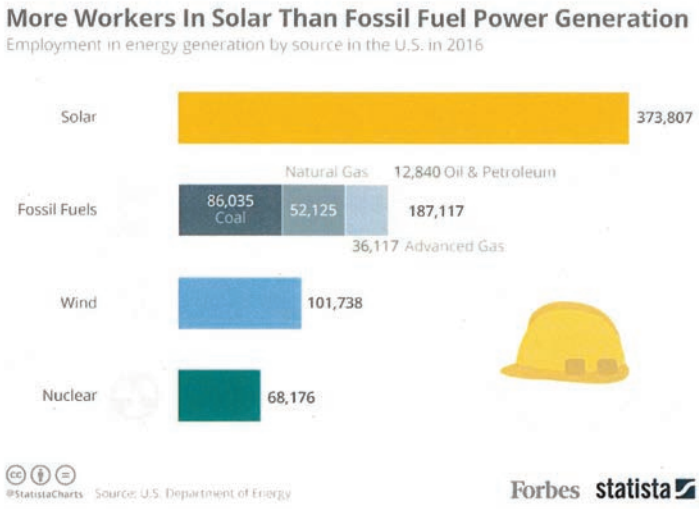
In the United States, more people were employed in solar power last year than in generating electricity through coal, gas and oil energy combined. According to a new report from the U.S. Department of Energy, solar power employed 43 percent of the Electric Power Generation sector's work force in 2016, while fossil fuels combined accounted for just 22 percent. It's a welcome statistic for those seeking to refute Donald Trump's assertion that green energy projects are bad news for the American economy.

Just under 374,000 people were employed in solar energy, according to the report, while coal, gas and oil power generation combined had a work force of slightly more than 187,000. The boom in the country's solar work force can be attributed to construction work associated with expanding generation capacity. The gulf in employment is growing with net generation from coal falling 53 percent over the last decade. During the same period, electricity generation from natural gas increased 33 percent while solar expanded 5,000 percent.

Fuel production and electricity generation together directly employed 1.9 million workers last year, according to the report; with 55%, or 1.1 million, working with fossil fuels. The DoE identifies another 2.3 million jobs associated with energy transmission, distribution and storage.

Solar energy added 73,615 new jobs to the U.S. economy over the past year while wind added a further 24,650.

(charted by Statista)



Statement by Mr. Dennison in Response to Dr. Mason

I also want to note, responding to Mr. Mason: while the entire country is not facing Depression era unemployment, many extraction communities are. We have an employment crisis. High unemployment is a problem, say in Mingo County, WV, but the even more concerning stats are in labor force participation . . . these are people who have permanently left the work force and given up looking.

WVU economists John Deskins has published work on these troubling economic stats.

[LIST OF DOCUMENTS SUBMITTED FOR THE RECORD RETAINED IN THE COMMITTEE'S OFFICIAL FILES]

Submission for the Record by Rep. Graves

—U.S. Energy and Employment Report from the National Association of State Energy Officials, May 2018

Submissions for the Record Mr. Dennison

—The Nature Conservancy Report—Natural Climate Solutions in West Virginia

—"Many Voices, Many Solutions: Innovative Mine Reclamation in Central Appalachia"—Report

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