

**COST-SAVING CLIMATE SOLUTIONS:
INVESTING IN ENERGY EFFICIENCY TO PROMOTE
ENERGY SECURITY AND CUT ENERGY BILLS**

HEARING
BEFORE THE
**SELECT COMMITTEE ON THE
CLIMATE CRISIS**
HOUSE OF REPRESENTATIVES
ONE HUNDRED SEVENTEENTH CONGRESS
SECOND SESSION

HEARING HELD
APRIL 7, 2022

Serial No. 117-17



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

U.S. GOVERNMENT PUBLISHING OFFICE

47-955

WASHINGTON : 2022

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**COST-SAVING CLIMATE SOLUTIONS:
INVESTING IN ENERGY EFFICIENCY
TO PROMOTE ENERGY SECURITY
AND CUT ENERGY BILLS**

THURSDAY, April 7, 2022

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

The committee met, pursuant to call, at 9:00 a.m., in Room 1334 Longworth House Office Building, Hon. Kathy Castor [chairwoman of the committee] presiding.

Present: Representatives Castor, Bonamici, Brownley, McEachin, Casten, Neguse, Escobar, Graves, Palmer, Carter, Armstrong, and Crenshaw.

Ms. CASTOR. The committee will come to order. Without objection, the Chair is authorized to declare a recess of the committee at any time.

As a reminder, members participating in a hearing remotely should be visible on camera throughout the hearing. For members participating in person, masks are optional. As with in-person meetings, members are responsible for controlling their own microphone. And you can be muted by staff only to avoid inadvertent background noise.

And as a reminder, statements, documents or motions must be submitted to the electronic repository, to sccc.repository@mail.house.gov.

Finally, if anyone's experiencing technical difficulties, please alert the staff right away.

And welcome to the Cost-Saving Climate Solutions: Investing in Energy Efficiency to Promote Energy Security and Cut Energy Bills committee meeting. Today, we will explore how investments in energy efficiency can save Americans money, reduce carbon emissions, and promote energy security.

I will now recognize myself for 5 minutes for an opening statement.

Well, on Monday, the world's top scientists, the Intergovernmental Panel on Climate Change, issued another stark wake-up call. We are behind. We are late. And we are running out of time to limit warming and avoid catastrophic impacts and rising costs. And unless we dramatically ramp up our efforts to expand clean energy and reduce heat trapping pollution, the consequences will be bleak. But America has the clean technologies needed to avoid these costly impacts. But unless Congress deploys them with ur-

gency in partnership with innovators and entrepreneurs, and across the economy, Americans will be forced to pay more and more.

The economic case for cost-saving clean energy and energy efficiency innovations is clear. In fact, the very first recommendation in our committee's Climate Crisis Action Plan is maximizing energy efficiency, one of the most cost-effective solutions for nearly all sectors of the economy.

By making our transmission lines more efficient, we can expand the reach of affordable renewables. By making renewables more fuel efficient, and deploying electric cars and trucks and fleets, we can save Americans money at the pump and avoid the volatility of global oil and gas markets. And by investing in energy efficiency in electrification upgrades, we can drive down the cost of keeping the lights on, keeping appliances running, and keeping the temperature agreeable inside and out.

Here's one example of how electrification can dramatically improve efficiency: according to the Department of Energy, electric vehicles use more than 75 percent of the energy they get from the grid to get your wheels moving, whereas gas vehicles only use about 12 to 30 percent of the energy from gasoline. In other words, when you charge up your electric car, you will use three-quarters of that energy to get where you are going. But when you fill up your tank, you are using less than a quarter. So that is \$40 that you paid at the pump, just \$10 of that gets you moving, and the rest is wasted.

So beyond cost saving potential, investing in cleaner, cheaper technologies will also go a long way in building the true American energy independence and security. Clean energy investments support American workers, American industries, and American manufacturers, instead of supporting foreign dictators and big oil CEOs.

By maximizing these savings, we can reinvest them to strengthen our most vulnerable communities. And we can deploy transformative energy efficient technologies that could potentially reduce heat trapping pollution by between 50 and 80 percent by the year 2050.

Federal investment in energy efficiency will put money back into the pockets of Americans. The average household could save up to \$500 a year with the investments in the House-passed reconciliation bill. Going even further would save households even more. By electrifying everything, we could save families thousands of dollars every year, and cut their energy use in half. Those extra savings would be a godsend for Americans, especially those least able to afford their energy costs.

So there is a common theme here. The cost of climate change and the cost of energy seem to always fall on working families, while oil and gas companies are reaping record profits. Americans are paying more at the pump for last century's fuels, meanwhile their communities are the ones suffering the economic harms of climate fuel disasters which cost more than \$145 billion last year. For too many Americans, it is hard not to feel like they are getting ripped off. That is why President Biden is working to lower energy costs and expand clean technologies. The Biden administration is working to update energy conservation standards for appliances, and to

modernize energy codes for Federal buildings. They are also working to deploy the investments in the Bipartisan Infrastructure Law which included more than \$3 billion to make homes more energy efficient and lower cost. Thanks to the infrastructure law, we are also poised to build a national network of 500,000 EV charging stations with a goal to make them as readily available as gas stations.

So as we stare down the barrel of a costly climate catastrophe, there is so much more that we must do. And the world's top scientists did offer a hopeful note in their report that reinforces the action we see across America. We have the talent, the innovations, the tools, and the technology to save consumers money, to reduce pollution, and provide a livable planet for future generations. So I look forward to the insight of our witnesses and our committee's discussion today.

[The statement of Ms. Castor follows:]

Opening Statement of Chair Kathy Castor

**Hearing on “Cost-Saving Climate Solutions:
Investing in Energy Efficiency to Promote Energy
Security and Cut Energy Bills”**

April 7, 2022

As prepared for delivery

On Monday, the world's top scientists, the Intergovernmental Panel on Climate Change, issued another stark wake-up call. We're behind, we're late, and we are running out of time to limit warming and avoid catastrophic impacts and rising costs. And unless we dramatically ramp up efforts to expand clean energy and reduce heat-trapping pollution, the consequences will be bleak.

America has the clean technologies needed to avoid these costly impacts. But unless Congress deploys them with urgency, in partnership with innovators and entrepreneurs and across the economy, Americans will be forced to pay more and more.

The economic case for cost-saving clean energy and energy efficiency innovations is clear. In fact, the very first recommendation in our committee's Climate Crisis Action Plan is maximizing energy efficiency, one of the most cost-effective solutions for nearly all sectors of our economy. By making our transmission lines more efficient, we can expand the reach of affordable renewables. By making vehicles more fuel-efficient and deploying electric cars and trucks and fleets, we can save Americans money at the pump and avoid the volatility of global oil and gas markets. And by investing in energy efficiency and electrification upgrades, we can drive down the costs of keeping the lights on, keeping appliances running, and keeping the temperature agreeable inside and out.

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Beyond the cost-saving potential, investing in cleaner, cheaper technologies will also go a long way in building true American energy independence and security. Clean energy investments support American workers, American industries, and American manufacturers—instead of supporting foreign dictators and Big Oil CEOs. By maximizing these savings, we can reinvest them to strengthen our most vulnerable communities. And we can deploy transformative energy-efficient technologies that could potentially reduce heat-trapping pollution by between 50% and 80% by the year 2050.

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lars every year and cut their energy use in half. Those extra savings would be a godsend for Americans, especially those least able to afford their energy costs.

There's a common theme here: the costs of climate change and the rising costs of energy seem to always fall on working families. While oil and gas companies are reaping record profits, Americans are paying more at the pump for last century's fuels. Meanwhile, their communities are the ones suffering the economic harms of climate-fueled disasters, which cost more than \$145 billion just last year. For too many Americans, it's hard not to feel like they're getting ripped off.

That's why President Biden is working to lower energy costs and expand clean technologies. The Biden administration is working to update energy conservation standards for appliances, and to modernize energy codes for federal buildings. They're also working to deploy the investments in the Bipartisan Infrastructure Law, which included more than \$3 billion to make homes more energy efficient and lower costs. Thanks to the infrastructure law, we are also poised to build a national network of 500,000 EV charging stations, with the goal of making them as readily available as gas stations.

As we stare down the barrel of a costly climate catastrophe, there's much more we must do. And the world's top scientists offered a hopeful note in their report that reinforces the action we see across America: we have the talent, the innovations, the tools, and technology to save consumers money, reduce pollution, and provide a livable planet for future generations. So I look forward to the insight of our witnesses and our committee's discussion.

And at this time, I am happy to recognize the Ranking Member, Mr. Graves. Good morning. You are recognized for 5 minutes.

Mr. GRAVES. Good morning, Madam Chair.

Thank you for having this hearing. And this is another topic, Madam Chair, where you and I, I think, share a lot of objectives. We have spent a lot of time talking about resiliency and adaptation of our respective coastal states and coastal districts, and the importance of making investments there. Being from south Louisiana, we have had 90 percent of the coastal wetlands lost in the Continental United States, which does make our communities more vulnerable to hurricanes, and sea rise, and other challenges related to sustainability.

This one, energy efficiency, look, if we can reduce the consumption of energy in things that we are doing, whether it is in our business, it is driving vehicles, it is manufacturing, then that helps improve the competitiveness of the United States. Energy efficiency and energy conservation efforts are absolutely critical in our long-term objectives here. And it is a no-regrets approach, because it allows us to reduce the cost of utility bills for consumers that are struggling with their ability to pay their bills today. It helps to reduce the cost of fueling vehicles in order to get to work or go to school, or spend time with family. Those are all win-wins, and there are no regrets. It improves the competitiveness of the United States.

But Madam Chair, I think something that is really important to keep in mind as well is the international perspective here. You are right, IPCC did release a new report last week. And it is interesting, because what has happened with Ukraine has sort of made, I think, a lot of people realize the United States is one country in a very large global community. And you have people that operate by different standards. And we often find ourselves trying to apply American values, American ethics, American standards to other countries.

How do you think Vladimir Putin feels about that? How do you think he feels about America's values, our standards? Look at what he is doing. He is just completely just rolling over people. No re-

spect for human rights. No respect for sovereignty. Yet, he is going to be a partner in climate change? Not a chance in hell.

What about President Xi in China? You think looking at what they are doing with slave labor and child labor, the way that they completely abuse the Uyghurs in human rights. Do you really think that China is going to have any respect for human rights? China's released 4 tons of emissions, increased 4 tons of emissions for every one ton we have reduced. I think that we are looking at ourselves a little bit more—as a bit more inflated than we really are. We are not going to be able to solve this issue on our own. Let me say it again, China has increased emissions 4 tons for every one ton of emissions we have reduced. That is moving in the wrong direction globally. Yet, we are sitting here talking about spending not millions, not hundreds of millions, not billions, tens of billions and hundreds of billions of dollars to try to save the planet whenever we have got other international actors that don't care. They don't care.

Let me read you something. President Biden's energy plan is going to result in higher electricity prices, higher prices at the gas pump, lost revenue sharing for hurricane protection, flood control, and coastal restoration, higher delivery costs, meaning delivery of groceries and all products, more dependence on foreign energy from China, Russia, Iran, and other countries, and a net increase in global emissions.

Madam Chair, all of those things—let me run through them again. Higher electricity prices. Check, we are seeing it. Higher prices at the gas pump. Check, we are seeing it. Lost revenue, because as a result of not doing lease sales, the first President in modern history to not do energy lease sales, we are losing revenue. The United States Treasury is losing revenue, which means because we have revenue sharing for offshore energy production—my home state, one of the most powerful hurricanes to ever made land-fall, Hurricane Ida, we are not getting the revenues that we should have to build hurricane protection restoring our coastal ecosystem and other projects, flood control. So that one we have realized.

Higher delivery costs. With inflation and supply chain we are getting high costs there. More dependence on foreign energy from China, Russia, and others. We are seeing that. A net increase in global emissions. We have seen that.

This is a statement that I made on January 27th of last year. Madam Chair, I am all for—I am all for the objectives that you have stated. But we have got to have a strategy that is actually global looking in nature, and one that truly achieves the objectives, not one that just thrusts costs on the United States taxpayers and makes energy unaffordable, and doesn't achieve what I believe are our common environmental goals.

I yield back.

Ms. CASTOR. Now I want to welcome our witnesses. We have got a great panel to talk about the benefits of energy efficiency. Paula R. Glover is the President of the Alliance to Save Energy. Ms. Glover leads a diverse coalition of stakeholders to find lasting consensus-based energy efficiency solutions. She has helped the Alliance secure billions of dollars in Federal funding for energy effi-

ciency programs, amplified its work on energy justice, and worked to advance the next generation of technologies.

Darnell Johnson is the CEO and President of Urban Efficiency Group, Illinois' first minority-owned utility implementation contractor and sustainability design firm run by and for Chicagoans. His work with UEG has assisted thousands of underserved residents in Indiana, Illinois, and Wisconsin, helped them reduce their energy burden by delivering energy efficiency and clean energy to communities.

Mr. Johnson is also the Vice Chair of the Building Performance Association and Chair of its Diversity, Equity and Inclusion Committee.

Dave Schryver is the President and CEO of the American Public Gas Association. Mr. Schryver leads APGA's work to represent the interest of America's publicly owned natural gas local distribution companies before Congress, Federal agencies, and other energy-related stakeholders.

And Sara Baldwin is the Director of Electrification Policy at Energy Innovation. Ms. Baldwin leads the firm's Electrification Policy practice area, providing research and analysis on the pathways to electrify and decarbonize buildings, transportation, and industry.

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

With that, Ms. Glover, you are now recognized 5 minutes to summarize your testimony. Welcome.

STATEMENTS OF PAULA R. GLOVER, PRESIDENT, ALLIANCE TO SAVE ENERGY; DARNELL JOHNSON, CEO AND PRESIDENT, URBAN EFFICIENCY GROUP (UEG), AND VICE CHAIR, BUILDING PERFORMANCE ASSOCIATION; DAVE SCHRYVER, PRESIDENT & CEO, AMERICAN PUBLIC GAS ASSOCIATION (APGA); AND SARA BALDWIN, DIRECTOR OF ELECTRIFICATION POLICY, ENERGY INNOVATION.

STATEMENT OF PAULA R. GLOVER

Ms. GLOVER. Thank you very much. Chair Castor, Ranking Member Graves, members of the House select committee—

Ms. CASTOR. Ms. Glover, will you pull the mic up a little closer?

Ms. GLOVER. How is that?

Ms. CASTOR. That is a little better.

Ms. GLOVER. Thank you.

Chair Castor, Ranking Member Graves, members of the House Select Committee, my name is Paula Glover. I am the President the Alliance to Save Energy. And I really appreciate you having me at today's hearing.

The Alliance is a nonprofit. We are a bipartisan coalition of business, government, environmental and consumer leaders, working to expand the economy while using less energy, doing more and using less. We were founded in 1977 by Senator Charles H. Percy from Illinois, and Senator Hubert Humphrey from Minnesota in response to the oil embargo and the energy crisis at that time.

Today, in addition to a potential energy crisis resulting from the pandemic, and the geopolitical crisis in Europe, we are also moving closer to a climate crisis, the climate tipping point. And this re-

quires us to develop climate change solutions while also meeting the challenges of energy security and affordability.

We are required to lead in energy production, but we must also lead in energy efficiency throughout all sectors of the U.S. economy, including manufacturing, transportation, and agriculture, and the built environment. And as we make these investments in efficiency products, equipment, supplies, and technologies, and as consumers in businesses adopt efficiency solutions, energy consumption is reduced and generation and production supplies are offset through lower demand.

In fact, without these investments made in efficiency since 1980, energy consumption would have been more than 60 percent higher. And these same investments help consumers avoid approximately \$800 billion a year in energy costs. That is the power of efficiency. This is achieved by investments that secure the building envelope, equipment standards, building codes, building design, and establishing policies that prioritize efficiency as a primary part of U.S. domestic policy—

And I am having a problem here. Excuse me. I am sorry. And I apologize. I am having a problem with my technology.

I do not. And that's probably why I am having a problem.

At the end of the day, efficiency needs to play an essential role in U.S. energy policy, and should be seen as a necessary and critical to help address our challenges, including climate. Efficiency investments are more critical when considering avoiding infrastructure costs, in addition to creating greater system reliability because of that reduced demand.

Moreover, efficiency is one of the most cost-effective and fastest ways to reduce emissions. And as indicated in a recent report, *Halfway There*, efficiency alone can reduce carbon emissions by 50 percent by 2050. And according to the International Energy Agency, over 40 percent of the emission reduction objectives of the Paris climate agreement can be reached to efficiency by 2040.

Further, if we are talking about economic impact, energy efficiency is the largest employer in the clean energy economy. We employ over 2.1 million people in the United States. And energy efficiency jobs are located in all but six counties in this country. We are local. We do this locally. We pay, on average, \$24 an hour, or 28 percent higher than the national median. And so, as you consider moving forward with budget reconciliation, and tackling our challenges, and future preparedness, we urge you to look at efficiency and make substantive investments. Investments, tax credits like 25C, 179D, 45L are important to get us moving over, moving forward. In addition to programs like HOPE for HOMES, building codes, and the like.

We thank you for your leadership on these issues. And, of course, are available for any questions that you may have. Thank you.

[The statement of Ms. Glover follows:]

**Written Testimony of Paula R. Glover
President, Alliance to Save Energy**

**Before the House Select Committee on the Climate Crisis
Hearing on “Cost-Saving Climate Solutions: Investing in Energy Efficiency
to Promote Energy Security and Cut Energy Bills**

April 7, 2022

Chair Castor, Ranking Member Graves, members of the House Select Committee on the Climate Crisis, my name is Paula Glover, and I am President of the Alliance to Save Energy. I thank you for inviting me to participate in today’s hearing titled *Cost-Saving Climate Solutions: Investing in Energy Efficiency to Promote Energy Security and Cut Energy Bills*.

The Alliance to Save Energy is a nonprofit, bipartisan coalition of business, government, environmental and consumer leaders working to expand the economy while using less energy. Our mission is to promote energy productivity worldwide—by advancing energy efficiency policy to achieve a stronger economy, a cleaner environment and greater energy security, affordability, reliability, and equity.

The Alliance was founded in bipartisanship in 1977 by Senator Charles H. Percy (R–IL) and Senator Hubert Humphrey (D–MN). The organization was launched at a time not too dissimilar from today, when an instability in energy supplies exposed a fundamental weakness in our nation’s economic and energy security. The challenges of the period required the nation to identify and develop solutions that would place the U.S. on a more secure energy path, less reliant on foreign resources with greater investments and development of energy technologies here at home. For Senators Percy and Humphrey, energy efficiency and demand-side solutions would provide part of the answer.

Today, in addition to a potential energy crisis resulting from the COVID–19 pandemic and the geopolitical crisis in Europe, we are also moving closer and closer to the climate tipping point. This requires us to develop climate change solutions while also meeting the challenges of energy security and affordability. We are required to lead in energy production—but we must also lead in energy efficiency.

However, the issue of energy security is not simply about supply. As Senators Percy and Humphrey identified 45 years ago, we must also invest in reducing energy demand through energy efficiency. Energy efficiency investments reduce energy intensity throughout all sectors of the U.S. economy—including manufacturing, transportation, in agriculture, and the built environment. In fact, but for investments made in energy efficiency since 1980, energy consumption would have been more than 60% higher.¹

When measuring energy consumption, industry and manufacturing account for 33% of all energy consumed; transportation equals 26%; and the residential and commercial built environment represent 22% and 18% respectively.² As we make investments in energy efficiency products, equipment, supplies, and technologies—and as consumers and businesses adopt efficiency solutions, energy consumption is reduced, and generation and production supplies are offset through lowered demand. This is achieved by investments that secure the building envelope, equipment standards, building codes, building design, and establishing policies that prioritize energy efficiency as a primary part U.S. domestic policy.

Energy efficiency also effectively addresses the issue of climate change—and should be used as the first solution to the climate crisis. As indicated in the recent report *Halfway There*, energy efficiency alone can reduce carbon emissions by 50% by 2050³, and according to the International Energy Agency (IEA), over 40% of the emission reduction objectives of the Paris Agreement can be achieved through energy efficiency by 2040.⁴ Through energy efficiency standards and labeling alone, the U.S. already avoids 343 metric tons of carbon emissions each year.⁵

Finally, as efficiency effectively delivers on its ability to increase energy security and mitigate climate change, it also makes energy more affordable. As a result of the efficiency investments made since 1980, consumers avoid approximately \$800 billion per year in energy costs.⁶

¹ <https://energyefficiencyimpact.org>.

² <https://www.eia.gov/energyexplained/use-of-energy/>.

³ <https://www.aceee.org/fact-sheet/halfway-there>.

⁴ <https://www.iea.org/commentaries/how-energy-efficiency-will-power-net-zero-climate-goals>.

⁵ <https://www.iea.org/reports/achievements-of-energy-efficiency-appliance-and-equipment-standards-and-labelling-programmes/executive-summary>.

⁶ <https://energyefficiencyimpact.org>.

This is the power of energy efficiency—reduced carbon emissions; reduced demand on supply; and billions of dollars in savings for consumers—all of which directly impact today’s challenges of energy and national security, energy affordability, and climate change.

Furthermore, energy efficiency has a positive impact on the economy. Energy efficiency is currently the largest employer in the clean energy workforce, employing over 2.1 million people in the U.S.—nearly seven times that of the wind and solar industries combined, and 12 times the size of the entire coal industry. These jobs pay on average \$24.44 an hour, or 28% higher than the national median hourly wage.⁷

To advance the multiple positive benefits of energy efficiency as a tool for national security, energy affordability, and climate change—and I would add economic growth—there should be a whole of government approach. This means prioritizing the role of energy efficiency targeting the major sectors of the U.S. economy, including industry, transportation, and the residential and commercial built environment. As federal dollars are released and deployed through agencies and programs, policies should ensure that national energy efficiency objectives are substantively linked. This includes energy efficiency as connected to small business activity, affordable housing funding, mortgage lending, agriculture, commerce investments, and elsewhere.

This means retrofitting and modernizing the nation’s critical facilities and public buildings—through direct investments, improved codes and standards, by leveraging private public partnerships, and through other measures. And this should also be across the federal footprint.

This also means research, development and commercialization of Active Efficiency technologies, which are the application and use of digital energy efficiency, including grid-integrated enabled buildings, and technologies that allow single and multiple buildings to take on, shift, and share load on a continuous basis.

We should employ these same solutions in the residential built environment, and with an emphasis on equity. According to research conducted by the Alliance to Save Energy on single-family homeownership, of the nearly 74.5 million owner-occupied households, 35.2 million are households with annual incomes below \$60,000.⁸ Moreover some of these same households represent families with the highest energy burden, with rural households having the highest energy burden when compared to other groups.⁹ At the same time, when segmenting energy burden by race, when compared to white households, Blacks spend 43% more of their income on energy costs, Hispanics, 20% more, and Native American households 45% more.¹⁰

To effectively deploy energy efficiency solutions in these homes, and to secure the full benefits of energy security and emission reductions, we must include these households as we deploy identified energy efficiency investments. This will also result in lower energy costs for these families, and reduced energy burden.

That said, we must also address energy efficiency for renters, where multi-family households under \$60,000 in annual income equal 33.4 million households out of 43.7 million.¹¹ These families often have little control over the energy efficiency investments in their homes, requiring policies and investments to incentivize landlords, including building performance standards, energy codes, tax incentives, and other mechanisms.

As we consider transportation, efficiency opportunities exist across the sector, including light and heavy vehicles, aviation, marine technologies, and rail. However private investments are costly, and research and development to advance future technologies are required, especially in aviation, rail, and marine engine performance. That said, on-the-road vehicles equal approximately 82% of transportation energy use, which makes the application of fuel efficiency standards in addition to investments in alternative fuel vehicles essential to reducing transportation energy demand.¹² As a brief example of the energy efficiency impact of electric vehicle (EV) technology as an alternative, EVs convert up to 77% of the charged energy to the vehicle and braking systems versus 12%–30% for vehicles powered by gasoline.¹³

From the industrial perspective, the U.S. Department of Energy (DOE) has taken the lead through its Better Plants Program, the purpose of which is to improve en-

⁷ <https://e4thefuture.org/wp-content/uploads/2021/10/Energy-Efficiency-Jobs-in-America-National-Summary-2021.pdf>.

⁸ All data from 2015 EIA RECS.

⁹ <https://www.aceee.org/press/2018/07/rural-households-spend-much-more>.

¹⁰ <https://www.aceee.org/press-release/2020/09/report-low-income-households-communities-color-face-high-energy-burden>.

¹¹ All data from 2015 EIA RECS.

¹² https://afdc.energy.gov/conservation/system_efficiency.html.

¹³ <https://www.fueleconomy.gov/feg/evtech.shtml>.

ergy efficiency and sustainability through partnerships with some of the nation's leading manufacturers and water and wastewater treatment agencies. Total program participants equal 3,500 facilities and 13.8% of the U.S. manufacturing energy footprint. Most recent reporting indicates that program participants have avoided more than 1.9 quadrillion Btus and saved \$9.3 billion in energy costs.¹⁴ Avoided energy use and energy savings should be increased exponentially but will require greater support for and expansion of initiatives like the Better Plants Program and other related projects, including incentives for manufacturers to increase energy efficiency investments.

With the above in mind, we also see investments in energy efficiency as essential to the reliability of the electric grid. This is particularly true as policy and markets shift a substantive share of energy demand toward electrification. Based on analysis and depending on the rate of electric vehicle (EV) adoption, we should anticipate significant future growth in grid load. According to the Brattle Group, if the projected rate of EV growth increases from 1.5 million in 2020 to 10–35 million by 2030, we will need grid investments up to \$125 billion across the electric power sector—and that's to serve 20 million EVs.¹⁵ These vehicles will add 60–95 terra-watt hours (TWh) of electricity demand to the grid annually, in addition to 10–20 gigawatts (GW) of peak load, which in turn would require 12–18 gigawatts of generation capacity from renewable energy.¹⁶

These investments will come at a cost. There will be a cost to develop and deploy the infrastructure, and there will be a cost transferred to consumers and businesses. Brattle estimates that \$30–50 billion will be needed for generation and storage, with \$15–\$25 billion needed for transmission and distribution upgrades, and another \$30–\$50 billion for charging and customer related infrastructure.

Although some of these costs will be offset as we factor in fuel switching, carbon reductions, and the future ability of EVs to shed and share load, the payback is not immediate.¹⁷ In all likelihood, consumers will realize an increase electricity costs, which will be necessary to ensure that the grid is reliable and able to meet consumer demand. However, energy efficiency can help avoid some of these increased costs, while also adding greater grid reliability.¹⁸

This is particularly true as we think about Active Efficiency when combined with traditional passive efficiency measures including building envelope retrofits. Active Efficiency reduces consumption through demand flexibility, and also reduces load through technologies that allow appliances, buildings, communities, neighborhoods, and potentially whole cities to shift, share, and shed load on a continuous basis.

In conclusion, the energy transition is here. However, if we fail to lead with energy efficiency, then our investments in the transition will have sealed-in decades of energy waste, in addition to lost savings for consumers. From a policy perspective—including as we think about national security and the nation's energy security—when forwarding policies on electrification, we must lead with energy efficiency. As we deploy renewable generation assets and related transmission and distribution investments, we must lead with energy efficiency. And as we identify future investments in oil, natural gas, coal, and carbon capture, we must lead with energy efficiency. We have the ability through investments in demand-side solutions to directly lower the level, rate, and cost by which we consume our energy supplies.

The focus on energy efficiency in the Infrastructure Investments Jobs Act (IIJA), and what might come out of a budget reconciliation package are a good start, including but not limited to facilitation of energy code adoption, funding for the Weatherization Assistance Program, grants for schools and non-profits, and other measures. However, congress must also ensure passage of key investments proposed in budget reconciliation, including robust funding of energy efficiency tax incentives, 25C, 45L, and 179D, funding for Hope for Homes, and robust funding for climate bank activity targeting energy efficiency solutions in disadvantaged and tribal communities. And, we would also urge hearings, and consideration of the Main Street Efficiency Act—Alliance to Save Energy-led legislation that specifically targets energy efficiency investments in small businesses. This legislation was introduced by Congressman Peter Welch in the House, and Senator Catherine Cortez-Masto in the Senate.

I thank you for the opportunity to provide testimony as part of today's hearing. As we lead with energy efficiency, we add reliability to our energy supplies, we in-

¹⁴ https://betterbuildingsolutioncenter.energy.gov/sites/default/files/attachments/2021_Better_Plants_Progress_Update.pdf.

¹⁵ <https://www.brattle.com/insights-events/publications/electric-power-sector-investments-of-75-125-billion-needed-to-support-projected-20-million-evs-by-2030-according-to-brattle-economists/>.

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ <https://www.ase.org/blog/does-grid-study-many-reminders-success-energy-efficiency>.

crease national and energy security, we help to ensure greater energy affordability, and we reduce carbon emissions. It is worth repeating—that through energy efficiency alone, we can reduce carbon emissions by 50% by 2050. And through energy efficiency we can achieve 40% of the reductions required by the Paris Climate Agreement. Thank you again for the opportunity, and I look forward to your questions.

Ms. CASTOR. Thank you, Ms. Glover.

Mr. Johnson, you're recognized for 5 minutes to summarize your testimony. Welcome.

STATEMENT OF DARNELL JOHNSON

Mr. JOHNSON. Good morning, Chair Castor, Ranking Member Graves, and members of the House Select Committee. I am honored to be invited to discuss the important role that buildings and the building environment can play in reducing America's contribution to the global crisis, climate crisis. Again, thank you for inviting me to this discussion.

My name is Darnell Johnson. And I serve as the CEO and President of Urban Efficiency Group, a utility implementation contractor and community sustainable design firm. Our firm's work systemizing sustainability has influenced how BIPOC communities adopt energy efficiency and sustainability best practices in how they engage in across community climate collaborations.

As you may know, the building sector is responsible for 31 percent of the U.S. greenhouse gas emissions. And while buildings are significant contributors to our climate crisis, they can also be a key part to the solutions.

As the committee is focused on addressing the climate crisis, I want to emphasize that all of my testimonies today are all policies and practices that will advance energy efficiency; will not only help save the planet by adjusting climate change and decarbonization, but would also save the people; as our decisions affect the lives of real humans, both environmentally and economically. Therefore, we must ensure our actions toward eliminating energy poverty are diverse, equitable, and inclusive.

As we look at the stark disparities that exist in U.S. energy burdens, both in urban and rural, low-income households, spends substantially greater portions of their income on energy costs compared to non low-income households.

Often those that fall between the gap of qualifying for low-income energy efficiency programs and those that have the financial bandwidth to leverage rebates and pay the upfront costs associated with energy efficiency upgrades are left with limited options and are often referred to as the working poor.

To bridge this growing gap, Congress should advance policies aimed at helping low-income Americans make energy efficiency upgrades to their home. That is the reason why I strongly urge Congress to enact the bipartisan HOPE for HOMES.

And I want to thank Chairwoman Castor and Congressman Casten on this committee for their cosponsorship to that. This is important legislation that aims at helping all Americans by providing homeowner's manager energy or savings for homes, rebates for upgrading homes and doubling those rebates for middle and lower-income Americans.

As we look at the economic benefits, the same built environment that creates some of our challenges also creates the opportunities for small business to work with development opportunities. Energy efficiency was the largest employer and the fastest growing sector in the energy industry before the pandemic and can be again. But simply put, energy efficiency equals jobs. It is crucial that we invest in our workforce. And that means that we must ensure that contractors across the country have equal access to job training. The hope training portion in HOPE for HOMES that I mentioned earlier would provide immediate hope, training, support to contractor businesses, and help companies pay their contractors to undertake training to educate them about a home's energy structure and systems.

And as we begin to look at the equity within all of this, the challenges of energy equity are also visible in the disproportionate diverse makeup of the workforce and the contractors. And so, we have to do more to prepare our diverse workforce for quality jobs and energy efficiency and drive further growth in this industry.

In conclusion, Madam Chair, members of the committee, I, again, thank you for the opportunity to come before you and to share in this important discussion.

One of the things that is really important is that the Blue Collar to Green Collar Jobs Development Act of 2021 would create a comprehensive program to improve education and training for workers in the energy efficiency industry.

And so, the legislation would also give priority to the businesses and other entities that recruit workers for local communities, displaced energy sector workers, veterans, minorities, and women, thereby creating more diverse, robust, and inclusive workforce for the future.

And so, as I conclude, I ask that you consider the homes that you and your constituents live in as part of the solution to eliminate the crisis, the climate crisis. We can no longer allow incrementalism to be the standard by which we measure success when dealing with the complex issues of climate and energy efficiency. We acknowledge the challenges regarding the climate crisis are great, but our collective ability to find the resolve is greater. Achieving energy equity is the outcome of an intentional investment.

Thank you. I look forward to any questions that you may have. [The statement of Mr. Johnson follows:]

**Testimony of Darnell Johnson
Vice Chair of the Building Performance Association, and CEO and
President of Urban Efficiency Group**

**Before the
U.S. House of Representatives, Select Committee on the Climate Crisis**

**At the Hearing on April 7, 2022:
"Cost-Saving Climate Solutions: Investing in Energy Efficiency to Promote
Energy Security and Cut Energy Bills"**

Chair Castor, Ranking Member Graves, and members of the Committee, my name is Darnell Johnson and I thank you for inviting me to testify today on the important role that buildings can play in reducing America's contribution to global climate change. As you may know, the buildings sector is responsible for 31% of all U.S.

greenhouse gas emissions.¹ While buildings are a significant contributor to our climate crisis, they can also be a key part of the solution. My testimony will focus in particular on how the residential sector is key to carbon reductions and achieving numerous other benefits. In addition, I am here because I believe that diversity brings strength, inclusion is indicative of an acceptance that is essential to growth, and equity is a human right that should be embraced as the standard and not an exception. Energy efficiency policies must provide continuous support for the diverse, equitable and inclusive expansion of workforce development, which is indicative of meaningful policy reform.

Policies aimed at retrofitting the over 115 million homes across the country will not only help reduce carbon emissions from the nation's residential building stock but will also help homeowners save money on their monthly utility bills and improve the comfort, health, safety, and resiliency of their homes. Advancing energy efficiency in buildings across the U.S. will support climate change mitigation and resilience, while also being an engine for job growth and economic opportunity.

I am the CEO and President of Urban Efficiency Group, a utility implementation contractor and community sustainability design firm based in Chicago, IL and I have over two decades of entrepreneurial experience and a fixation on advancing energy equity. My industry-specific credentials include, but are not limited to, BPI-Building Analyst, Building Envelope, Infiltration Duct Leakage, Energy Auditor, Quality Control Inspector, Healthy Homes Evaluator, RESNET Rater, and EcoDistrict Accredited Professional.

I am also proud to serve as the Vice-Chair of the Building Performance Association (BPA), formerly known as the Home Performance Coalition, a national non-profit 501c6 organization that works with industry leaders in the home performance and weatherization industries to advance energy-efficient, healthy and safe home retrofit policies, programs and standards through research, education, training and outreach. Additionally, I serve as Chair for the Diversity, Equity and Inclusion (DEI) Committee to advance the organization's internal DEI practices to influence the industry more broadly. I am pleased to represent BPA here today.

Energy Efficient Buildings are a Pathway to Deep Decarbonization

As this committee is focused on addressing the climate crisis, I want to emphasize that all I am testifying to today, all policies and measures that will advance energy efficiency, will not only help address climate change and are critical to achieving deep decarbonization. Energy efficiency is not only cleaner and cheaper than building new low-carbon or carbon-free generation, but by reducing the need for energy and stretching out the work of every unit of energy, we can reduce the overall need for more resources. Deploying energy efficiency reduces demand for primary energy and generating capacity needs and therefore lowers the overall costs of shifting to a low-carbon energy system.²

Ultimately, the cleanest and cheapest energy is the energy you don't use in the first place. A 2019 report from ACEEE found that energy efficiency alone can cut energy use and greenhouse gas emissions in half by 2050.³ Buildings deliver 33% of the total emissions reductions in the report's model, and upgrades to existing buildings, homes, appliances, and equipment are identified as some of the largest cost-effective opportunities to achieve these reductions.

The residential buildings sector in particular remains a largely untapped resource for carbon reduction goals. I will discuss specific policy opportunities to address barriers and advance energy efficiency in the residential sector in a moment. But first I would like to give you some examples of how energy efficiency can benefit the workforce and the homeowner in ways that can positively impact the lives of Americans.

It is our firm's experience, working in 13 "Chicagoland" communities covering both South and West Suburban Cook County, and 5 communities in Northwest Indiana for more than a decade and delivering energy efficiency retrofit services to more than 6,000 low-income homes, that many (Black, Indigenous, People Of Color) BIPOC and low-income communities are severely underserved by energy efficiency programs. We have observed that there are three primary drivers that sustain this inequity: awareness, access, and affordability. While utility and WAP income quali-

¹ <https://www.epa.gov/sites/production/files/2019-04/documents/us-ghg-inventory-2019-main-text.pdf>

² An NRDC study found that 80% emissions reductions in the U.S. by 2050 is achievable and cost-effective using existing clean energy technologies. Energy efficiency is the single greatest contributor to emissions reductions in the model scenario which assumes an aggressive, but technically and economically achievable, deployment of energy efficiency across the U.S. economy. <https://www.nrdc.org/sites/default/files/americas-clean-energy-frontier-report.pdf>

³ <https://aceee.org/sites/default/files/publications/researchreports/u1907.pdf>

fied programs attempt to address the affordability barrier, awareness and access remain the existential threats to program participation. Failure to incorporate inclusive processes that enlist the input of diverse thought leaders and organizations from within the target communities, perpetuates the use of misguided communication and marketing strategies. In order to connect with hard-to-reach populations, we must first listen to them. To do otherwise stymies information sharing and limits participant enrollment in energy efficiency programs and exacerbates the divide between those who are participating in the fight to address climate change, and those forced to remain on the sidelines.

Energy Burdens and Energy Efficiency

The reduced energy burden resulting from energy efficiency upgrades to the residential stakeholder, in general, and to the low-income residential stakeholder, specifically, cannot be understated. According to a report published by ACEEE, low-income households spend 8.1% of their income on energy costs, on average, in comparison to 2.3% for non-low-income households⁴. However only 17% of homes receiving energy efficient upgrades are identified as low-income. This high energy burden correlates even more strongly with race. Nationally, Black households spend 43% more of their income on energy costs than their white, non-Latinx counterparts; Latinx households spend 20% more; and Native American households spend 45% more.⁵ It is critical that a new approach that incorporates procedural justice is used that focuses its results on increasing low-income participation and reducing both carbon emissions and energy burdens.

Energy Burdens Matter

As we consider the adverse impacts of energy burdens on our country's most vulnerable populations, the need for energy equity advocacy becomes clear. We believe those that are closest to the problems are also closest to the solutions. As a practitioner and diversity thought leader, it is important that I provide accurate accounts of the social fatigue resulting from the energy inequity that's disproportionately affecting BIPOC and low-income communities. Admittedly, it is not enough for me to share the accounts with our congressional leaders, but rather to be the impetus of innovative ideas that will influence policy and resource allocation going forward.

Energy Efficiency Policy as a part of Health and Equity Policy

As I showed in my example, energy efficiency is a key strategy for not only reducing carbon emissions but also for improving the lives of Americans. Legislation that advances energy efficiency in buildings, especially residential buildings, provides many benefits in addition to energy and pollution reductions including increased comfort, health, and energy affordability.

The occupants of the vast majority of homes in the U.S. experience building-related comfort problems, health issues, and/or high utility bills—problems which could all be significantly mitigated by proper construction techniques and energy efficiency upgrades. Studies have shown that improvements in occupant health from residential energy efficiency are strongest among vulnerable groups: lower income households and residents with pre-existing health conditions linked to housing risks.⁶

Energy costs are a significant living expense. Even before the pandemic, the nearly one-third of U.S. households who face challenges paying energy bills or sustaining adequate heating and cooling in their homes, the cost savings provided by energy efficiency are critical⁷. A study released last year by the Roosevelt Institute and Evergreen Action aptly called “Economic Recovery Begins at Home⁸ provides a policy prescription for creating jobs and protecting the climate while focusing on equity. I encourage you to consider it.

Congress should advance policies aimed at helping middle income Americans make efficiency upgrades to their homes. This is why I strongly urge Congress to enact the bi-partisan, HOPE for HOMES Act (H.R. 3456). And, I want to thank Chairwoman Castor and Congressman Casten on this committee for their co-sponsorship. This important legislation aims to help ALL Americans by providing Home Owners Manage Energy Savings (HOMES) rebates for upgrading homes and dou-

⁴ Report: *Low-Income Households, Communities of Color Face High “Energy Burden” Entering Recession* | ACEEE

⁵ *u2006.pdf* (aceee.org)

⁶ <https://e4thefuture.org/wp-content/uploads/2016/11/Occupant-Health-Benefits-Residential-EE.pdf>

⁷ <https://www.eia.gov/todayinenergy/detail.php?id=37072>

⁸ https://rooseveltinstitute.org/wp-content/uploads/2021/03/RI_EconomicRecoveryBeginsatHome_3Pager_202103-1.pdf

bling those rebates for middle and lower income Americans. These rebates target the actual energy performance of a home—so Congress is paying for the real energy savings resulting from those retrofits, investing in America’s homes and the people who live in them. You have done your part by including significant portions of this legislation in Build Back Better, but as you know, the job is not done yet and I encourage you to continue to fight to pass H.R. 3456.

In addition to the cost-savings benefits to homeowners, efficiency upgrades also have health and safety benefits. A U.S. Department of Energy report on the Weatherization Assistance Program found that home improvements focused on energy efficiency can improve indoor air quality, which reduces respiratory illness and sick days, and reduce thermal stress caused by exposure to extreme indoor thermal conditions (temperature, humidity, drafts).⁹ A report from E4TheFuture, entitled “Occupant Health Benefits of Residential Energy Efficiency”¹⁰ which reviews existing research on the link between resident health benefits and energy efficiency upgrades, also found that residential energy efficiency upgrades can produce significant improvements in asthma symptoms and help improve overall physical and mental health.

While Congress passed the reauthorization and expansion of the Weatherization Assistance Program (WAP) in 2020, and then provided additional support in the bipartisan infrastructure bill in 2021, it is critical that Congress continue to support and expand the WAP. One of the key issues we see are contractors not weatherizing homes because there are barriers—such as mold, asbestos, rodent concerns—that need to be addressed first, before energy efficiency measures can be put in place. I know there are members in the House and Senate looking to allow the Weatherization program flexibility to address these barriers so that unhealthy homes are not left untreated.

I implore the committee to remember that there can be no climate policy without taking into account equity. Walking away from upgrading the efficiency of a home, moving onto another because that home is not healthy, is not seeing climate through an equity lens.

Energy Efficiency Through an Equity Lens

By definition equity means to be fair, and it is with this in mind that I would like to establish a premise to bring the equity lens into focus regarding the energy efficiency industry. Energy efficiency as we know it began in the mid-1970’s with the OPEC oil crisis, around the same time the US was wrestling with the social policy exhaustion stemming from the Civil Rights movement of the 50’s and 60’s. It was during this paradigm shift that white men established themselves as the dominant force that would drive the energy efficiency industry forward while people of color were inundated with fighting for basic human rights.

To fault the historical trailblazers for their contribution in establishing and advancing energy efficiency would be a misplacement of blame. However, to resist systemic change that supports diversity and equitable access to this emerging market is disempowering. To make this point more salient, I would like to introduce the Social Equity Theory of Change¹¹. This theory of change suggests that in order to achieve greater equity the following must be considered:

1. Self—Address the unconscious and implicit biases that shape our opinions and influence how we process the surface level diversity that we see in other social identity groups.
2. Systems—Organizations, companies, and governments are run by people, but if the people that run these entities lack the ability to be equitable, so will the practices, policies, and opportunities that they develop and deploy.
3. Society—Ultimately the end-users, which is society in general, and low-income communities specifically, will experience an inequitable allocation of resources and opportunities.

By sharing and urging consideration of these unconventional, and perhaps uncomfortable, concepts with this committee, I hope to humanize the challenges associated with the climate crisis and energy burden and help you build a policy path that includes equity and job creation while decarbonizing the U.S. economy.

⁹ https://weatherization.ornl.gov/wp-content/uploads/pdf/WAPRetroEvalFinalReports/ORNL_TM-2014_345.pdf

¹⁰ <https://e4thefuture.org/occupant-health-benefits-of-residential-energy-efficiency/>

¹¹ This concept is consistent with the Racial Equity Theory of Change while the Social Equity Theory of Change goes beyond race and racism and addresses the systemic social barriers that deal with inclusion, diversity and equity. https://www.aspeninstitute.org/wp-content/uploads/files/content/docs/rcc/RACIAL_EQUITY_THEORY_OF_CHANGE_08.PDF

Energy Efficiency Creates Jobs

As soon as the nation began shutting down in response to the global pandemic, America's energy efficiency workforce began to dissolve. A report from E2¹² found that, over the course of 2020, the energy efficiency sector shed a net of nearly 272,000 jobs, an 11% decline that wiped out the consistent job gains from the three years before. The small businesses that make up the residential energy efficiency sector were particularly hard hit by the crisis, as residential contractors conduct most of their work via physical visits to homes. Many homeowners and renters still remain hesitant to invite contractors indoors, and it is vital that we support these contractor companies as they rebuild their businesses.

Now is the time to help these small businesses rehire and prepare for a new stage of significant advancement of America's existing home infrastructure. It is crucial that we invest in our workforce and that means that we must ensure that contractors across the country have equal access to job training.

The HOPE Training portion in HOPE for HOMES (H.R. 3456) that I mentioned earlier would provide immediate "HOPE" training support to contractor businesses and help companies pay their contractors to undertake training and educate them about a home's energy structure and systems. While the Build Back Better language is briefer, I urge you to review the needed details in H.R. 3456 where HOPE training provides needed stipends for contractors. These stipends will also support individuals who have changed careers during the pandemic or due to changes in the economy. Because this training also allows for and encourages online training—which has evolved and improved significantly during the crisis—contractors from all states would have access to these courses and would be able to invest in workforce development.

To address climate change, America's homes must use energy more efficiently. As I noted, I am the Vice-Chair of the Building Performance Association which stands ready to support contractors in connecting them to job training and employment resources. BPA is committed to helping build an energy efficiency workforce to meet the demand of the climate crisis.

Energy efficiency was the largest employer and fastest growing sector in the energy industry before the pandemic and can be again. Put simply, energy efficiency equals jobs. According to the 2021 *Energy Efficiency Jobs in America*¹³ report released by E4TheFuture, the energy efficiency sector employs over 2.1 million Americans, more than twice as many workers as the entire U.S. fossil fuel industry. In the first half of 2021, the industry added more than 8,000 jobs nationwide, bouncing back from massive layoffs stemming from the COVID-19 pandemic. Still, employment remains well below pre-pandemic total job numbers due to challenges related to workforce, construction, and supply chains. Importantly, these are well-paying and sustainable jobs. Entry level wages in all sectors of energy efficiency jobs exceed the national average and approximately 80% of employers in the industry provide healthcare and retirement account contributions.¹⁴ These local, family-sustaining jobs exist all across the country; 99.8% of U.S. counties have energy efficiency jobs and more than 280,000 of these jobs are in rural areas.¹⁵ A significant portion of the energy efficiency jobs in the U.S. are in the residential sector, and 54 percent of energy efficiency jobs involve construction and repairs.¹⁶

These are the contractors—the "boots on the ground"—installing energy efficiency products and technologies and working to reduce energy waste in homes and commercial buildings across the country. These jobs are, by their very nature, inherently local and cannot be exported. Contractors are local—their kids go to the same schools as their clients, they sponsor baseball teams, they share in community successes and failures. Policies that encourage investment in energy efficiency can further advance growth in this industry, creating even more well-paying jobs all across America and generating economic opportunity through the decarbonization transition.

Importantly, policies that provide incentives for building efficiency retrofits, such as the HOMES act or tax policy like the 25C federal credits, create a ripple effect

¹² <https://e2.org/wp-content/uploads/2021/04/E2-2021-Clean-Jobs-America-Report-04-19-2021.pdf>

¹³ https://e4thefuture.org/wp-content/uploads/2021/10/Energy-Efficiency-Jobs_2021_All-States.pdf

¹⁴ https://e4thefuture.org/wp-content/uploads/2021/10/Energy-Efficiency-Jobs_2021_All-States.pdf

¹⁵ *Ibid*; <https://e2.org/wp-content/uploads/2021/04/E2-2021-Clean-Jobs-America-Report-04-19-2021.pdf>

¹⁶ https://e4thefuture.org/wp-content/uploads/2021/10/Energy-Efficiency-Jobs_2021_All-States.pdf

on jobs. Demand for insulation, air sealing, HVAC will certainly create work for those who install these products, but it also creates jobs in the manufacturing and distribution of those products. This creates jobs around those industrial centers where workers eat, shop, and live.

Not only can energy efficiency be the largest employer in the energy sector, it has the most potential for even more job growth moving forward. With an aging building stock across the country, we have only scratched the surface on the investment potential for energy efficiency improvements. Addressing barriers to retrofitting these existing homes and buildings and advancing energy efficiency across the entire buildings sector will simultaneously support decarbonization and job creation.

It is also important to note that the energy efficiency industry is made up of small businesses: 90% of energy efficiency businesses in America have fewer than 100 employees.¹⁷ These small businesses are the heart of the American economy—creating jobs, driving growth, and saving us all money through improved energy efficiency. They are also the ones that are in need of assistance when it comes to ensuring that there are qualified workers to fill these jobs. Small energy efficiency businesses need resources to help train new hires and provide ongoing education to existing employees, keeping them up to date on certifications and trained in the latest technologies and health and safety practices.

To prepare more American workers for quality jobs in energy efficiency and drive further growth in this industry, Congress should act to support workforce development and jobs training. *The Blue Collar and Green Collar Jobs Development Act of 2021* would create a comprehensive program to improve education and training for workers in the energy efficiency industry, including manufacturing, engineering, construction, and building retrofitting jobs. This legislation will result in more American workers who are equipped to provide energy efficiency products and services and whose work will reduce energy waste and save money for homes and businesses across the country. The legislation would also give priority to businesses and other entities that recruit workers from local communities, displaced energy sector workers, veterans, minorities, and women, thereby creating a more diverse, robust, and inclusive workforce of the future. This important legislation continues to evolve, and I want to encourage the members of the committee to work with Chairman Rush to move this legislation through Congress and to the President's desk.

Energy Efficiency and Sound Economic Policy—The Small Business Story

Energy Efficiency provides a career path that pays a living wage, but is also a gateway to small business ownership. Yet the cost associated with training, equipment, certifications, and the access to a qualified workforce are barriers to entry. Our firm developed a quasi-small business incubator (Energy+) to remove the barriers mentioned and increase supplier diversity. This comprehensive approach to developing and deploying more minority business enterprise (MBE) firms in the energy efficiency space, or “business in a box” concept was successful in launching two (2) minority owned energy efficiency contracting firms that boast a six-figure net profit year over year. With greater investments in legislation like the Blue Collar to Green Collar Jobs Development Act of 2021 and the HOPE for HOMES Act of 2021 we can increase the contractor diversity in the energy efficiency sector and experience a more diverse workforce.

Small business and micro-business in BIPOC communities

The Energy+ initiative provides an end-to-end experience to ensure success and sustainability of a new energy efficiency firm. This experience includes, but is not limited to, MBE candidate recruitment and screening, small business development training, BPI certification training, connection to a broader network of support, connection to systems support, access to capital, access to contracts, MBE certification support, and capital purchase support. Additionally, this initiative empowers local MBE service providers the opportunity to create and expand local workforce and small business opportunities, while delivering healthy home and energy assessments and home retrofit services to households at or below 80% of Area Median Income. Despite the many barriers that entrepreneurs of color face, BIPOC businesses comprise a significant portion of our economy and often act as the economic lifeblood of their communities. Yet, despite the growth of BIPOC small businesses, there is still a disparity when it comes to access to capital, contracting opportunities and other entrepreneurial development opportunities for minority-owned firms¹⁸.

The disproportionately low number of minorities with jobs in the energy efficiency field is symptomatic of a lack of MBEs working in the space. The lack of qualified

¹⁷ Ibid.

¹⁸ <https://www.sbc.senate.gov/public/index.cfm/minorityentrepreneurs>

MBEs is symptomatic of difficulties any firm faces when entering the relatively small and closed community—the clean energy community may be small, but it is growing. It needs to also grow in inclusivity. MBEs also face barriers associated with limited financial capacity, access to capital, access to clients, and challenges attracting workers in a closed business community. As we invest in addressing climate change, we must invest in a broad and inclusive vision of the green, American jobs that retrofit America.

Conclusion

In conclusion, Madam Chair, members of the committee, I again thank you for this opportunity to come before you and share my story and ask you to consider the homes you and your constituents live in as a part of the solution to the climate crisis. The built environment is one of the largest consumers of energy and thus emitters of greenhouse gas emissions. But we cannot address climate change without being mindful of the impact those policies have on communities of color and low-income households. Please know that we can address all these concerns simultaneously and fundamentally change the relationship people have with their energy use while improving the lives of families and increasing good, green, jobs.

With policy and program innovation that brings all of these pieces together to optimize energy usage we can reduce the need for new power plants, deliver more reliable energy services at lower costs, all while making homes healthier, more comfortable places to live.

Ms. CASTOR. Thank you, Mr. Johnson.

Mr. Schryver, you are up. Welcome. You are recognized for 5 minutes to summarize your testimony.

STATEMENT OF DAVE SCHRYVER

Mr. SCHRYVER. Thank you. Good morning, Chairwoman Castor, Ranking Member Graves, and members of the committee. My name is Dave Schryver. And I am the President and CEO of the American Public Gas Association. I am honored to appear today on behalf of the approximately 1,000 communities across the United States that own and operate their retail natural gas distribution systems. APGA's members are not-for-profit gas distribution systems owned by cities and other local government entities. The primary mission of a public gas system is delivering affordable energy. Our members have no obligation to deliver a profit to shareholders. Instead, local officials are responsible for setting rates with the goal of delivering energy to their community as safely and affordably as possible. That mission has become even more vital as Americans are struggling with the burden of high prices at the gas pump and rising inflation.

Natural gas has not been immune to price increases in recent years, but data from the Energy Information Administration continues to show that it remains the most affordable fuel source to heat your home in the winter. Homes fueled by natural gas consume less energy than electric homes when you consider the full fuel cycle from source to site, because almost two-thirds of the energy involved in delivering electricity is used or lost before it ever reaches the point of end use. In contrast, less than 10 percent of the natural gas is lost between the point of production and the residents, making direct use of natural gas almost three times more efficient than electricity.

It is estimated that the average home that uses natural gas appliances for heating, cooking, and clothes drying saves over \$1,000 a year compared to homes using electric appliances. Emissions reduction efforts also play a critical role in public gas systems' ability

to deliver energy affordably. Leaks are not just bad for the environment, they are also bad for business.

APGA members have dedicated significant resources to upgrading their pipeline infrastructure and investing in leak detection technology to decrease the amount of gas lost. Those efforts are good for the environment, but also ultimately reduce our members' operating costs and deliver savings to consumers.

APGA's members are also committed to helping their customers reduce their energy usage. Most offer weatherization assistance and appliance rebate programs to help their customers reduce their demand for energy and lower their bills.

Natural gas is not only more affordable than electricity, but also more reliable due to the inherently secure nature of the underground pipeline network that is used to deliver it, which is less vulnerable to extreme weather than electric transmission lines. Only one in 800 natural gas customers experiences an unplanned outage in a given year, compared to electric customers, who experience an average of at least one outage every year.

Even though we know natural gas is the most affordable and reliable way to fuel a home, public gas systems are still facing challenges. Some of our members have wait lists for would-be customers who cannot be connected due to a lack of pipeline capacity. This is a direct result of how difficult it has become to permit new natural gas infrastructure to supply gas to everyone who wants it. In colder climates, this often means continued reliance on propane or heating oil, which leads to higher energy bills and a greater environmental footprint.

We are also facing proposed bans on new natural gas hookups, building code changes at the local level to disincentivize the use of gas appliances. These bans are being proposed even though residential natural gas use accounts for only 4 percent of the emissions in the United States. Not only does this take away a consumer's right to choose the energy source that fuels their home, these efforts will also lead to higher costs for American families while producing little environmental benefit.

If politicians force fuel switching on natural gas customers, those households will not only face higher energy bills, but will also have to shoulder the cost of expensive new appliances. Last year, the Consumer Energy Alliance considered what it would cost if the nearly 60 million American households who rely on natural gas were forced to switch their furnaces, water heaters, stoves, and clothes dryers to run on electricity. Their research estimated a nationwide cost to consumers of more than \$258 billion. Those costs are just for the appliances themselves and do not account for the electric service panel upgrades needed to support the additional load of converting all their appliances to run on electricity.

One recent study estimated that that could result in an additional \$100 billion cost nationwide. APGA understands the need to transition to a clean energy future, but we urge Congress not to discount the role that natural gas can play. Natural gas has been delivering emission reductions in the energy sector for decades. But the development of renewable and natural gas and the potential of hydrogen, the gas industry can continue to deliver clean energy for American families in the future.

Congress should pursue an all-of-the-above energy policy that continues to invest in energy efficient, gas-fired appliances and the infrastructure needed to support their continued use if we are going to transition to a clean energy future without compromising reliability and imposing unnecessary burdens on consumers.

I thank the committee for the opportunity to testify on this important topic. And I look forward to today's discussion.

[The statement of Mr. Schryver follows:]

Written Testimony of Mr. Dave Schryver

President and CEO, American Public Gas Association

Before the House Select Committee on the Climate Crisis

Hearing on "Cost-Saving Climate Solutions: Investing in Energy Efficiency to Promote Energy Security and Cut Energy Bills"

April 7, 2022

Good morning, Chairwoman Castor, Ranking Member Graves, and members of the Committee. My name is Dave Schryver, and I am the President and CEO of the American Public Gas Association. Thank you for this opportunity to testify before the Committee.

I am honored to appear today on behalf of the approximately 1,000 communities across the United States that own and operate their retail natural gas distribution entities. APGA's members include not-for-profit gas distribution systems owned by municipalities and other local government entities, all directly accountable to the citizens they serve.

Prioritizing Affordability

The primary mission of a public gas system is delivering affordable energy. Our members have no obligation to deliver a profit to shareholders. Instead, local officials are responsible for setting rates with the goal of delivering energy to their community as safely and affordably as possible. That mission has become even more vital as Americans are struggling with the burden of high prices at the gas pump and rising inflation.

Natural gas has not been immune to price increases in recent years, but data from the Energy Information Administration continues to show that it remains the most affordable fuel source to heat your home in the winter.¹ The low price of gas as a commodity is not the only factor at play here.

Homes fueled by natural gas also have the advantage of consuming less energy than electric homes when you consider the full fuel cycle from source to site. To deliver electricity to homes and businesses, almost two-thirds of the energy involved is used or lost before it ever reaches the point of end use. In contrast, when natural gas is being burned as the direct source of energy, less than ten percent is lost between the point of production and the residence, making direct use of natural gas almost three times more efficient. As a result, it is estimated that the average home that uses natural gas appliances for heating, cooking, and clothes drying saves over \$1,000 a year on their energy bills compared to homes using electric appliances for those purposes.²

Emissions reduction efforts also play a critical role in public gas systems' ability to deliver energy affordably. Leaks are not just bad for the environment; they are also bad for business. APGA members have dedicated significant resources to upgrading their pipeline infrastructure by repairing or replacing leak prone pipe in their systems to decrease the amount of gas lost. They are also investing in leak detection technology that allows them to more accurately monitor their systems to identify and stop leaks. These efforts are good for the environment, but also ultimately reduce our members' operating costs and allow them to deliver savings to their customers.

¹"Winter Fuels Outlook," U.S. Energy Information Administration, October 2021, *available at*: <https://www.eia.gov/special/heatingfuels/resources/winterfuels2021.pdf>.

²"A Comparison of Energy Use, Operating Costs, and Carbon Dioxide Emissions of Home Appliances 2021 Update," EA 2021-04, American Gas Association, October 1, 2021, *available at*: https://www.aga.org/globalassets/research_insights/reports/ea-2021-04-appliance-cost-and-emissions-comparison-2021.pdf.

Delivering affordable energy is not just about low rates. APGA members are also committed to helping their customers reduce their energy usage. Most offer weatherization assistance and appliance rebate programs to help their customers take advantage of all available resources to reduce their demand for energy and lower their energy bills.

A Proven Reliability Track Record

Natural gas is not only more affordable than electricity, but also more reliable. Only 1 in 800 natural gas customers experiences an unplanned outage in a given year. In comparison, electric customers experience an average of at least one outage every year.³

This is due to the inherently secure nature of the underground pipeline network that is used to deliver it. Pipes buried underground are much less vulnerable to extreme weather than electric transmission lines. During recent extreme weather events like Winter Storm Uri, which had devastating consequences for many families that were without electricity for days, gas utilities were able to continue delivering energy to their customers.

The Gas Industry Is Confronting Significant Challenges

Even though we know natural gas is the most affordable and reliable way to fuel a home, public gas systems are still facing significant challenges. Some of our members, particularly those in the Northeast, have waitlists for would-be customers who want to receive gas service or add lines for additional appliances, but they are unable to do so due to lack of capacity. This is a direct result of how difficult it has become to permit new natural gas infrastructure. There are simply not enough pipelines to supply gas to everyone who wants it. Unfortunately, in colder climates, this often means households continue to rely on propane or heating oil to stay warm in the winter. This not only produces a greater environmental footprint, but also forces those customers to continue paying higher energy bills.

Other public gas systems are confronting challenges from local officials who want to ban new natural gas hookups or change building codes in their cities and counties to disincentivize the use of gas appliances in homes and businesses. These bans are being proposed in spite of the fact that residential natural gas use accounts for only 4% of emissions in the United States.⁴ Not only does this take away a consumer's right to choose the energy source that fuels their home, if successful, these efforts will inevitably lead to higher costs for American families while producing little environmental benefit.

The Cost of Forced Electrification

If politicians force fuel switching on natural gas customers, those households will not only face higher energy bills, but will also have to shoulder the additional cost of expensive new appliances and potential electrical system upgrades to support them.

Last year, the Consumer Energy Alliance considered what it would cost if the nearly 60 million American households who rely on natural gas for cooking, cleaning, or heating their homes were forced to switch to electric appliances. Their research found:

- A new electric furnace and installation costs an estimated \$2,500,
- A new water heater costs an average of \$1,180,
- A new, low-end electric range costs an estimated \$767, and
- A new electric clothes dryer costs an average of \$749.

The nationwide cost to consumers if we forced natural gas households to switch to electric appliances would come in at more than \$258 billion.⁵

These costs are just for the appliances themselves and do not account for the fact that many homes that currently rely on natural gas appliances would also be forced to upgrade their electric service panels to support the additional load of converting all their appliances to run on electricity. One recent study estimated that as many

³“Assessment of Natural Gas and Electric Distribution Service Reliability,” Gas Technology Institute, July 19, 2018, *available at*: <https://www.gti.energy/wp-content/uploads/2018/11/Assessment-of-Natural-Gas-Electric-Distribution-Service-Reliability-TopicalReport-Jul2018.pdf>.

⁴“Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2019,” Environmental Protection Agency, April 14, 2021, *available at*: <https://www.epa.gov/sites/default/files/2021-04/documents/us-ghg-inventory-2021-main-text.pdf>.

⁵“Green New Deal Would Cost American Consumers More Than \$258 Billion—in JUST Four Appliances,” Consumer Energy Alliance, April 20, 2021, *available at*: <https://consumerenergyalliance.org/2021/04/green-new-deal-would-cost-american-consumers-more-than-258-billion-in-just-four-appliances/>.

as 48 million households may require such an upgrade to fully electrify.⁶ Assuming an average cost of \$2,000 for an electric panel upgrade, we are looking at an additional \$100 billion cost nationwide.⁷

The Clean Energy Future

We at APGA understand the need to transition to a clean energy future, but we urge Congress not to discount the role natural gas can play in that future. Natural gas has been delivering emission reductions in the energy sector for decades. With the development of the renewable natural gas industry and the potential of hydrogen, the gas industry can continue to deliver clean energy for American families in the future, utilizing our existing infrastructure and skilled workforce.

It is vital that Congress pursue an all-of-the-above energy policy that continues to invest in and support energy efficient, gas-fired appliances and the infrastructure needed to support their continued use if we are going to transition to a clean energy future without compromising the reliability of our energy system and imposing unnecessary financial burdens on consumers.

I thank the Committee for the opportunity to testify on this important topic, and I look forward to today's discussion.

Ms. CASTOR. Thank you.

Next, Ms. Baldwin. Welcome. You are recognized 5 minutes to present your testimony.

STATEMENT OF SARA BALDWIN

Ms. BALDWIN. Good morning. Good morning, Chair Castor, Ranking Member Graves, and Select Committee members. Thank you so much for the opportunity to be here this morning.

I work for Energy Innovation, which is a nonpartisan energy and climate policy think tank. We provide research and analysis to support policy design that reduces emissions at speed and scale, required for a stable climate. Our work is data-driven and informed by climate science.

The IPCC report released this week made clear that actions are needed within this decade. And they will determine our collective climate future. Ignoring the urgent call to act will result in locked-in emissions, stranded assets, nonviable investments, and costly climate change.

The same IPCC report, as well as a recent International Energy Agency report, points to widespread electrification of more end-uses, buildings, vehicles, and some industries as a way to achieve net zero emissions by 2050.

Electrification refers to switching end uses that currently run on fossil fuels to run on carbon-free electricity. For example, by replacing an older inefficient gas furnace with a more energy efficient, all-electric heat pump.

The high prices for oil and gas are front of mind right now, but it is important to keep in mind that they are the result of issues on both the supply side, and the demand side. Reducing the demand for fossil fuels protects customers by putting a dampening effect on the high and volatile prices.

Electrification reduces demand for fossil fuels and today's all electric technologies are far more efficient than their fossil counterparts. For example, air source heat pumps to heat your home are two to four times more energy efficient than natural gas-burning furnaces. Induction stoves outperform gas stoves by 3-to-1, without

⁶“Addressing an Electrification Roadblock: Residential Electric Panel Capacity: Analysis and Policy Recommendations on Electric Panel Sizing,” Pecan Street, August 2021, *available at*: <https://www.pecanstreet.org/panel-size-paper-update/>.

⁷*Id.*

emitting harmful indoor air pollution. And EVs are nearly four times as efficient compared to gas or diesel vehicles also with pollution benefits to communities and individuals.

Electric technologies are also cheaper to operate. And electricity is a more price-stable commodity, which insulates consumers from price shocks. A March 2022 analysis shows EVs are 3-to-6 times cheaper to drive per mile than gas powered vehicles. Another analysis shows that if all new vehicle sales were all electric in 2035, that would yield \$2.7 trillion in consumer savings by 2050.

Electricity is generated from a diverse set of homegrown resources. And electric utilities and the grid are highly regulated to ensure affordable and reliable electricity for all end users. Modeling from Energy Innovation shows that electrification combined with a clean carbon-free grid is the most cost-effective pathway to drive down greenhouse gas emissions to net zero by 2050, while also creating jobs and improving public health. Our modeling shows that strong policies would, by 2050, increase gross domestic product by \$920 billion, create more than 5 million new job years, avoid more than 45,000 premature deaths, and 1.3 million asthma attacks annually.

We already have the technologies we need to start electrifying more end uses. And we don't have to wait for a breakthrough or an unproven costly alternative to be viable. However, ensuring a wide range of available models and products, and a trained workforce to support widespread electrification in an equitable manner, requires policy to remove barriers, uptake, and enable mainstream adoption.

Equitable incentives for EVs and electric appliances, such as those passed by the House last year, would be market game changers, and ideally, would be integrated into any future reconciliation package.

Well-designed incentives provisions, such as caps based on income, and cost per vehicle, used EV incentives, and higher incentives for electric equipment in households that are underserved and communities that are front-line will ensure more Americans can access and benefit from these technologies sooner.

Although I have not touched on it in detail today, more support is needed for industrial electrification. The U.S. industrial sector contributes nearly a quarter of our greenhouse gas emissions, yet few policies focus on this sector. Industrial operations are an untapped opportunity for greater price stability for made-in-America commodities by shifting more processes to run on carbon-free electricity.

Policies to boost domestic manufacturing and production of the minerals and materials needed for electric and clean technologies will improve America's competitiveness, and make our economy more insulated from supply chain disruptions.

The recent invocation of the Defense Production Act for critical minerals and some provisions in the Infrastructure Act are important first steps, but more incentives and funding would help move the dial.

In conclusion, the urgency of our climate crisis, combined with the inherent price volatility of oil and gas, requires that we work quickly to electrify as many end uses as possible. Although 2050

may seem like a far-away day, policy adoption and implementation take time, as does the necessary capital stock turnover to convert existing fossil fuel assets to carbon-free assets.

We must start now. Electrification is a viable solution that reduces harmful air pollution, creates American jobs, saves consumers money, and offers a cost-effective pathway to decarbonize our economy, but we need Federal leadership and smart policies to electrify the movement.

Thank you for your time and I look forward to questions.

[The statement of Ms. Baldwin follows:]

Testimony of

Sara Baldwin
Director, Electrification Policy
Energy Innovation

U.S. House of Representatives Select Committee on the Climate Crisis
“Cost-Saving Climate Solutions: Investing in Energy Efficiency
to Promote Energy Security and Cut Energy Bills”

April 7, 2022

Good morning, Chair Castor, Ranking Member Graves, and Select Committee Members. Thank you for the opportunity to be speak with you all today, and it's an honor to be here. I appreciate the work of this committee, and the leadership each of you has shown in your public service, to understand climate science and work collaboratively to generate policy solutions.

I am the Director of Electrification Policy with Energy Innovation, a non-partisan climate policy think tank providing research and analysis to support policies that reduce emissions at the speed and scale required for a safe climate future. Our work is based on scientific assessments of climate change, and our policy recommendations are grounded in data, driven by our open-source and peer-reviewed Energy Policy Simulator model.¹

I have devoted my 18-year career to advancing workable solutions to climate change because it is the one issue that truly impacts everything, and I believe it is one of the most important issues of our time. The two most recent contributions to the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (from Working Groups II and III) are sobering; both make painstakingly clear that our time to limit warming is perilously short, and the societal choices and actions taken *within the next decade* will determine our collective climate future.² The Working Group III report, issued this week, notes that limiting warming to around 1.5 degrees Celsius requires that global *greenhouse gases must peak before 2025 at the latest, and be reduced by 43 percent by 2030; at the same time, methane would also need to be reduced by about a third.*³ Fixing the “pervasive leaky natural gas infrastructure”⁴ is paramount to minimizing methane's damage within the decade.

¹ Available at: <https://energypolicy.solutions/>.

² IPCC, 2022: Summary for Policymakers [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Lösschke, V. Möller, A. Okem (eds.)]. In: *Climate Change 2022: Impacts, Adaptation, and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Lösschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. In Press. Available at: https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf and IPCC, 2022: Summary for Policymakers. In: *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.001, available at https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_SummaryForPolicymakers.pdf.

³ “The evidence is clear: the time for action is now. We can halve emissions by 2030,” IPCC Press Release, April 4, 2022, <https://www.ipcc.ch/2022/04/04/ipcc-ar6-wgiii-pressrelease/>.

⁴ Eric Roston, “Planet's Breakneck Warming Likely to Pass 1.5°C, UN Scientists Warn,” Bloomberg, April 4, 2022, https://www.bloomberg.com/news/articles/2022-04-04/planet-s-breakneck-warming-likely-to-pass-1-5-c-un-scientists-warn?cmpid=BBD040422_GREENDAILY&utm_medium=email&utm_source=newsletter&utm_term=220404&utm_campaign=greendaily.

The science tells us we must achieve net zero greenhouse gas emissions by or before 2050. That seems far away, but it takes time for policies to take effect, and to adopt new technologies. The greenhouse gases we emit into our atmosphere today will warm our world for decades. Getting on a safe climate pathway requires cost-effective solutions capable of scaling quickly. Electrification is an essential, cost-effective strategy to achieve this goal by switching end-uses that currently run on fossil fuels to run on carbon-free electricity. For example, swapping out an old gas furnace for a more efficient all-electric air-source heat pump, or driving an electric vehicle in lieu of an internal combustion engine vehicle. As I will discuss in my testimony, electrifying buildings, transportation, and much of industry powered by a clean grid puts us on the path to achieving a stable climate, while creating jobs and improving public health. It is also a pathway to enhance energy security and ensure our global competitiveness.

The International Energy Agency’s Net Zero by 2050 report calls out electrification as a core solution to achieve net zero emissions: “As electricity generation becomes progressively cleaner, electrification of areas previously dominated by fossil fuels emerges as a crucial economy-wide tool for reducing emissions. This takes place through technologies like electric cars, buses and trucks on the roads, heat pumps in buildings, and electric furnaces for steel production.”⁵ Similarly, the Working Group III report notes that “[s]tringent emissions reductions at the level required for a 2°C and below are achieved through increased direct electrification of buildings, transport, and industry, resulting in increased electricity generation in all pathways (*high confidence*).”⁶

All-electric technologies are considerably more efficient than fossil fuel counterparts, and this inherent efficiency reduces fossil fuel demand with a dampening effect on prices—which helps all consumers. Because electricity is a price-stable commodity, electric technologies are far cheaper to operate and help protect consumers from volatility and price shocks.

We have the technologies, and they are increasingly cost-effective, but smart policies and regulations are needed to jumpstart the market.

Today, we are experiencing a perfect storm of converging factors whose root cause is our overreliance on oil and gas: volatile and high fuel prices, devastating climate events, and energy insecurity. It is important to think both about the near- and long-term impacts of any solutions or actions so that solving one problem does not exacerbate others.

As this Committee has discussed at length, the high price⁷ of gas and oil is hurting Americans at the pump and at home⁸ and is increasing energy burdens⁹ for lower- and middle-income households.

These high prices are caused by a post-pandemic surge in consumer demand¹⁰ for oil and gas combined with supply shocks caused by global shutdowns, extreme weather events, and Putin’s war against Ukraine.¹¹

Oil is a global commodity, and natural gas increasingly so, meaning oil and gas markets operate outside the boundaries of any one country. Increasing short-term domestic production can provide some immediate relief, but no amount of domestic drilling and production will insulate us from this unending cycle of price volatility.

⁵“Net Zero by 2050: A Roadmap for the Global Energy Sector,” International Energy Agency, May 2021, <https://www.iea.org/reports/net-zero-by-2050>.

⁶“Working Group III contribution to the Sixth Assessment Report, Chapter 3: Mitigation pathways compatible with long-term goals,” IPCC Sixth Assessment Report: Mitigation of Climate Change, https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_Chapter03.pdf, 3–6.

⁷“Gas Prices,” AAA website, <https://gasprices.aaa.com>, accessed April 5, 2022.

⁸“Short-term Energy Outlook: Winter Fuels Outlook, October 2021” U.S. Energy Information Administration, March 8, 2022, <https://www.eia.gov/outlooks/steo/report/WinterFuels.php>.

⁹Energy burden refers to the relative proportion of your income that goes to pay energy bills, including for home heating and fueling a vehicle. Energy burden is different than an energy bill, which is the rate you pay for electricity combined with how much you use. With energy efficiency and conservation measures, even where electricity rates are high, you can reduce energy bills and help mitigate high energy burdens. According to ACEEE, 25% of U.S. households face a high energy burden (spend 6% or more of their income on energy bills), and low-income households spend three times more of their income on energy costs compared to the average non-low-income households (8.1% vs 2.3%). Source: <https://www.aceee.org/energy-burden>

¹⁰David Gaffen, Scott DiSavino, and Stephanie Kelly, “U.S. December oil demand hits highest since before pandemic—EIA,” Reuters, February 28, 2022, <https://www.reuters.com/business/energy/us-oil-demand-reached-highest-level-since-before-pandemic-december-eia-2022-02-28/>.

¹¹“Making Sense of Soaring Oil Prices,” Columbia Energy Exchange Podcast, March 22, 2022, <https://www.energypolicy.columbia.edu/making-sense-soaring-oil-prices>.

Fortunately, electrification can stabilize prices by reducing fossil fuel demand because all-electric technologies are highly energy efficient. Today's efficient electric technologies offer a hedge against price spikes. For example, air source heat pump furnaces are two to four times more energy-efficient than natural gas-burning furnaces.¹² Induction stoves outperform gas stoves by about three to one.¹³ Electric vehicles are nearly four times as efficient as internal combustion engine vehicles.¹⁴

Inherent efficiency advantages make electric technologies cheaper to operate, and electricity is more price-stable than oil and gas without global market volatility. Electricity is generated from diverse homegrown resources and electric utilities and the grid are regulated by federal, state, regional, and local entities tasked with ensuring affordable and reliable electricity for all consumers.

Today, U.S. households and businesses that rely on fossil fuels for transportation and heat are being hit with higher energy bills and gasoline bills, whereas those who live in all-electric homes or drive electric vehicles have been insulated from this price shock.

A recent analysis conducted by the Zero Emissions Transportation Association shows electric vehicles are three to five times cheaper to drive per mile than gas-powered vehicles, and in several states are five to six times cheaper to drive per mile.¹⁵ Analysis from University of California, Berkeley, Energy Innovation, and GridLab (known as the 2035 2.0 Study) shows light-duty electric vehicles will hold a total cost of ownership advantage within the next five years.¹⁶

All-electric homes also save money. RMI analysis comparing new all-electric single-family homes with dual fuel homes in seven cities¹⁷ shows that a new all-electric, single-family home has a lower net present cost than the new mixed-fuel home with lower annual utility costs in most cases.¹⁸ All-electric new homes also yield emit 50 percent up to 93 percent fewer greenhouse gases compared to mixed-fuel homes.¹⁹

Although the promise of energy savings is enticing, many consumers face upfront cost barriers and challenges accessing financing. Though costs are declining ahead of most projections, policies, regulations, and incentives can bring down costs further, level the playing field for all-electric technologies. Upfront incentives, applied at the point-of-purchase, are highly effective tools for equitable market transformation.²⁰

The upside to electrification is that we already have the technologies we need to start electrifying more end-uses today, without compromising performance. We don't have to wait for a new technology breakthrough or an unproven, costly alternative to become viable²¹ because conversion can occur incrementally using existing electrical infrastructure. In the U.S., 25 percent of homes

¹²Claire McKenna, Amar Shah, and Mark Silberg, *It's Time to Incentivize Residential Heat Pumps*, RMI, June 8, 2020, <https://rmi.org/its-time-to-incentivize-residential-heat-pumps/>.

¹³Micah Sweeney, Jeff Dols, Brian Fortenbery, and Frank Sharp, *Induction Cooking Technology Design and Assessment*, ACEEE, 2014, <https://www.aceee.org/files/proceedings/2014/data/papers/9-702.pdf>.

¹⁴"All-Electric Vehicles," U.S. Department of Energy, <https://www.fueleconomy.gov/feg/evtech.shtml>

¹⁵*Comparing the Operating Costs of Electric Vehicles and Gas-Powered Vehicles*, Zero Emissions Transportation Association, April 2022, https://drive.google.com/file/d/1_d6OXxWpF6GzBjZiFP3oj0QqQTM1P5io/view.

¹⁶Amol Phadke, N. Abhyankar, J. Kersey, T. McNair, U. Paliwal, D. Wooley, O. Ashmoore, R. Orvis, M. O'Boyle, R. O'Connell, U. Agwan, P. Mohanty, P. Sreedharan, and D. Rajagopal, *Plummeting Costs and Dramatic Improvements in Batteries Can Accelerate Our Clean Transportation Future*, University of California, Berkeley Goldman School of Public Policy, Energy Innovation, and Grid Lab, April 2021, <http://www.2035report.com/transportation/wp-content/uploads/2020/05/2035Report2.0-1.pdf?hsCtaTracking=544e8e73-752a-40ee-b3a5-90e28d5f2e18%7C81c0077a-d01d-45b9-a338-fcaef78a20e7>.

¹⁷Austin, Texas; Boston, Massachusetts; Columbus, Ohio; Denver, Colorado; Minneapolis, Minnesota; New York City, New York; and Seattle, Washington.

¹⁸The two modeled scenarios have nearly equivalent utility bills in Boston and Seattle.

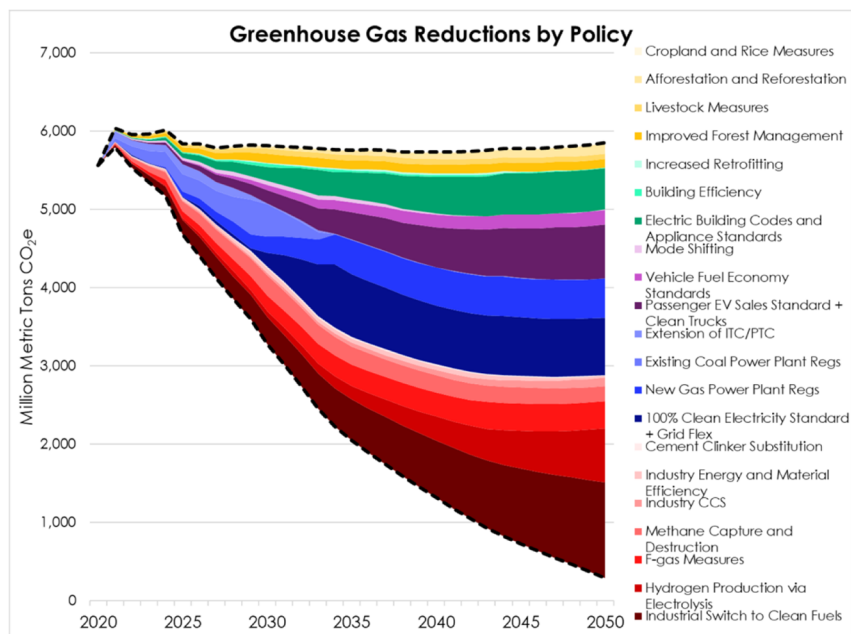
¹⁹Claire McKenna, Amar Shah, and Leah Louis-Prescott, "All-Electric New Homes: A Win for the Climate and the Economy," RMI, October 15, 2020, <https://rmi.org/all-electric-new-homes-a-win-for-the-climate-and-the-economy/>.

²⁰Sam Abuelsamid, "EV Purchase Incentives Need to Shift to Point-of-Sale Rebates," Guidehouse Insights, June 24, 2021, <https://guidehouseinsights.com/news-and-views/ev-purchase-incentives-need-to-shift-to-point-of-sale-rebates>.

²¹Sara Baldwin, Dan Esposito, and Hadley Tallackson, *Assessing the Viability of Hydrogen Proposals: Considerations for State Utility Regulators and Policymakers*, Energy Innovation, March 28, 2022, <https://energyinnovation.org/publication/assessing-the-viability-of-hydrogen-proposals-considerations-for-state-utility-regulators-and-policymakers/>.

are already all-electric,²² and almost half of single-family homes are appropriately wired for all-electric appliances.²³ Many buildings have sufficient electrical capacity to switch to all-electric appliances today, though older buildings might require electrical upgrades like a new panel or wiring. Consumers replacing older equipment, appliances, and vehicles can opt for all-electric options. Or, when building or buying new, they can choose all-electric options, avoiding potentially costly upgrades down the road. However, model and product availability to meet consumer needs is closely tied with policy support. As such, it is important for policies to send strong market signals to manufacturers, contractors, distributors, and dealers to encourage them to make and sell high performing, energy-efficient all-electric products.

More relevant to this Committee, electrification plus a clean grid puts us on a climate stable path while creating jobs, improving public health, and ensuring global competitiveness. Energy Innovation's U.S. Energy Policy Simulator modeling shows that electrification policy pathways combined with a clean grid—powered by a diverse mix of carbon-free resources like wind, solar, geothermal, hydroelectric, paired with batteries, existing nuclear and gas, and demand-side resources—can cut emissions, increase gross domestic product \$570 billion per year in 2030 and \$920 billion in 2050, and create more than 3.2 million new job-years by 2030 and 5 million new job-years by 2050.²⁴ The wedge graph below shows U.S. emissions under business-as-usual and the 1.5°C Scenario, including how much each specific policy reduces emissions through 2050. Although these are illustrative pathways, the electrification policies for buildings, transportation, and industry all contribute significant emissions reductions.



Transportation is the largest source of U.S. GHG emissions, contributing 29 percent of all emissions in 2019 and rising, unlike the electricity sector. Annual transportation emissions grew 22.9 percent between 1990 and 2019—the largest growth in annual emissions from any sector.²⁵ The 2035 2.0 Study showed that reaching

²²“One in Four U.S. Homes is All Electric,” U.S. Energy Information Administration, May 1, 2019, <https://www.eia.gov/todayinenergy/detail.php?id=39293>.

²³ Pecan Street, *Addressing an Electrification Roadblock: Residential Electric Panel Capacity*, <https://www.pecanstreet.org/panel-size-paper-update/>, page 1.

²⁴ Robbie Orvis and Megan Mahajan, “A 1.5°C NDC For Climate Leadership by the United States,” April 2021, <https://energyinnovation.org/wp-content/uploads/2021/04/A-1.5-C-Pathway-to-Climate-Leadership-for-The-United-States-NDC-update-2.pdf>.

²⁵“Greenhouse Gas Inventory Data Explorer,” United States Environmental Protection Agency, <https://cfpub.epa.gov/ghgdata/inventoryexplorer/#allsectors/allsectors/allgas/econsect/all>.

100 percent electric sales for all new cars and trucks by 2035 would cut transportation-related GHGs 93 percent, and put the U.S. on a path to net zero economy-wide emissions in 2050, avoiding the most devastating impacts of climate change. This would also create more than 2 million jobs in 2035 as compared with business-as-usual.²⁶ Adding more emphasis on domestic manufacturing would only amplify those job numbers.

In the U.S. nearly 90 million residential housing units and 4 million commercial buildings burn fossil fuels for space and water heating and cooking, and those buildings contribute 13 percent of our nation's GHG emissions.²⁷ Rewiring America analysis shows that we can avoid 166 million metric tons of carbon dioxide (CO₂) emissions by deploying heat pump technology across 104.7 million households (or 87 percent of U.S. households) today.²⁸ Building and retrofitting electrified homes and buildings across the country will require hundreds of thousands of skilled workers, creating more than 460,000 installation jobs, 80,000 manufacturing jobs, and 800,000 indirect and induced jobs in the U.S.²⁹

Even if we power our electric vehicles and homes with today's grid (which is not yet 100 percent carbon-free), we will still reduce net emissions. A Union of Concerned Scientists study shows that electric vehicles are already cleaner than gas vehicles in all states, regardless of regional differences in grid mix.³⁰ We have an opportunity to begin reducing emissions today with the adoption of efficient electric technologies, while we continue to drive towards a carbon-free grid.

However, given the slow pace of capital stock turnover,³¹ we need to start electrifying as many end-uses now as feasible to be on the path to climate stability by 2030 and ultimately 2050.

Electrification will also improve public health and reduce harmful air pollution indoors and outdoors. Nearly half of all U.S. residents live in counties with unhealthy ozone and particle pollution,³² and more than 20,000 die prematurely³³ every year from transportation pollutants. Transportation electrification will reduce a major source of harmful air pollutants, which disproportionately impact economically disadvantaged and communities of color³⁴, children, pregnant women, and the elderly. The 2035 2.0 study found that electrifying cars and trucks would avoid 96 percent of the premature deaths caused by transportation pollution.³⁵ Similarly, all-electric appliances and stoves can significantly reduce toxic air pollution in homes³⁶ and cut outdoor air pollution damaging to human health.³⁷

Electrification is synergistic with updating the electric grid to improve reliability, and more electric end-uses will cut per unit consumer costs. U.S. electric utilities have historically invested \$30 billion per year into the grid, and more investments will be needed to support more electrified end-uses.³⁸ But these

²⁶ Amol Phadke, et al., *Plummeting Costs and Dramatic Improvements in Batteries Can Accelerate Our Clean Transportation Future*.

²⁷ Sara Baldwin and Hadley Tallackson, *Making Buildings Better*, Energy Innovation, December 2021, <https://energyinnovation.org/wp-content/uploads/2021/12/Making-Buildings-Better-in-the-Build-Back-Better-Act.pdf>.

²⁸ "Benefits of Electrification," Rewiring America, <https://map.rewiringamerica.org>.

²⁹ "Benefits of Electrification," Rewiring America, <https://map.rewiringamerica.org>.

³⁰ David Reichmuth, "Electric Vehicles are Cleaner than Gasoline—and Getting Better," Union of Concerned Scientists Fact Sheet, May 2020, <https://www.ucsusa.org/sites/default/files/2020-05/evs-cleaner-than-gasoline.pdf>.

³¹ Amanda Myers, "The Capital Stock Turnover Problem for 100% Clean Energy Targets," Greentech Media, November 18, 2019, <https://www.greentechmedia.com/articles/read/the-capital-stock-turnover-problem-for-100-clean-energy-targets>.

³² *2020 State of the Air Report*, American Lung Association,

<https://www.stateoftheair.org/assets/SOTA-2020.pdf>.

³³ Kenneth Davidson, N. Fann, M. Zawacki, C. Fulcher, and K. Baker, *The recent and future health burden of the U.S. mobile sector apportioned by source*, Environmental Research Letters, Volume 15, Number 7, July 6, 2020, <https://iopscience.iop.org/article/10.1088/1748-9326/ab83a8>.

³⁴ American Lung Association *2020 State of the Air Report*.

³⁵ Amol Phadke, et al., *Plummeting Costs and Dramatic Improvements in Batteries Can Accelerate Our Clean Transportation Future*.

³⁶ "Combustion Pollutants in Your Home—Guidelines," California Air Resources Board, <https://ww2.arb.ca.gov/resources/documents/combustion-pollutants-your-home-guidelines>, accessed April 5, 2022.

³⁷ Dr. Yifang Zhu, R. Connolly, Dr. Y. Lin, T. Mathews, Z. Wang, *Effects of Residential Gas Appliances on Indoor and Outdoor Air Quality and Public Health in California*, UCLA Fielding School of Public Health, Department of Environmental Health Sciences, April 2020, <https://ucla.app.box.com/s/xyzt8jclixnetiv0269qe704wu0ihif7>.

³⁸ Amol Phadke, et al., *Plummeting Costs and Dramatic Improvements in Batteries Can Accelerate Our Clean Transportation Future*.

investments will make the grid stronger and more reliable and resilient.³⁹ Increased electricity demand from electrification will spread grid upgrade expenses over a much larger sales volume, lowering the cost per unit of electricity and benefitting 100 percent of U.S. residents that use electricity.⁴⁰ Combined with demand response and distributed energy resources, all-electric buildings provide unique load flexibility and other benefits, including integrating more renewable energy and expanded electric vehicle charging. For example, electric appliances can be programmed to respond to grid conditions and price signals, and if set up to do so, can provide valuable grid services and demand response when called upon by utilities. New smart grid funding from the bipartisan Infrastructure Investment and Jobs Act (IIJA) will support continued deployment of these functions and capabilities at scale.⁴¹ All-electric equipment can also be supported with distributed or community solar and battery storage to increase resilience when the grid goes down. No such back-up technologies exist for oil and gas equipment—which are also subject to grid outages. For example, you cannot pump gasoline or use most modern gas furnaces without electricity.

Despite their advantages, all-electric technologies are nascent relative to their fossil fuel-powered counterparts, and they stand to benefit from strong policies to jumpstart the market. Government policies, strong standards, and regulations can enable mainstream adoption, allowing more consumers to benefit from these technologies. Rigorous performance and efficiency standards are the foundation upon which policies should be built, reducing consumer costs, leveling the playing field for businesses, and amplifying the impact of other policies. For example, the U.S. Department of Energy and U.S. Environmental Protection Agency's work updating energy conservation standards for space- and water-heating equipment can save U.S. consumers and businesses more than \$100 billion on energy bills through 2050 while reducing cumulative CO₂ emissions by more than 500 million metric tons.⁴² Similarly, EPA's recent update to tailpipe emissions standards will reduce GHG emissions 3.1 billion tons by 2050, representing 50 percent greater emission reductions than their less stringent proposed standards, and will unlock \$190 billion in net benefits, including reduced climate change impacts, improved public health from lower pollution, and cost savings for vehicle owners.⁴³

But, more is needed.

We need practical and equitable incentives to help reduce upfront cost of electric technologies and send market signals. One of the biggest barriers to uptake is the slightly higher incremental cost of all-electric appliances and equipment. The International Council on Clean Transportation projects that electric vehicles will reach upfront price parity with gas vehicles within the next two to three years for shorter-range vehicles and within four to six years for longer-range vehicles.⁴⁴ Until that transpires, government leadership can help bridge this gap and get more consumers in price-stable electric vehicles.

Congress' passage of the incentives for new and used electric vehicles⁴⁵ and electric equipment for buildings⁴⁶ at the end of last year was an important first step in addressing this barrier. Ideally, such incentives would be integrated into any fu-

³⁹ Katherine Hamilton remarks for the Federal Energy Regulatory Commission Technical Conference on Electrification and the Grid of the Future, Docket No. AD21-12-000, April 29, 2021, <https://www.ferc.gov/media/panel-1-katherine-hamilton-world-economic-forum>.

⁴⁰ Baldwin, et al., *Assessing the Viability of Hydrogen Proposals*.

⁴¹ Ellie Long, "Here's How the Infrastructure Bill Improves the Grid," Alliance to Save Energy, November 22, 2021, <https://www.ase.org/blog/heres-how-infrastructure-bill-improves-grid>.

⁴² ASAP analysis based on Mauer, J. and A. deLaski, "A Powerful Priority: How Appliance Standards Can Help Meet U.S. Climate Goals and Save Consumers Money." 2020. Available at https://appliance-standards.org/sites/default/files/Powerful_Priority_Report.pdf. Products evaluated included residential and commercial gas-fired furnaces, boilers, and water heaters.

⁴³ "EPA Finalizes Greenhouse Gas Standards for Passenger Vehicles, Paving Way for A Zero-Emissions Future," US Environmental Protection Agency, December 20, 2021, <https://www.epa.gov/newsreleases/epa-finalizes-greenhouse-gas-standards-passenger-vehicles-paving-way-zero-emissions>; and "Final Rule to Revise Existing National GHG Emissions Standards for Passenger Cars and Light Trucks Through Model year 2026," US Environmental Protection Agency, <https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-revise-existing-national-ghg-emissions>.

⁴⁴ Nic Lutsey and Michael Nicholas, *Working Paper: Update On Electric Vehicle Costs in the United States Through 2030*, The International Council on Clean Transportation, April 2, 2019, <https://theicct.org/publication/update-on-electric-vehicle-costs-in-the-united-states-through-2030/>.

⁴⁵ *Electric Vehicle Incentives in the Build Back Better Act*, Energy Innovation, November 2021, <https://energyinnovation.org/wp-content/uploads/2021/11/Electric-Vehicle-Incentives-in-the-Build-Back-Better-Act.pdf>.

⁴⁶ Baldwin, *Making Buildings Better*.

ture policies under consideration by Congress and the Senate.⁴⁷ Any future policies should include provisions that ensure equity, expand access, and meaningfully address environmental justice. For example, including incentives for used electric vehicles would help the millions of U.S. residents that choose not to buy or cannot afford a new vehicle. Appropriate income caps, capping the vehicle value, and limiting the incentive based on the vehicle price will ensure the electric vehicles tax incentive is available to as many people as possible, while excluding high-income individuals and households that are far less likely to need an incentive to motivate their purchase decisions. Higher incentives for electric equipment located in multi-family housing and for frontline and underserved communities are other examples of common-sense policy provisions that merit future consideration to ensure an equitable transition.

Ensuring seamless adoption of electric technologies needs sufficient support for the infrastructure and workforce supporting them. The IIJA was a good start, allocating \$7.5 billion to help build-out a national electric vehicle charging network to reduce range anxiety and ensure equitable access to charging for people in rural and urban communities.

Although I've not touched on it in detail today, more support is needed for industrial electrification. Direct GHG emissions from the U.S. industrial sector make up roughly a quarter of the nation's total, yet very few policies and programs are focused on this sector. Industrial operations are an untapped opportunity to provide greater price stability for Made in America commodities by shifting more industrial processes to run on electricity. Lawrence Berkeley National Lab research shows industrial electrification could reduce fuel price risks and improve product quality in some industrial processes, noting that many essential industrial electrification technologies exist, but the diversity of processes and high levels of process integration make solutions more complex.⁴⁸ More funding is needed for research, development, and demonstration of electrification of low- to medium-heat industrial process heating and new programs to help address the economic and regulatory challenges to industrial electrification. Two existing tools that can and should be leveraged for this purpose are DOE's ARPA-E⁴⁹ program and the America COMPETES Act.⁵⁰

More support for domestic manufacturing of electric appliances and domestic production of the key minerals and raw materials needed for electric vehicles, batteries, electric appliances, and other clean technologies will improve America's competitiveness and insulate our economy from supply chain disruptions, as we electrify more end uses. Immediate steps to increase domestic supply chain of electric technologies through incentives for domestic manufacturing and domestic production of essential minerals and raw materials will ensure those jobs are created here and not outsourced. President Biden's recent invocation of the Defense Production Act for critical minerals is an important first step in this direction.⁵¹

Policies should consider workforce development opportunities and challenges inherent to technological changes. Electrification can create millions of jobs, but workers will need access to training, professional development, and in some cases incentives to help them retool or make necessary upgrades. The IIJA, for example, provides dedicated funding for workforce training in the power, buildings, and industrial sectors. As more policies are considered, they should continue to account for the workforce transition already underway.

In conclusion, the urgency of our climate crisis combined with the inherent volatility of fossil fuels requires that we work quickly to scale solutions that replace fossil fuel end-uses and equipment with zero-carbon alternatives. We cannot wait until 2030 or later to start. Electrification is a viable solution that offers a path to reduce our dependence on fossil fuels in the near- and long-term, support the decarbonization of buildings, transportation, and some industry, reduce consumer costs, improve public health, and create jobs. Smart policies will electrify the movement and energize our economy.

Thank you for your time and I look forward to questions and discussion.

⁴⁷A University of California, Davis study documented the efficacy of EV tax incentives for middle- and moderate-income earners, finding federal tax credits are one of the most important incentives for owners of moderately-priced EVs. Source: <https://escholarship.org/uc/item/0x28831g>.

⁴⁸"New study explores prospects and approaches for increased electrification of buildings and industry," Lawrence Berkeley National Lab, April 9, 2018, <https://emp.lbl.gov/news/new-study-explores-prospects-and-approaches>.

⁴⁹"Technologies," ARPA-E, <https://arpa-e.energy.gov/technologies>.

⁵⁰"America Competes Act," Public Law 110-69, Authenticated U.S. Government Information, August 9, 2007, <https://www.congress.gov/110/plaws/publ69/PLAW-110publ69.pdf>.

⁵¹Steven Mufson and Paulina Villegas, "Biden to use Defense Production Act for U.S. critical-minerals supply," The Washington Post, March 31, 2022, <https://www.washingtonpost.com/climate-environment/2022/03/30/critical-minerals-defense-production-act/>.

Ms. CASTOR. Well, thank you to all of our witnesses for your insightful testimony. I will recognize myself for the first 5 minutes for questions.

You know, it really has been a remarkable last decade to watch the American innovation in energy, innovation in appliances, and housing, and materials. And it holds such promise to help our neighbors back home reduce their electric bills and save money; but also, reduce pollution with all the health benefits that brings and help us solve the climate crisis. And that is why I am really proud of the Bipartisan Infrastructure Law that President Biden championed, that has these historic investments in weatherization, which means the ability to add insulation to your homes, more energy efficient appliances, and smart meters, and things like that. It means we are going to update our building codes, and we provided historic resources for electric vehicle charging, and even down to helping public schools become more energy efficient and save taxpayers money overall.

But Ms. Baldwin, you know, you have taken a deep dive, Energy Innovation certainly has done a really comprehensive analysis. There are a lot of naysayers out there that say, Oh, okay, we can't have a reliable grid, we can't have all of these things, we can't save money and reduce pollution, and help solve the climate crisis. What do you say after all of your work and analysis looking at the EE opportunities?

Ms. BALDWIN. Thank you for that question Chair Castor.

What I would say is that, you know, our model informs our work. We really try to identify the solutions that are most cost effective, that simultaneously create co-benefits. As I mentioned, creating a clean grid powered by carbon free electricity, and then electrifying as many end uses as possible shows repeatedly that that is the way to drive down emissions, and we can do so by saving consumers money, but also creating American jobs.

Is it easy? No. We have work to do. I think that is clearly the message for this committee as well as the committee—excuse me, as well as this body. There are ample opportunities to correct market failures with strong policy and leadership. And I think that, as I mentioned in my testimony, the reconciliation package forthcoming that may or not pass—

Ms. CASTOR. Oh, it is coming—

Ms. BALDWIN [continuing]. Is a great opportunity to rectify these market failures, to fill in the gaps that the Infrastructure Act did not address, and really address the American consumer and the businesses here in figuring out ways to benefit them.

Ms. CASTOR. And Mr. Johnson, you are doing a lot of that hard work on the ground. I mean, this is labor intensive to help folks on the ground, small business owners, folks who are just trying to get through the day. Tell me what has been successful? And now with these historic investments just under the Bipartisan Infrastructure Law and hopefully with some of the other tax credits, what is happening out there? And what opportunities do you see? And what else do you need for the Congress to help folks put the insulation in their homes, weatherize their homes, get the energy efficient appliances in?

Mr. JOHNSON. Thanks for the question, Chair Castor. I think it is very insightful that we begin to look at what is going on at the ground level. And as we begin to look at different legislations such as HOPE for HOMES, and the HOPE for HOMES Act and the Zero Energy Home Act, all of these different types of bills that are making resources readily available to empower the contractor, at the ground, the boots on the ground.

Ms. CASTOR. Tell us a story of a contractor. Tell us a personal story—

Mr. JOHNSON. Sure.

Ms. CASTOR [continuing]. Of what you've seen on the ground where you do work.

Mr. JOHNSON. Absolutely. And I think that most importantly what is most transformative to me is when we began to see how these resources directly impact the contractor and their ability to scale their businesses, and create local jobs, and create opportunities for small business development, and expansion of those small businesses. As we began to see the infusion of resources, we have been able to see small businesses empowered to deliver training for their existing staff to be able to scale up, while being able to afford to bring on new employees to be able to expand their business model to deliver on the growing demand of energy efficiency and the other sustainability best practices that are out there. And so, it is really important to see that happening, because that is where the magic really happens. Oftentimes, on the ground where we don't see those lives transform, those businesses expanding, and those communities receiving services that they traditionally have been overlooked. And so, that is empowering for me when you understand the disproportionate nature by which historically those services have not been delivered.

Ms. CASTOR. Thank you very much.

Mr. ARMSTRONG, good morning. You are recognized for 5 minutes.

Mr. ARMSTRONG. Thank you, Madam Chair. It is just interesting to me how different places in the world are, and even in our own country, as there is a lot of communities doing what they can, either rightly or wrongly, to try and wean themselves off of gas, we are trying to get more in North Dakota. And, you know, over the last 10 years, our state has grown about 16 percent, which for a small rural state is a lot, but it doesn't tell the whole story. We have had tremendous growth in the western part of the state, tremendous growth in the eastern part of the state. But our rural ag communities in the center part of our state continue to have an out migration. And the number one thing I hear from every one of those communities, in order to survive in the 21st century, we need water, and we need gas, and we need it for things that are important, not just for North Dakota, but I think for the whole country and the world right now. Trying to get a fertilizer plant put together. We have a soybean crushing facility that will then take its products and put them into a biodiesel refinery, of which we sell almost all of it to the State of California.

And listen, not all problems with this are borne out of the Federal Government. I know it is easy to deal with this, but we have had a tremendous oil boom in western North Dakota and have fought, and fought, and fought, and invested billions and billions

of dollars to get gas infrastructure in place so we can actually deliver that associated gas that we are capturing in the western part of the state to some of our communities. And we need it. And we don't have the other options. I mean, there is not a member on this committee that doesn't support energy efficiency. It is good for the consumer; it is good for the environment. And year over year, producers throughout the system improve a variety of household items to increase efficiency and deliver energy savings to the market. And at-home consumers demand everything from windows, to heating systems, to small appliances, consumers demand these items delivery efficiency at an affordable price and the market provides.

However, I do—and I do get concerned whenever we talk about, and have these conversations about energy efficiency because they often, in this town, tend away from cooperation and move towards mandates, and voluntary programs that allow the market to innovate and the consumer decide just work better, because they work better in North Dakota, compared to Colorado, compared to wherever else, because the on-the-ground demands are just different, depending on where you live.

So Mr. Schryver, the ENERGY STAR program is a well-known guide for consumers looking to choose more energy efficient items for their home. Seeing the blue label on an application is a powerful indicator that guides consumers in a certain direction when purchasing at-home appliances. In your testimony, you mention the cost savings provided by gas appliances. Are those included in the ENERGY STAR program?

Mr. SCHRYVER. Not to the extent that we would like. We believe there should be a greater focus on the cost associated with operating the appliance. And as I mentioned earlier, just tremendous savings associated with natural gas appliances.

The way the program is structured right now, natural gas appliances do not make that top cut of the most elite, most efficient under ENERGY STAR. We, as I said earlier, we do believe that natural gas appliances are the most efficient on a cyber-source basis. They are 92 percent efficient. You don't lose three times that efficiency that you do on electricity. So we would like to see the program revamped to include natural gas appliances in that top tier.

Mr. ARMSTRONG. Well, and would it be fair to say through EPA actions, there are entire communities in states like mine that will not be able to take advantage of the program now because they don't have other options?

Mr. SCHRYVER. We think—studies have shown consumers prefer natural gas. They prefer it for cooking, they prefer it for heating. It is more efficient. It is more affordable, you know. Overall, it is domestically produced. So from APGA's perspective, we are concerned about any Federal action that precludes the ability of a consumer to choose which appliance works best for them. And we have seen standards at the Department of Energy that we believe push people away from natural gas furnaces. That is something we are focused on.

Mr. ARMSTRONG. Can you specifically walk through some of the costs associated with forced electrification and current efforts to increase the efficiency of gas appliances?

Mr. SCHRYVER. Sure. If you have forced electrification, you are going to have costs associated with switching your appliances out, you are going to have costs associated with upgrading your electric panel, you are going to have costs associated with upgrading generation and transmission. All those costs can be passed on to consumers and they are significant.

Mr. ARMSTRONG. But it is not just efforts to ban or discourage the use of appliances in the home. In your testimony, you mention efforts at the local level to cut off supply, including through bans in natural gas hookups.

What policy proposals at the Federal level may have a similar effect?

Mr. SCHRYVER. We haven't seen anything at the Federal level, just at the local level, as you stated. We have seen communities ban new natural gas hookups, which more or less creates a death spiral for that local gas utility.

At the Federal level, in the past we have seen appliance standards that push people away from natural gas, such as the furnace standard that requires a condensing furnace.

Mr. ARMSTRONG. Thank you.

I yield back.

Ms. CASTOR. Next up, Rep. Brownley.

I see you virtually. Welcome. You are recognized for 5 minutes.

Ms. BROWNLEY. Thank you, Madam Chair, and thank you for holding this hearing.

I wanted to talk about a bill that I introduced a while ago. It is a bill around energy efficient appliances for both consumer products and industrial equipment.

The bill allows states to set stricter standards than the national standard when the DOE misses statutory deadlines for issuing new or revised standards. It expands the pool of products that DOE may issue standards. It reduces the lead time for when standards must come into effect, generally to a maximum of 3 years. And it gives explicit authority to DOE that it can evaluate more than one efficiency metric when measuring products' performances.

So we know that products not covered by the Federal standard have the potential to save Americans a substantial amount of energy, and there are so many products that are not under the Federal law that states are providing. They can provide their own efficiency standards if it is not covered by Federal law. And there are quite a few and the states seem to be doing a better job, in my opinion, than the Federal Government does.

So, Ms. Glover, can you kind of speak to, if we had better Federal standards, higher standards, continuing standards that continue to update with new technologies, et cetera, what difference is that going to make for both consumers and for our climate?

Ms. GLOVER. Congresswoman, I want to first apologize, because I am not as familiar with your proposed bill. So I am going to try my best to answer your question, but I am not familiar with your bill and I want people to put that on the record.

I think improved standards can always help consumers. But I think we also want to ensure that we have the right standards in place so that consumers can make the choices that are best for them. And I think in doing that, in giving people the kind of infor-

mation that they need to make those choices, we can resolve lots of problems.

My hesitancy is always that we have many problems that we are trying to solve at the same time. We are trying to address climate, we are trying to address affordability, and we are trying to address security. And so we want to make sure that creating a standard that solves one problem doesn't make another problem worse. And so that would be my only hesitancy.

I also, though, believe that consumers are really the ones who should have the say, and that, as we talk about equity, we should be thinking and allowing communities to really speak on their own behalf for what they believe is right for themselves and how this transition should work for them.

Because in the end, I think that is, one, how we are going to have some sustainable change that is going to be successful and not have a flip-flop because we are trying to enact some things that consumers aren't aligned with and do not support.

Ms. BROWNLEY. So then do you think that it is better not to have Federal standards and to have community standards, state standards, that are more consistent with what the consumer—

Ms. GLOVER. No, I don't want to say that. No. So let me correct myself. I am actually not saying that we should not have Federal standards.

Ms. BROWNLEY. Okay. And do you believe that the Federal standards are not comprehensive enough?

Ms. GLOVER. I honestly, Congresswoman, do not know that I would have enough information to say that they aren't or they are. I just don't know enough.

Ms. BROWNLEY. Okay.

Is there anybody else on the panel that might respond?

Ms. BALDWIN. I would be happy to jump in, Congresswoman, with one comment, which is there is absolutely room for improvement with respect to appliance standards. We are lagging relative to the rest of the world.

And in particular, with respect to all-electric appliances, I think that there is much more that can be done to bring more of them into the market and make them both more cost competitive upfront, but also get the models and the products into circulation. We are not seeing enough in circulation. So more should be done and can be done.

Ms. BROWNLEY. Thank you.

Madam Chair, I yield back.

Ms. CASTOR. Next, Rep. Palmer, you are recognized for 5 minutes.

Mr. PALMER. I thank the Chairman.

I thank the witnesses for being here.

Mr. Johnson, there is a township in Pennsylvania, Pembroke Township, about 2,100 people, 85 percent or so are African American. They have been heating their homes with wood, with propane, which is fairly expensive. They haven't had natural gas. Jesse Jackson, Al Sharpton, Marc Morial, major civil rights leaders, have all been involved in trying to get a natural gas pipeline in Pembroke Township.

Do you support their efforts to do that?

Mr. JOHNSON. I want to thank you for the question. I think that is a very—

Mr. PALMER. Yes or no? Just, I mean, do you support their efforts to get a natural gas pipeline so that these people can have low cost—it is not as low cost as it used to be with the Biden administration policies—but low cost, reliable fuel for heating their homes in the wintertime? It is a yes or no.

Mr. JOHNSON. I think it is a bit more than a yes or no. I mean, I think—

Mr. PALMER. No, it is yes or no. You either support it or you don't.

Mr. JOHNSON. I think it is a bit more than yes or no.

Mr. PALMER. I think your answer is no. And I think you are trying to filibuster the answer.

Mr. JOHNSON. No, I wouldn't say it is no. My answer is not no. You asked me if I support their efforts. When you say their efforts, I think their efforts are much broader than just saying whether I support it on the premises of them getting natural gas.

Mr. PALMER. No, sir, I am not going to let you filibuster the answer. You either support getting this impoverished community natural gas, which not only provides them with a means of heating their homes, but also gives them the opportunity to grow the local economy and create jobs.

And I don't understand why those of you on the other side of the aisle just cannot say yes or no to a simple question. It is because you don't support it.

Mr. Schryver, I have talked a lot about energy poverty, energy injustice, economic injustice. I grew up dirt poor. We heated our house with a coal heater. We cooled it with a box fan in a window. So I kind of get this a little bit.

I just want to hear from you what benefit it has been to American families, particularly low-income families, for the revolution in natural gas. I will give you some stats and you can comment on it.

Over the last decade natural gas prices have saved consumers \$1.1 trillion. Electricity customers' costs have gone down by \$203 billion. And Ms. Baldwin might be interested in this, it saved 11,000 winter deaths.

Would you like to comment on that?

Mr. SCHRYVER. Thank you for the question.

I agree with you, homes powered by, fueled by natural gas save consumers money. And when you are talking about low-income homes, that is especially important because that is less of their percentage that is going to pay their utility bill.

Natural gas is fueling an industrial surge in states like Georgia. It is, as I mentioned, it is cheaper than electricity. It is more reliable than electricity. It is domestic. It is abundant. It is resilient.

For all those reasons, we think consumers benefit from having natural gas appliances in their home.

Mr. PALMER. Well, at the very beginning of the Biden administration they began terminating leases on Federal lands. We know the other things they have done that have caused prices to go up. We were below \$3 per million cubic feet of natural gas, now we are up around, what, \$6 or \$7?

And that is coming right straight out of the pockets of hard-working Americans that right now are struggling to pay their energy bills, struggling to pay their food bills.

The U.S. Census Bureau reported that a fourth of all U.S. households cut back on what they spend on food and medicine because of higher utility costs.

In Great Britain, Ms. Baldwin, you might be interested to know this, that in the winter of 2016–2017, because of the tremendous increase in utility, household utility bills, there were 17,000 excess winter deaths directly attributed to energy poverty. I fear that is where we are heading in this country.

And, Mr. Schryver, would you like to comment on that?

Mr. SCHRYVER. Sure. From APGA's perspective, our members are fighting hard to preserve the ability of consumers to choose natural gas. As I said, those who want to have natural gas in their homes should be allowed to have it, whether it is for cooking, water heating, cooktop, heating their home. We believe consumers want natural gas and should have that choice.

Mr. PALMER. For the record, let it be known that my Republican colleagues and I support lower household energy costs for all Americans.

I yield back.

Ms. CASTOR. Rep. Bonamici, you are recognized for 5 minutes.

Ms. BONAMICI. Thank you, Chair Castor.

And thank you to all of our witnesses.

We all know that investing in energy efficiency lowers household and business energy costs, reduces emissions, and mitigates the effect of climate change, including on respiratory health.

In my state, we have Energy Trust of Oregon. It is an independent, nonprofit organization that partners with our local utilities to help consumers, their customers, benefit from energy efficient use and also renewable energy generation.

In 2021, their efforts kept a total of 162,000 metric tons of carbon dioxide out of the atmosphere. That is the equivalent of removing 38,000 cars from Oregon roads for a year. So they really do show that energy efficiency works.

Mr. Schryver, I want to thank you, first of all, for acknowledging the need to transition to clean energy. Thank you for that acknowledgment. But I note in your testimony you talked about the cost of electrifying common household appliances, and you said it would cost more than \$258 billion.

I want to point out that that finding does not accurately depict the actual costs and benefits of electrifying household appliances. It only accounts for the upfront costs and not the lower energy use and long-term savings that come from electrification.

And second, it ignores the reality that thousands of customers every year actually replace aging appliances. So it is sort of analogous to discussing the cost of transitioning to clean energy without considering the cost of inaction or the benefits of transitioning.

And I wanted to ask Ms. Baldwin—I have a two-part question—why do the long-term cost savings associated with household electrification outweigh the upfront costs?

And second, how can we help appliance-buying consumers—and this is following up on your answer to Representative Brownley—

how can we help appliance-buying customers make choices that will save them money and keep the air they breathe cleaner?

Ms. BALDWIN. Thank you so much for that question, Congresswoman.

As I stated in my testimony, energy efficient appliances, and all-electric appliances in particular, hold an efficiency advantage over their fossil fuel counterparts, which means that for each unit that goes in to provide heat or heat water or to cook, you get two to four times more out of that unit of heat. And that is effectively why there are substantial energy savings over the long-term.

In addition, electricity, as I mentioned, is a price-stable commodity. We have a diverse source of resources that we draw on to provide electricity. And that diversity effectively creates a hedge against spikes in prices, as well as volatility resulting from reliance on international markets. Oil and gas are—oil especially, but increasingly natural gas—are global commodities, and as such, they are subject to that volatility.

To your second question, helping consumers get access to more efficient appliances and all-electric appliances is paramount to success in this electrification effort.

I know that in Utah I cannot easily access an all-electric heat pump without perhaps getting talked out of it by the contractors that I call, who want to sell me a gas furnace. I also know that I can't get an incentive from my utility because fuel switching is prohibited by law.

I know that there are a lot of people out there who want to do the right thing. They want to purchase an all-electric, efficient heat pump, or an EV, or other appliances, and they find upfront costs to be the barrier.

So policies that do two things: reduce the upfront cost, make it a level playing field, increase the availability of those appliances in the market, sending the right signals to manufacturers and contractors alike, and also ensuring that they have access to equitable financing.

Ms. BONAMICI. Thank you.

Mr. Johnson, thank you for your testimony.

We know that, as you mentioned and Ms. Glover mentioned, energy efficiency is also a boon for jobs. There were 2.1 million jobs in the energy efficiency space in 2020, more than any other sector within the energy industry.

But job growth is potential and significant, but only 25 percent of the energy efficiency workforce is female, and Black and Latino workers are underrepresented.

So, Mr. Johnson, what steps can Federal lawmakers take to increase diversity in the energy efficiency workforce?

Mr. JOHNSON. Thank you for that question.

One of the things I think is very critical in terms of increasing diversity is ensuring that there is access, local access, to training opportunities, and making sure that those training opportunities are diversified so that there is more than one path to get you to certification and get you into an industry that is growing at the rate that the energy efficiency industry is growing.

I think that when we began to see more diversity within the ranks of workforce and small business development, we began to

see broader adoption of those services and technologies in under-represented communities as well.

Ms. BONAMICI. I appreciate that. And as a member of the Education and Labor Committee, we just marked up the Workforce Innovation and Opportunity Act the other day that is heading to the floor that will do just that, to help people get into the path to a good job and also diversify and make those opportunities available to more.

My time has expired. Thank you, Madam Chair. I yield back.

Ms. CASTOR. Thank you.

Mr. Carter, you are recognized for 5 minutes.

Mr. CARTER. Thank you, Madam Chair.

And thank all of you for being here. This is a very important hearing.

But I have to admit that it is somewhat ironic that here we have a hearing on how to promote energy security and cut energy bills at a time when we have a lack of energy security and we have record high energy prices directly as a result of the policy of this administration, of the Biden administration. That is just some irony that I find here.

Mr. Schryver, I am very glad that we have got you here today. I appreciate you being here. You are with the American Public Gas Association.

And gas is extremely important. It gives us reliable energy to power our economy. And we really need natural gas well into the future.

I want to share a story with you. I am a member of the Conservative Climate Caucus, and about a month ago we were over in Europe, in Brussels, and then we went up to Sweden. And we had an opportunity to meet with the leaders over there about what they are trying to do with renewables.

The unfortunate thing that we found there is that the innovation is not keeping up with the public policy there. They have already set in place the process of closing down nuclear plants, and some of them are already closed. And yet they can't provide for their energy needs with the renewables at this point.

Now, hopefully, they will in the future, and I hope we will here in this country in the future. But we can't right now.

And we look at natural gas, and before the Russian invasion of Ukraine what we saw was Nord Stream 2, where they were going to be getting natural gas from Russia to Germany and all throughout Europe. And yet that is dirtier natural gas than what we have here in America. We have some of the cleanest natural gas and we have an abundance of it.

And I would share another story with you, and that is in my district we have had an LNG plant that has converted from an import plant to an export plant at Elba Island, in Chatham County, in Savannah. And that is the kind of progress that we need to have and the direction that we need to be moving, and I am very convinced of that.

You know, when we talk about gas and natural gas, the direct use of natural gas in homes is 97 percent efficient and it is almost universally cheaper than electricity. And that is significant again. And in Georgia, we have experienced that.

I know in some areas of this country, such as San Francisco, Seattle, and New York, that they have actually stopped using natural gas and prohibited from using it.

We have done just the opposite in Georgia. In fact, we have had the State of Georgia and our legislature actually prohibited local governments from banning natural gas or any other type of energy. And I think that is the right move and I am very proud.

And it is because of our use of natural gas in the State of Georgia that we have been able for, I believe it is 7 years in a row now, been the most business-friendly state in the nation, and it is because we have low energy costs, because we utilize natural gas.

Let me ask you, Mr. Schryver, as I just mentioned, gas is very important to the State of Georgia. How is the push for electrification impacting your members in my state?

Mr. SCHRYVER. Thank you for the question.

Gas is very important in the State of Georgia. As I mentioned earlier, it is fueling an industrial growth that you just talked about, which is great for the state. Municipal Gas Authority of Georgia is one of our members and they are very involved in that effort.

When you talk about electrification, one thing to keep in mind is right now natural gas is actually the largest source of electricity generation. It is 40 percent. Renewables are about 20 percent.

And certainly renewables are going to grow, and they should grow. But at the end of day, when the wind is not blowing and the sun is not shining, that generation is going to be backed up by natural gas generation.

So our view is, isn't it a lot more efficient to use that natural gas directly, as we talked about? It is over 90 percent efficient from the time you take it out of the ground and get it to the burner tip. You are only losing 10 percent of that efficiency.

With electricity you are losing two-thirds of that efficiency when you take the natural gas out of the ground, get it to the generation plant, get it over the transmission line, the distribution line, and to the electric appliance. You are losing two-thirds of that efficiency.

Our view is it is just more efficient to use it directly.

Mr. CARTER. I am almost out of time, Mr. Schryver, but I would be remiss if I did not mention, and it will probably come as a surprise to my fellow members and my colleagues here on the committee, but Georgia, being the number one forestry state in the country, not only did we use natural gas, but those forests serve as a carbon sink.

So if you look at the full cycle, then you see that we are carbon neutral when we are using natural gas.

And with that new information that I have submitted to this committee, I yield back.

Ms. CASTOR. Rep. Neguse, you are up now. You are recognized for 5 minutes.

Mr. NEGUSE. Thank you, Madam Chair.

Colorado's forests take great umbrage at the championing of the Georgia forests by my friend from Georgia.

I will say, Mr. Schryver, I appreciated your comment about renewables. I think you said renewables will go up and should go up.

And I am not sure if my colleagues on the other side of the aisle would agree with that sentiment, but I appreciate nonetheless you acknowledging that.

I also will say that I am grateful that some of my colleagues on the other side of the aisle have seen the light with respect to energy efficiency and the importance of promoting and advancing energy efficiency.

I wish they would have translated that newfound passion for energy efficiency into legislative action, because of course they have had multiple opportunities over the course of the last year and a half to show in practice what energy efficiency means.

The Bipartisan Infrastructure law, just by way of example, as I am sure each of our witnesses are aware of, included significant investments in energy efficiency. Unfortunately, I believe none of my colleagues—with the exception of one of my colleagues—on the other side of the dais voted for that bill.

But, nonetheless, we hope there will be more opportunities, as one of our witnesses mentioned, through perhaps a reconciliation bill this summer, and we will see where the chips fall.

I thought, Mr. Johnson, your written testimony was very powerful. And there is a quote here I will just read from it.

“A 2018 report from the ACEEE found that energy efficiency alone can cut energy use in greenhouse gas emissions in half by 2050.” Just energy efficiency alone. That is remarkable. And I would think that could serve as a clarion call for us to take energy efficiency seriously and to lean in and double down on the investments that would get us there.

Now, Mr. Schryver, I want to follow up on a question that my colleague from Oregon articulated during her presentation, and that was around some of the costs of what you describe as forced electrification. And I guess I just want to dig in this a little bit.

So you talk about, you say the nationwide cost to consumers if we forced natural gas households to switch to electric appliances would come in at more than \$258 billion in your written testimony.

You are saying if every, all 60 million Americans that have natural gas appliances, dryers, furnaces, water heaters, et cetera, if they were all compelled to switch to electric devices today, that is the cost, in your view.

But of course, as you well know, the life span of a dryer is 10, 15 years, right? Furnace, you tell me, 15, 20 years, maybe with the right repairs may go 25. So these appliances are being replaced every day in America. And this cost I don't think is a true reflection in that sense. You would agree?

Mr. SCHRYVER. We think the costs of forced electrification are significant. Appliances will be switched. The transmission system will have to be upgraded. Generation will have to be increased.

And as I mentioned earlier, the whole premise behind forced electrification is to move to a more renewable grid. But at the end of the day, again, when the wind is not blowing and the sun is not shining, that generation [inaudible] be backed up by natural gas.

Mr. NEGUSE. I hear that you say they are significant. I am just saying this number, I think you and I both can agree, nobody is saying that tomorrow every single appliance in the United States

of America would be replaced. So I don't think this is a fair characterization of the cost.

I hear what you are saying about your argument regarding the costs being significant. And so over a 10-year period or a 15-year period perhaps you could talk about sort of how much it would cost over that time frame.

But, in any event, I mean, let's say we will go with your number, let's say \$250 billion over a 10-year period. Do you know how much the Tax Code subsidizes crude oil and natural gas today?

Mr. SCHRYVER. I think most energy forms enjoy subsidies of some form or another.

Mr. NEGUSE. Sure. I am asking you about natural gas subsidies.

Mr. SCHRYVER. Most of the natural gas—oh, on the production side, you know, our members aren't producers.

Mr. NEGUSE. Understood.

Mr. SCHRYVER. So I can't speak to those.

Mr. NEGUSE. Understood. It is part of the supply chain. I am sure you know that by some estimates, conservative estimates, they range between \$18 billion to \$20 billion a year, 80 percent of which would go towards natural gas and crude oil. You could further allocate that number, but call it \$10 billion, call it \$11 billion a year, over the course of 100 years—excuse me, 10 years—\$100 billion dollars that we are spending to subsidize natural gas here in the United States.

I think that is an important part of the equation when you consider the upfront costs that you have described regarding the electrification of appliances in the United States, and I think that is important to keep in mind.

But with that, I see my time has expired. I would yield back to the Chair.

Ms. CASTOR. Thank you.

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

Mr. GRAVES. All right. Thank you.

I appreciate y'all's testimony.

Ms. Glover, I really appreciated your comments. I just thought that they were largely grounded and rational and thinking about solutions.

One of the things I mentioned in my opening statement that I just struggle with—and looking at Vladimir Putin, for example. Again, the guy has no respect for human rights. He doesn't care about the environment. He doesn't care about anything. All he cares about is his own ego.

The United States has led the world in reducing emissions. And, yes, energy efficiency efforts that you promote, it is a part of that. It is a part of reducing emissions.

How does the United States move forward with some of these actors, like Russia and China and others, who just don't care? And like I said before, for every 1 ton of emissions we have reduced, China has increased by 4.

And so how do we handle sort of the international aspect? Because we can't change the climate just in the United States. Whatever happens is going to happen globally.

And so what is your thought on how we address this international issue when you have countries like that that just don't care?

Ms. GLOVER. That is likely the million-dollar question, Congressman.

Mr. GRAVES. Or gazillion.

Ms. GLOVER. Okay, Gazillion-dollar question.

I don't know how you would change someone's mind. But I think that the United States can demonstrate some real leadership in efficiency—

Mr. GRAVES. Sure.

Ms. GLOVER [continuing]. By doubling down and making the kind of commitment so that every community, every small-business owner has not only access to efficiency measures, but also has the ability to adopt them.

And that ability to adopt them I think is even more important in some way. That ties to this idea of affordability. And through that demonstration of that leadership, what you would hope is that other economies would follow suit. And that may be the best that we can do.

But in terms of your specific question of how do we influence a Vladimir Putin, how do we influence a Xi Jinping. I don't know. I mean, that would be my honest answer. But I don't think that that should prevent us from doing what we can do in terms of efficiency here.

Mr. GRAVES. And one of the things that I like, I think, largely about your testimony, I am not sure if I am putting words in your mouth, but I think that you largely kind of reflect this model of aligning incentives.

And what I mean by that is that, look, it is an incentive. If I just own a house, it is an incentive for me to be more energy efficient because I have a lower heating and cooling bill, a lower electricity bill. Incentives are aligned. And it makes sense there.

But in many cases we are watching things that are being done where we are just spending unbelievable amounts of money and we are not seeing a requisite return on investment. We are spending money on things that are not providing a return on investment for U.S. taxpayers and it is concerning for me.

But I just want to tell you that I appreciate your testimony and your perspective on this.

Mr. JOHNSON, you seem to express a lot of comments and concern about affordability, which, again, we represent south Louisiana, we have some of the highest poverty rates in America, and this is a big deal for our constituents.

But you also seem to advocate a lot of policies that have been pushed by states like California, by European nations, where you have significantly higher energy costs there than we do in my home state.

And so, I am just curious if you can help me reconcile that. So if you are pushing things that actually cause higher electricity bills and pushes people into energy poverty, how does that line up with your objective of ensuring the affordability of energy?

Mr. JOHNSON. It is a good question. I think that one of the things that we have to be very clear on in understanding this larger issue

of equity and energy efficiency and affordability is that there are different needs based upon the areas that you are in.

And, ultimately, when you are trying to address the needs of communities that have been traditionally left behind, it is going to require investments larger upfront to get many of those communities on pace.

So initially, yes, you will see a larger investment, but what we have to also focus on is: What is the economy of scale over time? What is the payback on that investment?

And so, if we are looking at it strictly from upfront costs, then, yes, it is very easy to make that argument. But what is our rate of return on the back side? Are we making sure that communities are advancing? Are we making sure that employment rates are increasing? Are we making sure that workforce development opportunities are becoming more diversified? To be able to lift those things, it costs.

Mr. GRAVES. Thank you.

I am running out of time here. But, Mr. Schryver, I just want to make note, up in New England we watched where they prohibited the connection of natural gas pipelines into homes and others. And we saw them have to get natural gas from Vladimir Putin to bring into New England to actually supply those homes.

And I am out of time, but perhaps I will submit a question for the record for you to share a little bit more information on that. Yield back.

Ms. CASTOR. Rep. Casten, you are recognized for 5 minutes.

Mr. CASTEN. Thank you, Madam Chair.

And thank you so much for our speakers. I have a deep and long-standing love affair with energy efficiency, and I appreciate you all being here to support it. I think by most measures it is the single largest source of new energy in our system over the last couple decades, and certainly the biggest opportunity going forward.

I also think that there has been some confusion in this hearing. This is the climate committee, sometimes I feel like we need to remind ourselves of that, and energy efficiency, per se, is not the jurisdiction of this committee. It is a question of, are we reducing the greenhouse gas emissions per unit of useful energy in our homes?

Mr. Palmer and I are in violent agreement. I do not want to go back to the coal burner in his house. Not just—even if it was a really efficient coal burner, I wouldn't want that in your home for all the pollution reasons, and we are supportive of that transition.

However, by the same logic, if you have a solar panel on your roof that is only converting sunlight into electricity at 9 percent, and you are using that to keep your stove heated, I would rather you have that than a 33 percent electric grid converting natural gas because it is fewer greenhouse gas emissions and it is less money for consumers.

Mr. Johnson, number one, welcome from Chicago and representing us well. It is great to see you here.

You have been, I think, a very effective and loud advocate to make sure that all of our communities have access to cheaper and cleaner energy.

And as I am sure you are aware, it is a fairly common practice for a lot of municipal utilities, who in theory should support a local-

ity's freedom to choose, to actually prevent you from having access to all those choices. There are 21 states, I believe, that have legislation now in place that prevents municipalities from putting any limitations on the use of fossil gas and new construction.

So I think you will agree. But just for the record, do you agree that it should be up to local communities to decide what is best for the people they represent?

Mr. JOHNSON. Absolutely. I think that there should be, in looking through the lenses of procedural justice, I think that we should be able to have a voice and be influential of what we are doing at the local level that best services that local community.

Mr. CASTEN. Thank you. I am glad you agree.

Mr. Schryver, a couple just quick yes or noes.

Do I understand right, APGA is funded primarily by the membership dues from municipalities?

Mr. SCHRYVER. By community-owned utilities. They are not just cities, but —

Mr. CASTEN. No, I understand. But most of your revenue comes from the funding from municipalities and your memberships in municipalities?

Mr. SCHRYVER. That is correct.

Mr. CASTEN. Yes, okay. So then most of your members are overseen or managed by the democratically elected municipal government. Yes or no?

Mr. SCHRYVER. The vast majority are regulated by a locally elected or appointed utility board or city council.

Mr. CASTEN. Okay. So your industry has referred to your opposition to greenhouse gas emissions reduction as energy choice legislation. But doesn't that legislation prevent democratically elected municipal officials from actually setting the kinds of local energy policy and code ordinances for their community that Mr. Johnson would like to see to make his job better?

Mr. SCHRYVER. You are talking about the 20 states that have enacted energy choice legislation?

Mr. CASTEN. I am talking about the policies that you have been advocating for to prevent municipalities, democratically elected municipalities, from doing their job.

Mr. SCHRYVER. Sure. And just for the record—

Mr. CASTEN. Thank you for the yes, because I would like to submit—

Mr. SCHRYVER. Actually, it is not a yes.

We believe natural gas is in the best interest of consumers and they should have the right to choose. Natural gas, solar, these bills don't restrict just natural gas, they leave open any fuel choice.

Mr. CASTEN. Well, look, I want to come back to that.

Madam Chair, I would like to submit for the record an APGA board book that is listing energy choice legislation, as they call it, which serves as a gas preemption as their number one policy for 2021.

Ms. CASTOR. Without objection.

[The information follows:]

Submission for the Record
Representative Sean Casten
Select Committee on the Climate Crisis
April 7, 2022

ATTACHMENT: American Public Gas Association, 25 January 2021, “2021 Winter APGA Board of Directors Meeting Book.”

The document is retained in committee files and available at:
<https://www.documentcloud.org/documents/20959775-2021-winter-board-book#document/p50/a2093951>

Mr. CASTEN. I want to come back to your last comment there, Mr. Schryver. I completely agree with your point that in a grid that is 33 percent efficient and is fueled by gas the choice between using gas and a 33 percent efficient generator and sending that through a wire uses less gas, emits less greenhouse gas emissions than using that same gas if it is a swap between an electric stove and a gas stove. I take your point.

We are rapidly electrifying our grid—oh, I am sorry, we are rapidly greening up our grid. We cannot look our children in the eye and say that we are doing what we have to do to provide a sustainable planet unless we electrify massive parts of our grid and decarbonize the grid. In big parts of our country, like the Northwest, we are already primarily a renewable grid.

Does your industry advocate, in the name of our children, in the name of our environment, in the name of people’s wallets in those parts of country that have a lower carbon grid, to make sure that people have access to those? Or is it just about selling the gas?

Mr. SCHRYVER. First of all, on the natural gas side, since 1990 we have reduced emissions by approximately 70 percent.

Mr. CASTEN. I am asking a different question. In a grid that does not have—that does not depend on 33 percent efficient fossil fuel plants—and, yes, that is the grid we have had since 1957. It is not the grid we want to give our children. We owe them better.

As we transition, is it still about the gas or is it about giving ourselves a better planet?

Ms. CASTOR. The gentleman’s time has expired.

Mr. CASTEN. I yield back.

Mr. SCHRYVER. It is about—oh, I am sorry.

Ms. CASTOR. Next up, Rep. Crenshaw. I see you virtually. You are recognized for 5 minutes.

Mr. CRENSHAW. Thank you, Madam Chair.

I would say what we owe our children is prosperity and energy reliability. And, as of now, there are only three things that offer that: gas, coal, and nuclear energy.

I yield the remainder of my time to the Representative from Louisiana, Garret Graves.

Mr. GRAVES. Thank you. Thank you, Mr. Crenshaw.

Mr. Schryver, I want to continue the line of questioning before.

So you have a situation where you have people, and Ms. Glover brought this up before, giving consumers choice. But you have governments that are coming in and actually blocking or preventing access to your technology, your gas, in some cases.

So when they didn’t have the access to gas, they brought in home heating oil, which of course has higher emissions, less efficient and

more expensive, and then they had to bring in gas from Vladimir Putin from Russia.

Could you just reflect on the impacts to consumers and the environment and what it does to global security when you have policies like that that are so shortsighted?

Mr. SCHRYVER. When you have a capacity constrained area, like we have seen in Massachusetts, and consumers want natural gas, because it is cleaner, it is more affordable, it is more resilient, and they can't get it, they are heating their homes, because, as you know, Massachusetts has a tough winter, with heating oil or propane, both of which are much more expensive and have a greater environmental footprint than natural gas.

Mr. GRAVES. So, Madam Chair, I would like to ask unanimous consent, an April 5 article from E&E News, "Surging electric bills threaten California climate goals."

Ms. CASTOR. Without objection.

[The information follows:]

**Submission for the Record
Representative Garret Graves
Select Committee on the Climate Crisis
April 7, 2022**

ATTACHMENT: Mulkern, A. C., 5 April 2022, "Surging electric bills threaten Calif. climate goals," *E&E News*.

This article is retrained in committee files and available at:
<https://www.eenews.net/articles/surging-electric-bills-threaten-calif-climate-goals/>

Mr. GRAVES. Thank you.

Another question. Under the Biden administration, they projected that global energy demand is going to go up 50 percent—50 percent—between now and 2050. And that means, yes, more renewables, and it means an increase in every energy source, wind and solar and wave and geothermal—and oil and gas.

Let me say this again: The Biden administration's projections show an increase in demand for all energy sources. In fact, for developing countries, depending on economic scenario, as much as an 80 percent increase in natural gas demand.

So the Biden administration, the first—or one of the first actions they took was an executive order to ban new energy production—to ban new energy production. So you are not cutting off demand, you are just cutting off domestic supply.

So what happens in a scenario like that? And I know you are not an expert on the upstream side, but what happens in a scenario like that?

Mr. SCHRYVER. You know, we have experienced it, last year with Storm Uri. When you have instances where demand increases and supply decreases, consumers are hit with high energy prices.

Mr. GRAVES. So consumers are hit with higher prices because you have a lack of supply to meet demand. But then also you have a scenario where other countries, like, I don't know, Vladimir Putin, comes in and backfills the lack of production in the United States.

It was said a few times today, the U.S. has some of the most efficient, some of the cleanest production in the world. If the Biden administration is even projecting that there is going to be a 50 percent global increase in energy demand, why would we not fill it domestically where we do it safer, we do it cleaner, it creates economic activity here, it doesn't fund bloodshed like we are seeing in Ukraine right now?

Does that make sense to any of you? To any of you, does that makes sense why we wouldn't produce energy here when even this administration is saying there is an increase in demand? And by not doing it, as Mr. Schryver said, it results in higher prices, it results in funding authoritarian regimes?

Look, I am all for energy efficiency, I am, because, like you said, Ms. Glover, the incentives are aligned. If we can pay lower electricity bills and it costs us less money to build widgets in the United States, that is great. It is good for all of us.

But if we are just going to push solar and wind and what other pixie dust technology and we haven't thought through the supply chain and we are going to trade buying energy from Vladimir Putin to saying we are going to get critical minerals and rare earths from China, who then is going to use the money against us as well?

We have got to think through the supply chain strategies here to make sure that we can actually achieve these goals in a way that is consistent with U.S. interest. Does that make sense? Do any of you object to domestic energy production, to meeting the demand?

Madam Chair, let the record reflect no one objects, apparently. Yield back.

Ms. CASTOR. I want to thank all of our witnesses for being very efficient today with their time.

You have given us a lot of good advice on how to lower energy bills for consumers at home. And we hear you loud and clear: Using energy efficiency and all of these innovative tools also helps reduce greenhouse gases that are creating escalating costs for consumers.

And that is the reality we face. And, in fact, the world's top scientists, again, if you haven't dug into their report released just on Monday, say that we must—must—find these clean energy solutions quickly and urgently.

We cannot continue to double down on costly fossil fuels. We need to stand up to the petro despots across the globe and break this addiction to fossil fuels.

And the best way to do that, the most efficient way to do that is through energy efficiency, the energy of the jobs that are created right here in America that are abundant and ready to be deployed—not just lip service to energy efficiency, but actual votes, policy, and resources provided to our neighbors back home.

So with that, thank you all very much. The committee is adjourned.

[Whereupon, at 10:30 a.m., the committee was adjourned.]

**United States House of Representatives
Select Committee on the Climate Crisis**

Hearing on April 7, 2022

**“Cost-Saving Climate Solutions: Investing in Energy Efficiency to Promote
Energy Security and Cut Energy Bills”**

Questions for the Record

Paula Glover

President

Alliance to Save Energy

THE HONORABLE KATHY CASTOR

1. How would the energy efficiency investments in the Bipartisan Infrastructure Law, such as the \$3.5 billion for the Weatherization Assistance Program, funding for energy code adoption, and grants for schools and non-profits help advance energy efficiency across the nation? How would the House-passed climate investments build on that foundation?

The residential and commercial built environment represent approximately 40% of U.S. carbon emissions. Funding through the IIJA to support the Weatherization Assistance Program (WAP), grants for energy efficiency improvements in non-profits and public schools, and similar investment opportunities directly address the need to reduce emissions and respond to climate priorities. That said, additional and substantive investments in energy efficiency are required if we are to meet the urgent need. This includes but is not limited to additional WAP funds, and resources to support WAP readiness.

That said, federal investments proposed in budget reconciliation that are now part of the House-passed legislation are essential if we plan to move the ball forward. Key funding provisions include the energy efficiency tax incentives 25C, 45L, and 179D; Hope for Homes; critical facilities modernization; climate bank provisions, and others. Unfortunately, the critical facilities modernization provision in the House-passed measure is substantially reduced when compared to the Open Back Better legislation (H.R. 1485) on which the provision is based. The House-passed measure would provide \$500 million versus the \$18 billion proposed in H.R. 1485.

2. Could you please describe the role of appliance and equipment standards in furthering energy efficiency, energy cost savings, and reducing carbon pollution? What are some examples?

Appliance and equipment standards play an essential and critical role in reducing carbon emissions, and in fact, appliance standards and labeling alone avoid 343 metric tons of carbon emissions a year. Currently, the administration has a large task with some 100 plus rulemakings not yet completed, which could save consumers billions over the next 3 decades, while also lowering energy costs and carbon emissions.

That said, in addition to establishing clear standards to drive market penetration of high efficiency equipment and appliances, the Alliance recommends that policy makers also respond to concerns related to affordability and access. While we definitively want consumers using the most efficient product types, if they are unable to afford the equipment or retrofit, then the benefits of emission reductions and energy cost savings are avoided. Although high efficiency appliances and equipment repay the consumer over the life of the product, often when affordability is an issue, consumers make their purchase decisions based on exiting daily and monthly living expenses. To help address this issue, policy makers should support additional funding for the Weatherization Assistance Program (WAP), expansion of the energy efficiency tax incentives (25C, 45L, and 179D), and programs like Hope for Homes.

3. What are some additional Federal energy efficiency policies that could help reduce consumer energy bills and help achieve our national climate goals?

Energy efficiency tax incentives are an important tool to drive greater energy efficiency adoption, with specific attention to sections 25C, the tax credit for homeowners making efficiency upgrades; 45L, the credit for single-family and multi-family development; and 179D, the deduction for commercial buildings.

That said, many consumers do not itemize and are otherwise left without an incentive to drive efficiency investments. Hope for Homes, legislation that is part of

the budget reconciliation bill that passed the House is idea for these homeowners, and provides a rebate when achieving identified efficiency levels.

Climate banks can also be effective tools in driving energy efficiency investments for consumers, and budget reconciliation as passed by the House provides \$11.970 billion for climate bank activity and an additional \$8 billion for the rapid deployment of low and zero-emission products, technologies, and services, specifically targeting financial and technical assistance in low-income and disadvantaged communities.

The Alliance would also recommend funding pathways to incentivize energy efficiency investments in small businesses, as provided in HR 4903, the Main Street Efficiency Act. Small businesses often lack the resources to prioritize energy efficiency, however once solutions are deployed, owners are able to identify significant business savings. HR 4903 would provide grants to utilities that operate demand side management programs, and leverage those funds to provide reduced or no cost retrofits for the small business enterprise.

4. In your testimony, you mentioned that energy efficiency investments are essential to improving electric grid reliability as we continue to electrify homes, businesses, and vehicles. Could you please describe in additional detail how energy efficiency investments can complement upgrading and expanding the electric grid? How can energy efficiency help unlock a path towards a cleaner and more reliable grid?

As indicated in written testimony, investments in energy efficiency are essential to the reliability of the electric grid. This is particularly true as policy and markets shift a substantive share of energy demand toward electrification. Based on analysis and depending on the rate of electric vehicle (EV) adoption, we should anticipate significant future growth in grid load.

According to the Brattle Group, if the projected rate of EV growth increases from 1.5 million in 2020 to 10–35 million by 2030, we will need grid investments up to \$125 billion across the electric power sector—and that’s to serve 20 million EVs.¹ These vehicles will add 60–95 terra-watt hours (TWh) of electricity demand to the grid annually, in addition to 10–20 gigawatts (GW) of peak load, which in turn would require 12–18 gigawatts of generation capacity from renewable energy.²

Energy efficiency directly reduces demand on the grid through efficient products and equipment that have lower energy intensity and still perform the same or better as a less efficient equipment or product type. A most common example would be the use of an incandescent light bulb versus an LED. LEDs in general use more that 75% less energy. As grid load decreases through energy efficiency we also increase the ability of the grid to provide power to customers and businesses without interruption. Additionally, “during power interruptions, lower loads due to energy efficiency measures allow more customers to be switched across feeders for faster restoration time.”³

Energy efficiency’s positive impact on grid reliability and its ability to lower load and infrastructure investment costs, also make it possible to integrate more renewable capacity onto the grid faster. Researchers already appreciate the variability of renewable energy and the limited capacity of storage technologies, and see energy efficiency as a necessary compliment to a cleaner grid.⁴

5. In your testimony, you describe “active efficiency.” How could active efficiency opportunities support better resilience to climate impacts like the extreme heat waves in the Pacific Northwest last summer?

Active Efficiency technologies would include solutions such as grid-interactive efficient buildings, smart buildings optimization and analytics, and use of distributed energy technologies that allow building systems to shift, share, and shed load, including direct links to light and heavy vehicles. As Active Efficiency technologies are added into the energy efficiency equation, overloading and wear and tear on the grid are reduced significantly, reducing the likelihood of equipment failure.⁵

6. Could you please describe how innovation in industrial energy efficiency could help save money for businesses while also reducing carbon pollution? Which Federal investments could facilitate greater innovation in industrial energy efficiency?

¹ <https://www.brattle.com/insights-events/publications/electric-power-sector-investments-of-75-125-billion-needed-to-support-projected-20-million-evs-by-2030-according-to-brattle-economists/>.

² *Id.*

³ https://eta-publications.lbl.gov/sites/default/files/ee_reliability_resilience_2021_12_03.pdf.

⁴ <https://aip.scitation.org/doi/10.1063/5.0064570>.

⁵ *Id.*

Industry and manufacturing account for 24% of U.S. GHG emissions.⁶ As a result, any viable strategy to reduce overall emissions must include industry energy efficiency.

When talking about energy efficiency in the industry and manufacturing context, we are targeting the equipment used, operations and process, and the application of smart manufacturing technologies. The end game is to optimize manufacturing and industry systems in a way that achieves the highest efficiency outcomes. In application, this means deployment and utilization of multiple solutions, including but not limited to distributed energy resources, carbon capture, electrification, low-emission fuel technologies, and storage. From an equipment and operations perspective, relevant solutions would include high efficiency motor systems, combined heat and power, strategic energy management, and others.

Federal investments that could be useful in driving energy efficiency include funding to support Industrial Assessment Centers, incorporating First Three⁷— applications of transformative industrial technologies; Flex-Tech⁸—DOE funding for states to create a version of the successful energy saving NY program; and Commercial Deployment of Efficient Technologies⁹—building on the Clean Industrial Technologies Act provisions of the Energy Act of 2020.

7. How could Federal energy efficiency investments promote American energy security? Could increased energy efficiency help reduce demand for globally traded fossil fuels with volatile prices?

Energy efficiency investments reduce energy intensity throughout all sectors of the U.S. economy — including manufacturing, transportation, in agriculture, and the built environment. In fact, but for investments made in energy efficiency since 1980, energy consumption would have been more than 60% higher.¹⁰

As we make investments in energy efficient products, equipment, supplies, and technologies— and as consumers and businesses adopt efficiency solutions, energy consumption is reduced, and generation and production supplies are offset through lowered demand. This is achieved by investments that secure the building envelope, equipment standards, building codes, building design, and establishing policies that prioritize energy efficiency as a primary part of U.S. domestic energy policy. If we are using less energy as a result of energy efficiency, we are also using less supply—reducing the need for larger and larger amounts of energy production.

THE HONORABLE MIKE LEVIN

1. The United States has a long history of developing fuel economy standards. President Ford signed the first standards into law in 1975 in response to the 1973 oil embargo by Arab nations in protest to U.S. support for Israel during the Yom Kippur War. These fuel standards, along with subsequent updates, have cut American oil consumption by 25 percent, or nearly 2 billion barrels a year. Strong fuel economy standards strengthen U.S. energy independence and help reduce reliance on fossil fuels, particularly from foreign nations. Unfortunately, the previous Administration sought to weaken these fuel economy standards and limit the ability of states like California to set their own emissions rules. According to Consumer Reports, each vehicle sold under the Trump rule would have cost its owner on average \$2,100 dollars more due to increased gas costs. Thankfully, the Biden Administration has reversed this decision—last week, the Department of Transportation office released new fuel efficiency standards for vehicles, increasing fuel economy to a fleetwide average for new vehicles of 49 miles per gallon by 2026. As a result, Americans purchasing new vehicles in 2026 will get 33 percent more miles per gallon as compared to 2021 vehicles. This means new car drivers in 2026 will only have to fill up their tanks three times as compared to every four times that new car drivers today do for the same trips. This rule is expected to save 234 billion gallons of fuel through 2050. Can you talk about why these strengthened fuel efficiency standards, along with parallel investments in electric vehicles, are good for both consumers and the environment?

Fuel economy standards and electric vehicle deployment directly reduce demand for oil and gas supplies thus reducing the levels of carbon emissions that would be

⁶ <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>.

⁷ https://amendments-rules.house.gov/amendments/CASTOR_050_xml220128155220265.pdf.

⁸ https://amendments-rules.house.gov/amendments/TONKO_053_xml220128093201458.pdf.

⁹ https://amendments-rules.house.gov/amendments/DOYLE_018_xml220129124931674.pdf.

¹⁰ <https://energyefficiencyimpact.org>.

emitted from less efficient vehicle types. Additionally, fuel economy standards lower the cost of energy for consumers in that they are traveling further while burning or using less fuel. The efficiency impact of electric vehicle (EV) technology as an alternative is much greater. EVs convert up to 77% of the charged energy to the vehicle and braking systems versus 12%–30% for vehicles powered by gasoline.¹¹

Questions for the Record

Darnell Johnson

**President and CEO, Urban Efficiency Group; and Vice Chair,
Building Performance Association**

THE HONORABLE KATHY CASTOR

1. How would the energy efficiency investments in the Bipartisan Infrastructure Law, such as the \$3.5 billion for the Weatherization Assistance Program, funding for energy code adoption, and grants for schools and non-profits help advance energy efficiency across the nation? How would the House-passed climate investments build on that foundation?

The energy efficiency investments included in the Infrastructure Investment and Jobs Act (IIJA), signed by President Biden on November 15, 2021, will support a number of crucial residential energy efficiency programs. As you noted, IIJA included an historic \$3.5 billion in funding for the Weatherization Assistance Program, which focuses on bringing energy efficiency to communities that need it most and improving home performance for low-income households. These investments will not only lower utility bills and reduce greenhouse gas emissions but will also improve occupant comfort and health¹ in underserved communities that have historically been left behind. With rising energy prices stemming from Russia's war in Ukraine, these high-energy-burden communities have suffered disproportionately—so this historic investment could not come at a more important time.

Additionally, IIJA included other funding to drive additional energy efficiency adoption, including: \$550 million for the Energy Efficiency and Conservation Block Grant Program (EECBG) to support implementation of energy audits and retrofits to improve both residential and commercial energy efficiency; \$500 million for grants for energy efficiency and renewable energy improvements at public school facilities; \$250 million to support an energy efficiency revolving loan fund for residential and commercial buildings; and \$225 million to enable sustained, cost-effective implementation of updated building energy codes within the DOE Building Technologies Office (BTO). These programs will all drive demand for energy efficiency upgrades in buildings across the country, including in homes, businesses, and schools.

While the historic investments from IIJA—in WAP in particular—will improve home performance in underserved communities, this funding alone is not enough. One key issue facing WAP is that many low-income homes have other issues—such as structural deficiencies, and health issues such as mold and asbestos—that have to be addressed before they are eligible for WAP. Nationally, 10–30% of income-eligible weatherization clients are deferred because of one or more of these problems.² We need to address these health and safety issues so that this backlog of homes can become eligible for the program. Many deferred income-eligible weatherization clients are located in low-income, historically disadvantaged communities—the very same communities facing disproportionately high energy burdens and health risks.

I was pleased to see the enacted Fiscal Year 2022 Appropriations package appropriate \$15 million for a Weatherization Readiness Fund to address these issues, and I applaud the leadership of Sen. Reed (D-RI), Sen. Collins (R-ME), Sen. Coons (D-DE), and Sen. Shaheen (D-NH) in the Senate for introducing legislation (S. 3769, the Weatherization Assistance Program Improvements Act of 2022) to authorize this FY22 appropriation and support potential additional appropriations in FY23. Congressman Tonko (D-NY-20) is leading the effort on the House side, and I hope

¹¹ <https://www.fueleconomy.gov/feg/evtech.shtml>.

¹ <https://e4thefuture.org/occupant-health-benefits-of-residential-energy-efficiency/>. As I noted in my initial testimony, this report from E4TheFuture, entitled “Occupant Health Benefits of Residential Energy Efficiency” which reviews existing research on the link between resident health benefits and energy efficiency upgrades, found that residential energy efficiency upgrades can produce significant improvements in asthma symptoms and help improve overall physical and mental health.

² https://e4thefuture.org/wp-content/uploads/2022/04/E4-EFG_Weatherization-Barriers-Toolkit-4-7-2022.pdf.

Chairwoman Castor and the other members of this committee will consider supporting Congressman Tonko's bill upon introduction President Biden requested \$30 million in his FY23 budget for the Weatherization Readiness Fund, and the Building Performance Association (in conjunction with E4TheFuture) submitted FY23 appropriations requests to both House and Senate offices in support of \$37.5 million for the fund.

Beyond these weatherization readiness issues, access and awareness challenges in underserved communities are also critical barriers to broader adoption and program success. As I mentioned in my testimony before the committee, to connect with hard-to-reach populations, we must first listen to them. To do otherwise stymies information sharing, limits participant enrollment in energy efficiency programs, and exacerbates the divide between those participating in the fight to address climate change, and those forced to remain on the sidelines.

The House-passed climate investments from last year's Build Back Better package would make crucial investments in residential energy efficiency via both direct funding and tax credits (including an expanded and extended 25C residential energy efficiency tax credit). Most notably, the HOPE for HOMES Act, included in the package that passed the House last fall, would provide funding to small businesses for training contractors in new skills and rebates to homeowners for upgrading their home's energy performance (doubling rebates for middle- and lower-income Americans). I applaud Chairwoman Castor for her leadership cosponsoring HOPE for HOMES and ensuring its inclusion in Build Back Better, and I thank her for her continued advocacy in support of this bill this year.

2. Could you please share one or two specific insights from your on-the-ground experience on how energy efficiency improvements have helped families enjoy a higher quality of life?

Our firm's work is largely performed in disinvested, economically challenged communities. The disparities associated with this demography include, but are not limited to, limited access to information and resources resulting in them being placed in the "hard to reach" category. Respecting the customer's confidentiality, I'm going to use "Mrs. Jones" to reference the customer experience. Mrs. Jones lives on the Southside of Chicago and happened to be home the day our firm was providing retrofit work for her neighbor. She inquired about the work and wanted to know how she could receive the services and associated cost. After explaining to her the benefits of living in an energy efficient home (cost savings, comfort, and health and safety), she was sold. She was connected to the program administrator and, when she was approved to receive the services at no cost, she was ecstatic.

During the energy audit, it was discovered that Mrs. Jones had asbestos in her attic that was disturbed, and a furnace that was over 30 years old with a cracked heat exchanger. Additionally, due to the age of the furnace and neglected maintenance, the furnace was contributing to higher levels of CO₂ in the home, creating an additional health and safety risk. The presence of asbestos in the attic would have caused the retrofit services to be deferred until the asbestos was remediated, but our firm was able to leverage our social capital to get the asbestos remediated (\$8500.00) at no cost to the homeowner. This action allowed the retrofit work to proceed as planned. The value add to the customer is as follows:

1. She was made aware of the energy efficiency program offerings.
2. She was educated on the benefits of living in an energy efficiency home.
3. She received the retrofit upgrade to enjoy cost savings, increased comfort, and remedied the health risks.
4. She received a brand new furnace.
5. She became an ambassador for the program and energy efficiency more broadly.
6. She remains an advocate for our work, energy efficiency, and participates in our referral program to get new customers enrolled.
7. We have experienced a 35% increase in customer participation from that community year over year.

There are many examples of "Mrs. Jones" in low- and middle-income communities across the country—folks who need critical home energy upgrades, but face other issues—including structural deficiencies and health issues such as mold and asbestos—that must be addressed before they are eligible for key programs like WAP. These important "readiness" upgrades would be supported by the Weatherization Readiness Fund, mentioned in more detail above under Question #1.

3. In your testimony, you mention the need to deliver reliable energy services at lower costs. What kinds of investments will help ensure equitable access to reliable and affordable electricity?

Significant investments in energy efficiency and an expanded energy efficiency workforce, with a particular emphasis on underserved communities, can help ensure equitable access to reliable and affordable electricity—while also creating jobs, reducing demand on the electric grid, lowering household utility bills, cutting greenhouse gas emissions, and improving energy independence. As I noted in my testimony to this committee, deploying energy efficiency reduces demand for primary energy and generating capacity needs and therefore lowers the overall costs of shifting to a low-carbon energy system. Energy efficiency is cleaner and cheaper than building new low-carbon or carbon-free energy generation resources.

Nowhere is this need clearer than in residential buildings. In 2021, residential buildings accounted for 21% of total U.S. energy consumption.³ Unlike other sectors of the economy, the residential sector is notoriously difficult to address, with approximately 140 million housing units nationwide⁴ that make up a patchwork of varying household income levels, awareness, and access to key energy efficiency solutions. These circumstances make the residential sector particularly challenging to decarbonize. Policies like the rebate program contained in the HOPE for HOMES Act (H.R. 3456) would expand access to more affordable residential energy solutions, particularly via larger rebates available for middle- and lower-income homeowners, leading to more affordable electricity and energy bills. Additional training funding included under HOPE for HOMES would also expand training opportunities for contractors, growing and diversifying the energy efficiency workforce.

The cost to upgrade a home's energy efficiency is growing, as are the costs for contractors to carry out these upgrades. The pandemic-led workforce shortage and supply chain constraints have driven these price increases, making it less likely that a homeowner will make those investments without federal subsidies providing the incentives. These upgrades are even more cost-prohibitive for lower-income homeowners, underscoring the crucial importance of rebate proposals like HOPE for HOMES.

4. How should Congress ensure that all communities, including environmental justice communities, are included in climate policy development and benefit from the transition to a clean energy economy? Could you please elaborate on why it is important for communities to have a seat at the table when Federal, state, and local governments are exploring climate solutions?

Traditionally, BIPOC communities are the last to adopt emerging energy efficiency technologies. This delay should not be interpreted as a lack of interest, but rather reflects existing barriers to adoption (awareness, access, and affordability). The top-down approach usually causes an information gap, leaving social identity groups that are considered the “outgroups” with limited or late information. We can close this gap by adopting Procedural Justice⁵ best practices, to ensure policies are equitable and require the inclusion of diverse perspectives. Those perspectives should be shared by the stakeholders and thought leaders that have the “lived experience” and understand the challenges and needs of the demography they represent. It's not enough for these communities to just be at the table—their perspectives should inform and influence the policies being drafted in a way that is equitable. The existential threats are too great to continue transactional policy making. We need to embrace diversity, prioritize inclusion, and demand transformative policy making that serves the greater good of humanity.

5. Energy efficiency can be complementary to other climate solutions like rooftop solar energy. Could you please describe the holistic approach your firm has taken to helping families benefit from complementary climate solutions? What lessons could we draw for Federal policy development?

At Urban Efficiency Group (UEG), we are focused on advancing energy equity by all means necessary. While we are fully supportive of decarbonizing our electric grid and shifting to renewable energy sources, we must also recognize the significant equity issues that can arise from electrification, particularly in the absence of proper information and awareness in our most underserved communities. We must first focus our attention on providing these communities with accurate and straightforward information about what fuel switching entails—the benefits to health and the environment but also the costs—both short and long term. We should not, and cannot, expect our low- and moderate-income communities to absorb the cost of fuel switching. In the example of rooftop solar energy, many of the low- and moderate-

³ https://www.energy.gov/sites/prod/files/2019/04/f61/bto-geb_overview-4.15.19.pdf

⁴ <https://www.census.gov/quickfacts/fact/table/US/HCN0102I2>.

⁵ Procedural justice—Wikipedia

income homes we serve do not have the rooftop integrity to support PV arrays, and still lack needed weatherization, health, and structural measures (which could be addressed via the Weatherization Readiness Fund, as mentioned in more detail above under Question #1).

We must also recognize that various mechanisms bringing renewable energy sources to underserved communities—for example power purchase agreements—can also present equity issues in terms of asset ownership and profitmaking. We must make sure to shape policy in a way that can bring low-carbon energy to our underserved communities while also helping these communities increase resiliency and human capital, not in a way that leads to continued/renewed exploitation.

While Congress works to get those policies crafted, we should be focusing primarily on energy efficiency. As I mentioned in my written testimony submitted to the committee, the cleanest and the cheapest energy is the energy you don't use in the first place. A 2019 report from the American Council for an Energy-Efficient Economy (ACEEE) found that energy efficiency can cut GHG emissions by about 50 percent by 2050.⁶ Buildings deliver 33% of the total emissions reductions in the report's model, and upgrades to existing buildings, homes, appliances, and equipment are identified as some of the largest cost-effective opportunities to achieve these reductions.

We have seen these savings firsthand at UEG, and the on-the-ground success of deploying these energy efficiency measures offers important lessons for Federal policy development: energy efficiency is a vastly untapped resource that our communities can unleash—with adequate financial support and a focus on equity. Initial investments from the Infrastructure Investment and Jobs Act, and further proposals like the HOPE for HOMES Act contained in the House-passed Build Back Better package, can bring crucial energy efficiency measures directly into millions more homes in the communities where they are needed most.

Importantly, a holistic approach to helping our most vulnerable and underserved communities must involve not just clean energy and energy efficiency investments, but investments to grow the human capital in these communities via well-paying clean energy and energy efficiency jobs, with particular attention to diversity, equity, and inclusion. Like many trades, the energy efficiency industry has historically been a white, male-dominated industry.⁷ There is a real need to focus on training and workforce development that incentivizes greater diversity and equity, prioritizing minorities and women for training. Residential energy efficiency businesses—the vast majority of which have fewer than 25 employees—are crucial to our communities, providing local jobs that cannot be outsourced. They know how to do more with less and should have equal access to funding sources to bring on local workers and train them for growing demands. Supporting small businesses will generate economic growth and could help avoid unintentional exclusion of communities of color who have been historically overlooked by unions who may not have deep ties to these specific communities, thus opening opportunities to expand workforce diversity and allowing local communities to build and maintain human capital.

Chairman Rush's Blue Collar and Green Collar Jobs Act (HR156) will be crucial to building this workforce. The bill includes an important Energy Workforce Grant Program and I urge the members of the Select Committee to co-sponsor this important legislation. I elaborate further on the importance of this bill in the question below.

THE HONORABLE MIKE LEVIN

1. According to Department of Energy estimates, households participating in the Weatherization Assistance Program save on average \$372 dollars each year. Not only will this funding provide critical assistance to low-income households, but it will also help grow the energy efficiency job sector. This sector already employs 2.1 million people, more than twice as many workers as work in the entire U.S. fossil fuel sector. That is why I am also glad that the bipartisan infrastructure law recognizes the need to recruit and train more Americans for careers in this sector by including \$10 million dollars for energy efficiency career skills training grants. Can you talk about why it is important to pair energy efficiency program investments with parallel investments in developing the energy efficiency workforce?

⁶ <https://www.aceee.org/fact-sheet/halfway-there>.

⁷ According to the 2021 Energy Efficiency Jobs in America report, a large majority of workers in the US energy efficiency industry are white males.

Pairing energy efficiency program investments with investments in the energy efficiency workforce is critical—one cannot fully advance without the other. I was pleased to see funding for energy efficiency career skills training grants included in the Infrastructure Investment and Jobs Act (IIJA), but much more support is needed, as that funding focuses on non-residential sectors. As I noted in my testimony before this committee, the costs associated with training, equipment, and certifications are often steep, and constitute significant barriers to expanding and diversifying the energy efficiency workforce. Like many trades, the energy efficiency industry has historically been (and remains) a white, male-dominated industry.⁸

Directly pairing investments in energy efficiency with workforce investments is smart strategy, and there is legislation that would do just that. The HOPE for HOMES Act (H.R. 3456) pairs workforce training grants with a direct rebate program for homeowners to ensure workforce needs are met alongside critical home performance upgrades. A budget reconciliation version of HOPE for HOMES was included in the Build Back Better package that passed the House last year. Thank you for your vote of support for HOPE for HOMES in this reconciliation package, and I urge you to continue supporting this bill during legislative negotiations this year. The “HOPE” training will help small businesses make investments in their workers that they are currently disincentivized to do as the workforce is unstable and the fear of losing a newly trained employee challenges those investments. By subsidizing this training, we are ensuring that both the work is done well and that small businesses embrace the training as a part of business, raising the education level and expertise of the industry.

Additional federal investments via legislation like the above-mentioned Blue Collar and Green Collar Jobs Development Act (HR 156) can increase the contractor diversity in the energy efficiency sector and create a more diverse workforce. That legislation, sponsored by House Energy & Commerce Energy Subcommittee Chairman Bobby Rush (D-IL-01) includes a vital Energy Workforce Grant Program that provides grants directly to small businesses, among others, to support on-the-job training and external training of employees in the clean energy and energy efficiency industries, with an emphasis on minority and women-owned businesses. Small residential energy efficiency businesses like ours, the Urban Efficiency Group (UEG), are the perfect vehicles for this workforce funding—we know how to do more with less. Supporting small businesses will generate economic growth and could help avoid unintentional exclusion of communities of color who have been historically overlooked by unions who may not have deep ties to these specific communities, thus opening opportunities to expand workforce diversity and allowing local communities to build and maintain human capital. I urge the members of this Select Committee to co-sponsor this important legislation and hope to see it passed before the end of the 117th Congress.

As I mentioned in my written testimony before the committee, our firm, UEG, developed a quasi-small business incubator (Energy+) to remove some workforce cost barriers and increase supplier diversity. This comprehensive approach to developing and deploying more minority business enterprise (MBE) firms in the energy efficiency space, or “business in a box” concept was successful in launching two (2) minority owned energy efficiency contracting firms that boast a six-figure net profit year over year.

2. What efforts are you working on to build the future of the energy efficiency workforce and how can your experiences inform our work here in Congress?

We are vested in solving the challenges of an illiquid clean energy workforce by localizing training opportunities for diverse participants. Additionally, we understand the workforce challenge will continue as we are losing practitioners through attrition. This challenge has influenced the creation of a training program for high school students, to provide early exposure and engagement to the energy efficiency and home energy performance industry. Our youth initiative, Green Generation, is entering its second year and we have experienced an increase in enrollment. This program not only focuses on energy efficiency, but also includes leadership training, advocacy, and sustainability. Upon high school graduation, the students will have secured six Building Performance Institute certifications, qualifying them to enter the clean energy workforce immediately if college is not the plan after high school. The impact of this program was covered by the Department of Energy in an article here.⁹ I believe it is imperative that Congress considers making larger investments

⁸ https://e4thefuture.org/wp-content/uploads/2021/10/Energy-Efficiency-Jobs_2021_All-States.pdf.

⁹ <https://www.energy.gov/eere/wipo/articles/eere-success-story-building-green-generation-chicago>.

in youth focused clean energy programs to ensure the next generation leaders are prepared to enter these emerging markets.

Questions for the Record

Dave Schryver
President and CEO
American Public Gas Association

THE HONORABLE GARRET GRAVES

1. Mr. Schryver, as I mentioned in our hearing, I am really concerned that the energy policy decisions that some states and regions of the country are making will have negative consequences for consumers. For example, in New England, the permitting and regulatory structures in place often makes it difficult to obtain natural gas—some states like New York have even sought to ban it.

a. How does limiting access to natural gas impact consumers?

As discussed in my testimony, data from the Energy Information Administration continues to demonstrate that natural gas is the most affordable way to heat a home, and a recent study commissioned by the American Gas Association found that the average home that uses natural gas for cooking, heating, and clothes drying saves \$1,000 a year compared to a home using electricity for those functions. When consumers are unable to choose natural gas for their homes, they are denied those savings.

In colder climates, this oftentimes means households are forced to rely on propane or heating oil to stay warm in the winter. This leads not just to higher energy bills, but also to a larger environmental footprint as these fuels produce higher emissions than natural gas.

2. Mr. Schryver, during our hearing, you were asked about the 20 states around the country that have enacted energy choice legislation.

a. How important is consumer choice when it comes to fuel sources to heat and power their homes—whether it's natural gas, solar power, or another fuel source? Please explain.

APGA and our members believe consumer choice is vital. As referenced in my response to the previous question, using natural gas in the home delivers significant savings to consumers. As families across the country struggle with rising costs due to inflation, it is more important than ever that consumers be empowered with the ability to choose the energy source for their home that makes the most economic sense for them.

I want to emphasize that energy choice legislation does not prevent state or local lawmakers from introducing tax breaks or other incentives for consumers to choose to electrify their homes. Energy choice bills simply ensure that natural gas remains an available option for those who want it, so consumers have no limitations when it comes to choosing the energy source that best suits their needs.

b. How important is local control when it comes to reliability and affordability of energy? Please explain.

APGA members are not-for-profit entities that are owned and operated by local governments, which means they have no obligation to create profits for shareholders. Instead, they are directly accountable to the ratepayers, which means affordability and reliability are always a priority. Our members are residents of the communities they serve—their ratepayers are also their families, friends, and neighbors, which influences how they operate their utilities.

3. Mr. Schryver, during our hearing, it was suggested that the costs of electrification would be lower than stated in your testimony because consumers would eventually need to replace their existing appliances at the end of their lifespan anyway.

a. Would you like to expand upon this and how you arrived at your estimated costs?

The numbers cited in my testimony were compiled by the Consumer Energy Alliance. They calculated the cost to consumers of replacing their existing natural gas appliances with the electric equivalent. While it is true that appliances have a limited lifespan and consumers may eventually confront this cost regardless of whether

they switch fuel sources, we cannot disregard the other costs consumers will be burdened with if gas-fired appliances are no longer an option when the time comes for replacement.

As I mentioned in my written testimony, many homes that currently rely on gas appliances would require an electric panel upgrade to support the additional load of running the entire household on electricity, which comes at an additional cost.

Not only would individual homes potentially struggle with this increased load, our country's entire electrical grid is not prepared to supply the increased demand that it would face in an all-electric economy. A recent *Wall Street Journal* article¹ highlighted electric utilities' plans to invest unprecedented sums of money in overhauling their aging infrastructure to make it more reliable and able to support the increased demand that would be associated with the current Administration's plans to electrify everything. Those investments will ultimately be paid for by consumers when utilities pass those capital costs on to them in the form of higher electric bills.

As stated in my written testimony, natural gas homes currently save an average of \$1,000 per year on their energy bills compared to their electric counterparts. There is every reason to believe that gap will continue to grow, making it more important than ever that consumers retain the ability to choose the energy source that makes the most sense for them.

Questions for the Record

Sara Baldwin

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THE HONORABLE KATHY CASTOR

1. How would the electrification investments in the Bipartisan Infrastructure Law, such as the \$7.5 billion for electric vehicle charging help advance access to energy-efficient vehicles? How would the House-passed climate investments build on that foundation to increase the energy efficiency of the entire economy?

Increasing our economywide energy efficiency requires replacing inefficient appliances, equipment, lighting, vehicles, and buildings with energy-efficient alternatives. Ensuring equitable access for all consumers, businesses, and communities—regardless of income, demographic, or location—requires available and affordable energy-efficient options. Whether via retrofit, replacement, or new construction, every purchase decision represents an opportunity to lock in energy-efficient assets that generate near- and long-term energy and cost savings while also providing climate, public health, and economic benefits. Because energy-efficient products and equipment occasionally have a higher upfront price and face other market barriers that prevent widescale adoption, policy plays an important role in leveling the playing field.

As noted in my testimony, all-electric vehicles (EVs), appliances, and equipment have considerable energy efficiency advantages over their fossil-fueled counterparts.¹ Increasing their deployment so that more consumers can benefit from these technologies requires overcoming the primary barriers to adoption: higher upfront cost, limited access to technologies, and limited infrastructure.

The Bipartisan Infrastructure Law (BIL) and the House-passed climate investments included several provisions to address these barriers and support widespread adoption of energy-efficient technologies. The BIL, for example, provides funding to support:²

- Increased transportation electrification infrastructure investments to benefit rural and urban communities while beginning strategic EV charging buildout

¹Katherine Blunt, "Utilities Plan Huge Electric Grid Upgrades, Adding to Power Bills," *Wall Street Journal*, available at <https://www.wsj.com/articles/utilities-plan-huge-electric-grid-upgrades-adding-to-power-bills-11650187802>.

²Testimony of Sara Baldwin at the Select Committee on the Climate Crisis Hearing "Cost-Saving Climate Solutions: Investing in Energy Efficiency to Promote Energy Security and Cut Energy Bills" held on April 7, 2022.

³U.S. Department of Transportation, "President Biden, U.S. Department of Transportation Releases Toolkit to Help Rural Communities Build Out Electric Vehicle Charging Infrastructure," February 2, 2022, <https://www.transportation.gov/briefing-room/president-biden-us-department-transportation-releases-toolkit-help-rural-communities>; and M. Moaz Uddin, "Electric Vehicle Programs in the Bipartisan Infrastructure Bill," Great Plains Institute, December 6, 2021, <https://betterenergy.org/blog/electric-vehicle-programs-in-the-bipartisan-infrastructure-bill/>.

via \$5 billion in major highway charging investments along the Alternative Fuels Corridor. The dedicated \$2.5 billion will support rural charging and measures to improve local air quality in disadvantaged communities.

- These investments will increase consumer confidence in their ability to charge wherever they travel—a barrier that must be overcome to encourage widespread EV uptake.
- Increased adoption of electric school buses through the Clean School Bus Program and electric trucks at ports, both high activity areas that can have a large impact on the air quality and public health of nearby communities. These measures will also provide long-term cost savings over the life of the vehicles.
- Increased domestic production of materials needed for scaled transportation electrification: \$140 million for rare-earth elements, \$3 billion for battery material processing, and \$3 billion for battery manufacturing and recycling.

While the BIL funding is an important step to enable transportation electrification and jumpstart the shift to more energy-efficient vehicles, it's just a down payment to equitably get more EVs on the road. The House-passed climate investments for new and used EVs included caps on income and vehicle costs to ensure that moderate-income households and individuals can access and benefit from EVs (not just those with higher incomes). The House-passed climate provisions also provided a 30 percent tax credit for electric heavy-duty vehicles to help convert the highest polluting vehicles on the road to run on clean, emission-free electricity.

In addition, the House-passed climate investments provided incentives for energy-efficient all-electric appliances and buildings to help reduce upfront costs and make the technologies affordable for more people.³ These investments would reduce overall energy consumed across the United States, lowering consumer energy bills and improving health in communities due to decreased NOx pollution. For example:

- High efficiency electric home rebates, with targeted investments specifically for low- and moderate-income households, homes in multifamily buildings, and upgrades in underserved and Tribal communities.
- Home Owner Managing Energy Savings (HOMES) Rebates for efficiency retrofit measures that are based on the amount of energy savings provided, with additional incentives for contractors.
- Home Energy Performance-Based Contractor Training Grants that support contractors transitioning to the high-efficiency economy through on-line and in-person training courses.
- Other investments in efficiency upgrades for public housing, affordable housing projects, rural rental housing, public buildings, tribal community housing, and public schools. In addition to funding efficiency upgrades, these investments would also support indoor air quality and increased climate resilience.

Ensuring more Americans benefit from energy-efficient technologies while shifting our economy to be more energy-efficient requires a combination of policies that address extant barriers to uptake, while also creating the market conditions that make it easy and affordable to choose the more energy-efficient option. The BIL is a good start, but the House-passed climate provisions are still needed to achieve these goals.

2. Could you please describe how efficient electrification could save money for consumers in communities throughout the United States?

Numerous studies show that consumers will save money with electrification:

- Energy Innovation, GridLab, and University of California, Berkeley's *2035 2.0 Report* modeling showed that a high electrification transportation scenario powered by a clean grid⁴ would create \$2.7 trillion in consumer savings through 2050—equivalent to an average U.S. household saving \$1,000 per year for the next 30 years. This analysis also accounted for the costs of grid upgrades that may be necessary due to increased electrification and a decarbonized grid.
- Energy Innovation analysis shows that electric vehicles are cheaper to own and finance from day one in most states compared to gasoline-powered coun-

³Energy Innovation, "Electric Vehicle Incentives in the Build Back Better Act: Provisions Will Save Consumers Money, Boost U.S. Manufacturing, And Protect Public Health," November 2021, <https://energyinnovation.org/wp-content/uploads/2021/11/Electric-Vehicle-Incentives-in-the-Build-Back-Better-Act.pdf>.

⁴The DRIVE Clean Scenario: 100% of new passenger vehicles in 2030 would be EVs and 100% of new medium- and heavy-duty trucks would be EVs in 2035. Amol Phadke and Nikit Abhyankar, "2035 2.0 Report," April 2021, <https://www.2035report.com/transportation/>.

terparts including purchase price, financing, taxes, incentives, maintenance, and operational fueling or charging costs. These savings are contingent the existing federal EV tax credit; if EV incentives in the House-passed climate investments are included then EVs become cheaper in nearly every instance, opening up ownership for all Americans looking to purchase a new car.⁵

- Rewiring America found that 87 percent of U.S. households would save money on their bills through household electrification (104.7 million of 120.7 million households).
 - The average U.S. household would save \$356 per year on their energy bills through electrification, for \$37.3 billion in collective annual savings.
 - 45 percent of households saving money would be low- and moderate-income, many of which would average \$444 in annual savings.
 - Households currently using electric resistance, fuel oil, or propane would average \$451 in annual savings.
- Energy-efficient all-electric new construction also offer consumer savings. RMI found that new all-electric homes save consumers on a net present basis and result in long-term energy savings in nearly all cases (the study was conducted across seven American cities with differing climatic conditions). I'd refer you to my written testimony for more details and the link to the full study.

Despite their cost-saving potential, higher upfront costs of efficient all-electric technologies are still a deterrent for many consumers. As such, incentives combined with rigorous performance standards can reduce upfront costs, thus enabling more people to benefit from technologies as they gain market maturity. As noted above, Energy Innovation research shows that federal incentives are necessary for consumers to experience the monthly bill benefits of purchasing electric passenger vehicles.⁶ Without these incentives, consumer savings will be left on the table as energy costs rise.

3. Could you please describe how consumers benefit when local governments are free to make decisions that support clean energy and the beneficial electrification of homes, businesses, and vehicles? From your perspective, how could a local government's decision to ban fossil gas hookups actually increase the reliability and affordability of energy for consumers?

Decisions made at the local level directly impact residents' health and well-being as well as community-level resilience. Local governments can also have an outsized impact on emissions. Buildings and transportation currently constitute 13 percent and 27 percent of the U.S. greenhouse gas emissions inventory, respectively.⁷ Local governments influence how buildings in their jurisdiction are built since they create the rules governing construction, permitting, inspections, and in some cases utility interconnections. They also influence different types of mobility and the adoption of cleaner vehicles through planning, zoning, incentives, regulations, and educational campaigns. Local building and transportation policies thus have huge potential to slow climate change, bolster resilience, reduce energy and water consumption, multiply consumer savings, and expand jobs and economic development.

Across the country, local governments are adopting clean energy, air quality, environmental justice, and climate goals and using the tools at their disposal to achieve these goals. In the process of assessing local air pollution, many of these governments are realizing that continued fossil fuels reliance will prevent them from achieving their climate goals while adversely impacting their constituents' health and well-being. Many local governments are influencing the adoption of clean electricity and electrified end-uses, along with distributed resources that improve resilience in the face of climate disasters. Achieving these goals at the local level directly impacts consumers, by saving money on energy bills and greater overall community sustainability and resilience. When local governments can choose the course that best fits their priorities, based on the will of their electorate and citizens, they benefit consumers where they live.

⁵ Orvis, "Most Electric Vehicles Are Cheaper to Own Off the Lot than Gas Cars" (Energy Innovation, May 2022), <https://energyinnovation.org/wp-content/uploads/2022/05/Most-Electric-Vehicles-Are-Cheaper-Off-The-Lot-Than-Gas-Cars.pdf>.

⁶ Orvis, "Most Electric Vehicles Are Cheaper to Own Off the Lot than Gas Cars."

⁷ The 13 percent of greenhouse gas emissions attributed to commercial and residential buildings accounts for both direct (e.g., onsite natural gas combustion) and indirect (e.g., offsite emissions associated with consumed electricity) greenhouse gas emissions. U.S. Environmental Protection Agency, "Sources of Greenhouse Gas Emissions," n.d., <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>.

To the second part of the question, increased electrification increases grid reliability by enabling demand-side measures that can reduce and manage electricity load, especially during times of grid strain. Whether through programmable thermostats, smart appliances, automated settings responsive to price signals, or vehicle-to-grid charging, technologies are increasingly expanding opportunities to improve grid reliability via electrified end-uses.

Although the rates paid for electricity, natural gas, and other fuels are not determined by local governments (they are far more influenced by state and federal government actions as well as international market forces), local actions to adopt energy-efficient equipment and construct energy-efficient buildings can reduce energy demand and lower monthly energy bills for consumers. Finally, the cost of electricity per unit of energy sold can potentially decrease as the economy electrifies. E3 analysis showed that grid investments required to support the high electrification scenario powered by a clean grid modeled in the 2035 2.0 report would have a nominal impact on rates and could even reduce the overall cost per unit of electricity.⁸

4. Could you please explain how the normal turnover in appliances and equipment due to their average life expectancy could help reduce any cost impacts to consumers of switching to electric appliances and equipment? How could Federal policy reduce that cost impact even further to make it even easier for consumers to switch to electric appliances and equipment?

Electrification is an immediately available climate solution that can occur as appliances, vehicles, and equipment are replaced due to old age—the average life of most building appliances, equipment, and vehicles is 10–20 years. An average consumer can switch to all-electric alternatives without replacing all equipment and machines at once. Rather, they can do so as the equipment ages out. The expenses incurred to replace those machines can go towards adopting more energy-efficient options that save consumers over the life of the equipment or vehicle. At the time of replacement, the impact should be measured not in the total cost of the replacement (which they would have to do regardless), but in the incremental cost of the all-electric alternative.

Bringing down this incremental cost with incentives can help efficient all-electric options compete on a level playing field with their fossil fuel-powered alternatives. Incentives that help the efficient appliances or vehicles ‘break even’ with their fossil fueled counterpart are most effective at influencing the consumer purchasing decisions. Efforts to bring down the upfront cost also impact financing and the monthly cost of ownership, which concerns many consumers. A federal policy can make it even easier to switch to electric appliances and equipment by influencing uptake at the point of purchase, ensuring the all-electric option breaks even with its fossil fueled counterpart, and by accounting for the real-life monthly cost of ownership. Ideally, consumers should see no net upfront cost difference when choosing the all-electric option over the fossil-fueled option.

Federal policy can also help ensure more options are in the market, supporting greater competition which will further reduce upfront costs. Incentives for manufacturers, distributors, and contractors to produce ample efficient electric appliances and equipment such as heat pumps helps meet consumer demand and reduces upfront costs. Consumer incentives provide assurance to manufacturers that increased market demand will exist for their products, prompting them to ramp up production.

The House-passed climate provisions mentioned above would jumpstart the market for all-electric appliances and EVs, while also providing support for contractor training, domestic manufacturing, and supply-chain development.

5. Any comparative analysis of the efficiency of residential heating options must be done carefully. Could you please explain in detail why electric residential heating systems could have greater efficiency than residential heating systems powered by distributed natural gas?

From energy production to end-use, generating electricity using renewable energy like solar and wind to power efficient all-electric appliances is the most efficient mode of powering end-uses. Renewable energy is around 97 to 98 percent efficient (meaning they do not generate much wasted energy in the form of heat or other losses to produce a kilowatt-hour of electricity). When renewable energy is stored

⁸Eric Cutter and Emily Rogers, “2035 2.0 Report Appendix: Distribution Grid Cost Impacts Driven by Transportation Electrification” (E3—Energy and Environmental Economics, n.d.), <http://www.2035report.com/transportation/wp-content/uploads/2020/05/2035-Transportation-Dist-Cost.pdf?hsCtaTracking=56dd694b-3158-4ad9-8c8e-11c00a78e98f%7C4ffcaa0e-5eee-4028-87ac-ccdd080ced4>.

in batteries and dispatched for later use, it enjoys a roundtrip battery efficiency anywhere from 85 to 90 percent.⁹ Comparatively, producing electricity with natural gas ranges from 40 to 60 percent energy-efficient.¹⁰ Regardless of source, the transmission and distribution of electricity results in approximately 5 percent energy loss in the process, which impacts overall efficiency.¹¹ The natural gas transmission and distribution network incurs around 3 percent losses due to leakage.

Equipment and appliance efficiency also impacts overall lifecycle efficiency. As noted in my testimony, highly efficient all-electric technologies are two to four times more energy-efficient than fossil-fuel counterparts. Determining the lifecycle efficiency of different energy sources for different end-uses, and the assumptions made about transmission and distribution losses, impacts the resulting efficiency figures. For example:

- Using the federal minimum standard for air source heat pumps of 260 percent, and the natural gas production efficiency numbers from the American Gas Association (AGA) report cited in Mr. Schryver’s testimony,¹² electric space heating from air source heat pumps powered by 100 percent natural gas, results in a 105 percent lifecycle efficiency. Comparatively, using 100 percent natural gas to fuel a high efficiency (97 percent efficiency)¹³ natural gas furnace would result in an 88.8 percent lifecycle efficiency.
- Using 100 renewable energy to power the same air source heat pump (260 percent efficient) would result in a lifecycle efficiency of 240 percent—almost three times more energy-efficient than heating with a gas distribution system fueling a gas furnace.
- The energy trajectory efficiency of energy delivered to the home in AGA’s report, which does not include end-use device efficiency, shows that electricity generated by renewable energy results in a cumulative efficiency of around 92 percent, compared with natural gas-based electricity’s cumulative efficiency of around 41 percent.¹⁴
- According to the same AGA report, the end-use of the appliance impacts the overall lifecycle efficiency (emphasis added):

“For new residential applications, full-fuel-cycle efficiency will be 74 percent for the natural gas space heating option that meets the minimum efficiency rating of 0.80. For electric heat pumps, whose federal minimum standard for fuel utilization efficiency is about 260 percent, the full-fuel-cycle efficiency will be about 98 percent. Less efficient electric resistance heating has a full-fuel-cycle heating efficiency of only 39 percent. The full-fuel-cycle efficiency for an oil furnace averages about 67 percent, due to an energy trajectory efficiency of 84 percent. The propane furnace full-fuel-cycle efficiency measure is also 70 percent. Again, these efficiencies reflect the total of all losses from extraction, processing, transportation, conversion, distribution, and end use of the natural gas, electric, oil, and propane systems.”¹⁵

In summary, the combined energy efficiency of electricity generated from renewable energy and efficient all-electric appliances used for space heating is the most

⁹Susan Tierney and Lori Bird, “Setting the Record Straight About Renewable Energy,” May 12, 2020, <https://www.wri.org/insights/setting-record-straight-about-renewable-energy>.

¹⁰A standard natural gas turbine for power generation has an efficiency ranging from 40 to 60 percent. Combined-cycle turbines, which provide 85 percent of U.S. natural gas-fired electricity, account for the higher end of the efficiency range. U.S. Energy Information Administration, “Natural Gas Generators Make up Largest Share of U.S. Electricity Generation Capacity,” October 16, 2020, <https://www.eia.gov/todayinenergy/detail.php?id=45496>. Natural gas combined heat and power (CHP) systems achieve higher efficiencies of 80 percent or more. Steven Nadel, “Natural Gas Energy Efficiency: Progress and Opportunities” (American Council for an Energy-Efficient Economy, July 2017). <https://www.aceee.org/sites/default/files/publications/researchreports/u1708.pdf>.

¹¹U.S. Energy Information Administration, “How Much Electricity Is Lost in Electricity Transmission and Distribution in the United States?,” November 4, 2021, <https://www.eia.gov/tools/faqs/faq.php?id=105&t=3>.

¹²“A Comparison of Energy Use, Operating Costs, and Carbon Dioxide Emissions of Home Appliances 2021 Update” (American Gas Association, October 1, 2021), https://www.aga.org/globalassets/research_insights/reports/ea-2021-04-appliance-cost-and-emissions-comparison-2021.pdf.

¹³Based on EIA estimates of existing stock, the average efficiency of a natural gas furnace is 90 percent. U.S. Energy Information Administration, “Annual Energy Outlook 2022,” March 3, 2022, <https://www.eia.gov/outlooks/aeo/data/browser/#/?id=30-AEO2022&cases=ref2022&sourcekey=0>.

¹⁴“A Comparison of Energy Use, Operating Costs, and Carbon Dioxide Emissions of Home Appliances 2021 Update.”

¹⁵“A Comparison of Energy Use, Operating Costs, and Carbon Dioxide Emissions of Home Appliances 2021 Update.”

energy-efficient mode of space heating—and this will only increase as the grid becomes increasingly clean and modernized.

6. The reliability of our energy systems is important to maintaining health, safety, and a high quality of life for American families. Could you please expand on how energy efficiency and electrification investments can enhance the reliability of the electric grid? How does a reliable electric grid help unlock the efficiency benefits of electrification?

The U.S. electricity grid and many of its largest utilities and grid operators are subject to numerous regulations and oversight that serve to ensure reliability and affordability. The established National Electricity Reliability Council (NERC) Reliability Standards define the reliability requirements for planning and operating the North American bulk power system that focuses on performance, risk management, and entity capabilities.¹⁶

According to the latest U.S. Energy Information Administration data, the U.S. electricity grid was fully operational and reliable for the average customer 99.9 percent of the time in 2020.¹⁷ That same year, during the limited time the grid was down for the average U.S. customer, 75 percent of outages were due to major weather events (hurricanes, snowstorms, wildfires)—these climate-related events are only getting worse as we delay climate action. Electrification and efficiency can further enhance reliability by deploying new and existing technologies, while also providing a clear climate solution that can be scaled within this decade:

- Widespread adoption of high-efficiency electric stoves, water heaters, and heat pumps reduces energy waste and overall demand for electricity. Generation resources allocated to serve peak demand can be utilized less frequently, thus ensuring greater longevity of existing capacity and other grid infrastructure components, such as transmission lines and substations.
- Electrification provides many opportunities for demand-side measures that enhance reliability. For example, some electric appliances can be programmed to respond to grid conditions and price signals. Others, such as energy-efficient air conditioners, can provide valuable grid services via demand response programs.¹⁸ New smart grid funding from the BIL will support continued deployment of these functions and capabilities at scale.¹⁹
- The increasing number of extreme weather events requires a greater attention to resiliency, and all-electric equipment can be powered directly by distributed and community renewable energy and battery storage to increase resilience when the grid goes down.
- Winter Storm Uri in Texas was largely due to an overreliance on natural gas that failed in the storm due to lack of appropriate weatherization of equipment. Such failures were chiefly responsible for and exacerbated the power outage.²⁰
- Most natural gas appliances and modern gas furnaces rely on electricity to operate, even though their primary fuel source is gas. This means that heating with natural gas does not obviate consumer impacts during an outage. For most gas appliances, an electric power outage also renders gas appliances inoperable, and reliability of the gas system does not translate to reliability of using gas-burning appliances. The same is true for gas stations—you cannot pump gas if the power goes out.

Fortunately, the BIL also includes \$65 billion in funding to upgrade the grid and bolster grid reliability going forward. This and numerous ongoing efforts by utilities and regulators across the country will ensure our electric grid remains strong, reliable, and resilient.

¹⁶North American Electric Reliability corporation, “NERC Standards,” n.d., <https://www.nerc.com/pa/Stand/StandPages/default.aspx>.

¹⁷U.S. Energy Information Administration, “U.S. Electricity Customers Experienced Eight Hours of Power Interruptions in 2020,” November 10, 2021, <https://www.eia.gov/todayinenergy/detail.php?id=50316>.

¹⁸Justin Brant, “Grid-Interactive Efficient Buildings: Providing Energy Demand Flexibility for Utilities in the Southwest” (Southwest Energy Efficiency Project, August 2019), <http://swenergy.org/pubs/grid-interactive-efficient-buildings-report>.

¹⁹Ellie Long, “Here’s How the Infrastructure Bill Improves The Grid,” November 22, 2021, <https://www.ase.org/blog/heres-how-infrastructure-bill-improves-grid>.

²⁰Dan Esposito and Eric Gimon, “The Texas Big Freeze: How a Changing Climate Pushed the State’s Power Grid to the Brink,” UtilityDive, June 2, 2021, <https://www.utilitydive.com/news/the-texas-big-freeze-how-a-changing-climate-pushed-the-states-power-grid/601098/>.

7. How would maximizing electrification as a climate solution reduce greenhouse gas pollution from the U.S. consistent with limiting average global warming to 1.5 degrees C?

According to several studies, an 80 percent clean grid by 2030 is achievable and would not compromise grid reliability nor affordability.²¹ A decarbonized electric grid is the lynchpin to broader economywide decarbonization as we electrify more sectors and end uses; indeed it is the most scalable and affordable pathway to align with a 1.5 degree C climate stable pathway. Rather than wait for a not-yet-existing technology breakthrough or commercializing expensive alternatives, electrification offers a near-term route to decarbonizing sectors still reliant on fossil fuels: namely, the building sector, ground transportation, and much of industry.

As noted in my testimony, Energy Innovation modeling with our Energy Policy Simulator shows which sectoral policies would put the U.S. on a 1.5 degree Celsius climate stable pathway through electrification and bring other benefits, for example:

- Buildings: reaching a 100 percent electric appliance sales standard by 2030 would cut 530 million metric tons (MMT) of carbon dioxide per year by 2050, contributing 10 percent of the overall emissions reductions needed to meet the U.S. NDC by 2050.
- Transportation: Achieving 100 percent EV sales for passenger vehicles, medium- and heavy-duty trucks, and buses by 2035 would reduce emissions by 821 MMT per year by 2050, or 16 percent of total emissions reductions needed to meet the U.S. NDC by 2050. This would save consumers \$2.7 trillion dollars through 2050.²²
- Industry: Electrification, paired with supplemental green hydrogen, can reduce emissions by 1,325 MMT per year by 2050, or more than 25 percent of total emissions reductions needed to meet the U.S. NDC by 2050.

8. American innovation is one of our greatest strengths. Could you please expand on how the electrified technologies you mentioned in your testimony are innovative and more efficient improvements over last century's fossil fuel-powered cars and appliances?

Electric technologies are efficient by design. Heat pumps move heat rather than burn fuel to heat or cool space and water. Induction stoves transfer heat directly to pans rather than first letting it dissipate into the air along with harmful air pollution from burning fossil fuels. In vehicles, removing combustion technology to instead rely only on battery storage reduces vehicle weight and total moving parts, thus reducing maintenance expenses and overall wear and tear over the vehicle's lifetime. Relying on battery charging means that users can charge their vehicle at times that suit them—overnight when it's parked in the garage or along the street, at the store as they shop, at work, or any other time the vehicle is parked (assuming charging is available). The new era of technologies has advantages of comfort, performance, and in many cases, long-term affordability. Their biggest advantage, however, is mitigating climate change while improving air quality and creating jobs.

9. How could American leadership on efficient electrification help encourage other countries to follow our example? Could American innovation and exports of clean and electrified technologies facilitate faster adoption of climate solutions in other countries?

As one of the world's top GHG emitters, the actions we take to reduce emissions and lead by example send a strong signal to other countries that we are committed to being part of the global solution to climate change. However, the U.S. must ramp up efforts to remain competitive. From 2010 through 2020, China manufactured the largest proportion of EVs globally at 44 percent, while Europe produced 25 percent. By 2020, the U.S. had manufactured only 18 percent of the global EV stock, a decrease from 20 percent in 2017.²³ Failure to stimulate domestic manufacturing of EVs and batteries, along with clean technology supply chains, will hinder our ability to lead in these critical markets.

Continued federal leadership can leverage the full capabilities of our domestic manufacturing industries and position the U.S. as a global leader. For example,

²¹Dan Esposito, "Studies Agree 80 Percent Clean Electricity By 2030 Would Save Lives And Create Jobs At Minimal Cost" (Energy Innovation, September 7, 2021), <https://energyinnovation.org/publication/studies-agree-80-percent-clean-electricity-by-2030-would-save-lives-and-create-jobs-at-minimal-cost/>.

²²Amol Phadke and Nikit Abhyankar, "2035 2.0 Report," April 2021, <https://www.2035report.com/transportation/>.

²³"Update on Electric Vehicle Costs in the United States through 2030," *International Council on Clean Transportation* (blog), accessed April 19, 2022, <https://theicct.org/publication/update-on-electric-vehicle-costs-in-the-united-states-through-2030/>.

adopting federal incentives for manufacturers to support the deployment of 100 percent passenger EV manufacturing by 2035 will create jobs and increase affordability for U.S. consumers. Similarly, significantly ramping up manufacturing of heat pumps and heat pump water heaters would support growth of domestic jobs and enhance competitiveness in a clean, electrified future. Doubling down on fossil fuel technologies, on the other hand, would likely render us obsolete in a global economy moving away from fossil fuels and toward decarbonization technologies.

10. How could the EnergyStar program be updated to better support efficient electrification consistent with our national climate goals?

The U.S. Environmental Protection Agency's EnergyStar program recently removed gas-fired appliances from their "Most Efficient" designation, which affirms the efficiency advantage electric appliances have over gas appliances. However, their general Energy-Efficient Products for Consumers list still includes several gas appliances, which may confuse consumers considering which equipment to buy if they are seeking highly energy-efficient, price stable, and climate-friendly options. The EnergyStar program could align their future decision-making to recognize only high-efficiency electric appliances, including air source heat pumps, including those designated for cold climates, and geothermal heat pumps.

11. How could Federal energy efficiency investments promote American energy security? Could increased energy efficiency help reduce demand for globally traded fossil fuels with volatile prices?

The global oil and gas markets are in turmoil amidst the Russian invasion of Ukraine, leading the European Union and the U.S. to reduce reliance on Russian oil and gas. Temporary increases to domestic fossil fuel production are unlikely to offer reprieve, and continued fossil fuel extraction and production will hold the U.S. captive to the inherent volatility and insecurity associated with global energy markets. Reducing demand for these products, however, would have a dampening effect on prices, and limit the power of the petro-state dictators controlling their production and sale. The faster the U.S. moves toward energy-efficient electrification and generation of renewable electricity, the sooner we can achieve greater energy security at home and abroad.

