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Good afternoon Chairman Rush, Ranking Member Upton, and distinguished members of the Subcommittee. My name is Yvonne McIntyre, and I am the Director of Federal Electricity and Utility Policy at the Natural Resources Defense Council (NRDC). NRDC is an international nonprofit organization of scientists, lawyers, and environmental specialists dedicated to protecting public health and the environment. Founded in 1970, NRDC has more than 3 million members and online activists supporting work to protect natural resources, public health and the environment. Prior to coming to NRDC, I spent over 30 years in the power sector first as an electrical engineer working in power plants and the distribution system, then moving over to federal government affairs. I want to thank you for holding this hearing on power sector resilience and inviting me to testify and provide comments on Titles II and III of the CLEAN Future Act (CFA). I want to commend the committee sponsors for the introduction of the CFA – it is an important and ambitious framework for moving the nation to a clean economy and tackling the climate crisis.

Fueled by our climate crisis, extreme weather events are posing increasing and more persistent threats to our nation's critical infrastructure. Once-in-a-century events are occurring regularly, and their impacts are becoming much more far reaching and destructive. Severe hurricanes and flooding, epic heat waves, wildfires and other extreme weather in the past few years wreaked havoc on our energy systems.

We need a 21st century power system that is responsive to the climate emergency we face today. This means utilizing clean, renewable energy and energy efficiency to curb our dependence on fossil fuels and cut the emissions fueling climate change and exacerbating air pollution that disproportionately harms low-income communities and communities of color. It also means ensuring our power system can withstand the extreme weather we are already experiencing, by making our grid more resilient and responsive. The good news is that we have a historic opportunity now to make the investments that will create jobs, modernize our electric grid and cut climate pollution. The CLEAN Future Act would be an important step in the right direction.

To enable a cleaner and more resilient grid, we recommend the federal government take action to: jump-start electricity transmission "superhighways" across and between regions; incentivize and expand energy efficiency, distributed solar, storage, efficient buildings and electrification; unlock the benefits of demand flexibility and distributed energy; and, provide assistance and support to low-income communities and communities of color to reduce the burdens and negative impacts from disasters and harmful pollution.

Each of these measures would also improve air quality by reducing locally-harmful pollution. Congress can and should reduce the toll that pollution takes on communities of color and low-income communities by acting to address cumulative pollution burdens. And Congress must also ensure that the investments made to transform the power system are targeted toward the communities facing the greatest risks from climate change and those disadvantaged by historic inequities.

A prime example of the threats we face is the cold weather catastrophe in Texas last month that led to dozens of deaths, untold suffering, widespread electricity outages, burst water pipes, and devastating electricity bills. The crisis most severely affected those living in inadequate housing lacking proper heat and insulation – disproportionately low-income communities and communities of color. News reports say it could be the most expensive disaster in the state's history, potentially exceeding the cost of Hurricane Harvey. While investigations and analysis of the specific causes are ongoing, we can point to some of factors we know contributed: limited regulation & oversight of the state's energy sector; a failure to winterize power and natural gas infrastructure; the isolation of Electric Reliability Council of Texas (ERCOT) from the rest of the nation's grids; and, inefficient buildings and equipment. I also reject as categorically false the argument cited by fossil fuel proponents that the cause of the power outages was an overreliance on renewable energy resources.

The Texas catastrophe was caused largely by a failure of government. Most of the Texas electricity grid is managed by ERCOT which has chosen to limit interstate ties to other grids and thus not be subject to federal regulation or oversight by the Federal Energy Regulatory Commission (FERC). ERCOT is subject to oversight by the Public Utility Commission of Texas (PUCT) and the Texas legislature. When the temperatures in Texas dipped below freezing, every type of energy resource was affected. Coal, nuclear and natural gas power plants shut down due to operating equipment failures and fuel shortages. Multiple issues throughout the gas production and delivery system led to problems with supply, further exacerbating the ability of gas power plants to operate. Wind turbines froze and solar production was limited due to cloud and snow cover. The February cold spell was not unprecedented: The state faced similar cold-weather events in 1989, 2003 and 2011 that caused freezing of energy infrastructure leading to power outages, though not as severe. After analyzing these prior events, State and Federal regulatory agencies made recommendations regarding winterization of energy infrastructure. However, in keeping with their views of limited regulations, the Texas regulators did not make those recommendations mandatory, so most companies did not implement them. In comparison, after the 2014 polar vortex caused power outages in the Northeast and MidAtlantic, the grid operators in those regions-- PJM, NYISO, and ISO New England--implemented market changes and enacted mandatory requirements and standards on power generators to better prepare for the impacts of extreme weather. Those changes and requirements allowed the regions to meet their electricity needs during the next polar vortex in 2019. If Texas had stronger regulatory oversight of the energy sector, the February crisis would likely have been less severe.

The February severe winter weather also impacted the Southwest and Midwest, and the regional electricity grids did experience some outages; however, they were limited and only lasted hours rather than days. The difference? The regional transmission organizations (RTOs) in these areas, the Southwest Power Pool (SPP) and the Midcontinent Independent Service Operator (MISO), are linked together with other regional grids via transmission lines so they were able to pull available electricity from each other, their eastern neighbor PJM, as well as from different parts of their own geographically diverse regions. As mentioned previously, the ERCOT grid has limited interstate ties to other grids making itself an electrical island. This lack of grid ties prevented ERCOT from being able to draw power from neighboring states, which could have lessened the severity of outages.

The Texas crisis was only the most recent weather event to affect the power sector, though it was one of the most extreme. Other states and regions have also seen power sector impacts due to severe weather, including California and the aforementioned 2014 polar vortex. Disruptive weather events will become even more frequent and severe as the climate crisis worsens. Sweeping reforms are needed to decarbonize and improve the responsiveness and adaptability of our nation's energy system. There are a number of policies we believe are critical to improving the resiliency of the electricity transmission system and to drive investments in a diverse portfolio of renewable sources, efficiency, and demand flexibility. Following is a discussion of these policies, including comments on related provisions in the CLEAN Future Act.

Electricity Transmission

Expanding our nation's transmission system may be the single-most important action we can take to improve resiliency and affordably decarbonize the nation's electric supply. Long-distance transmission moves clean energy from where it is available to where it is needed and enables balancing of the variability of wind and solar power on a national scale. The National Academies recently recommended an increase of 60 percent in the high voltage transmission system by 2030 as part of the least-cost path to reduce emissions. This agrees with many previous studies by the national labs, academia, and business. Absent major transmission investment, the cost of reaching 100% zero-carbon electricity will nearly double.

Transmission has always promoted reliability and resilience. Our transmission system grew out of mutual assistance agreements between utilities in the early 20th century. Transmission diversifies energy sources and, as mentioned earlier, allows neighboring regions to send power into regions suffering disruptions.

Outside of federal power authorities like TVA or Bonneville, most transmission is developed by the private sector. This system has advantages, including reliance on private financing rather than public expenditure. However, it suffers from lack of coordinated planning. Transmission companies plan around commercial needs rather than in support of national policy. As a result, there has been great difficulty in making the strategic investments needed in our national transmission system.

One notable success story is Texas's Competitive Renewable Energy Zone project (CREZ). Enabled by the Texas legislature, CREZ had state regulators lead the design of ambitious transmission projects, then handed off to the private sector to build and operate. The result was 3,600 miles of high-voltage lines that were built at a competitive price and catapulted Texas to renewable energy leadership.

The need for transmission at scale to meet the CFA's ambitious goals is the reason why NRDC is a supporter of the American Council of Renewable Energy's "Macro Grid Initiative" vision statement. The Macro Grid Initiative's premise is simple – expanding and upgrading the nation's transmission network will deliver jobs and economic development, a cleaner environment, and lower costs for consumers. The Macro Grid Initiative seeks to build out the grid at several levels: regional and interregional transmission lines, connections between the interconnections, and a nationwide high-voltage network. Several of the reforms we recommend here would help to accelerate necessary upgrades and expansions to our nation's grid.

The Electricity Transmission section of the CFA contains a number of provisions that will help advance the buildout of large-scale transmission. It declares a national policy that the transmission system should facilitate a decarbonized electricity supply. It also provides for promotion of new transmission technologies, eases transmission siting, provides FERC the ability to exercise backstop siting authority, and directs FERC to hold conferences on long-standing transmission planning problems. These are very positive steps to address transmission issues.

However, other than those provisions, the transmission measures in the bill amount to improvements to an approach that has yielded lackluster results. To be successful, the CFA must give FERC tools to consider climate change and address its lack of planning authority. Congress should specifically require that FERC consider the greenhouse gases (GHG) impacts of transmission projects in determining if rates are just and reasonable. Such a law would not enable FERC to enact carbon pricing or similar schemes, but it would give FERC the legal foundation it needs to implement the national transmission policy goals stated earlier.

Currently FERC has limited authority over transmission planning—it approves or disapproves projects identified by utilities and has some influence over ISOs and RTOs. This has been sufficient to deliver efficiency and competitive gains in RTO regions, but it is not sufficient to align transmission planning with the CFA's stated policy goals. Congress should remedy this by vesting FERC with planning authority, following the model Texas established with CREZ. FERC should be granted authority to identify transmission projects on its own or upon petition, or to delegate this authority to independent planning entities similar to ISOs, and to direct utilities to construct or solicit construction of those projects. Such an approach would retain the role of the private sector in financing, building, and operating the transmission grid, but would enable rational regional and national planning.

While not in the committee's jurisdiction, we also recommend the implementation of an investment tax credit for high voltage transmission. This, in conjunction with grants, loans, and the other policy tools mentioned here could have a significant impact in expanding transmission, enhancing resiliency and reaching the Biden-Harris administration's decarbonization goal.

Electricity Infrastructure Modernization and Resilience

Extreme weather outages most often hit the local "last mile" distribution system and isolated communities. Microgrids, distributed solar, storage, and smart, efficient buildings can all bolster resiliency against these sorts of outages and have climate benefits.

Demand flexibility—the ability to shift electricity consumption to coincide with times when electricity is clean and cheap—is a necessary pillar to achieve the transition to 100 percent clean electricity and make

the grid more resilient to extreme weather events. With recent advances in technology, it is possible to change the way we use electricity to support clean, reliable operation of the grid without reducing the quality of energy services provided to customers and while lowering costs for market participants. The increases in adoption of electric vehicles and efficient, electric appliances that we need to combat the climate crisis will also enable even greater demand flexibility.

Demand flexibility has the potential to bring enormous benefits in the form of cost savings and pollution reductions. A 2018 study of a highly renewable future for Texas showed that demand flexibility could reduce curtailment of renewable electricity generation by 40 percent, cut peak electricity demand by 24 percent, save $1.9 billion annually, and reduce grid CO2 emissions by 20 percent. A 2019 study showed that investments in cost-effective demand flexibility programs could save electricity customers more than $15 billion nationwide by 2030. Deployment of smart grid technologies and grid flexibility measures also allows grid operators and utilities to respond more readily and effectively in a time of crisis, like the one Texas experienced last month. For example, grid operators could use sensors, controls, and better data collection to protect the most vulnerable from power shutoffs or call on customers who are willing to reduce electricity use in real time.

Modernization of the electricity distribution grid is a key component of a clean, reliable, flexible power sector. Major upgrades to the distribution system are needed to enable smarter operation of the grid, take advantage of demand flexibility, and enable electrification of vehicles, buildings, and industrial facilities. Grid modernization will require major federal investments, including targeted support for grid upgrades that benefit low-income communities, high-energy-cost areas, and vulnerable households. The CFA authorizes a Department of Energy (DOE) grid modernization grant program at $7 billion over 10 years and a microgrid grant program at $15 billion over 10 years. However, this level of investment in grid modernization, covering both distribution and transmission, is insufficient; we propose $40 billion in DOE investments in grid modernization, with a particular focus on enabling electrification and bringing benefits to low-income, marginalized, and vulnerable communities.

Clean Electricity Generation

Distributed energy resources are a key part of building out a flexible, resilient grid. Distributed resources, such as onsite solar generation, electric vehicles, and heat-pump water heaters, can respond to the needs of the grid while maintaining energy services for customers. Incentives to strategically deploy these resources can help protect the most vulnerable customers.

Unlocking the benefits of demand flexibility and distributed energy resources will require action at the federal, state, and local levels, including appliance efficiency standards; federal investments in sensors and controls, utility programs, and deployment of electric appliances and vehicles; updated permitting and utility rules for energy storage; and more.

The CFA authorizes a new DOE program to provide loans to states, tribal organizations, and utilities to finance the deployment of distributed energy resources and other measures to increase demand flexibility. The bill also authorizes a grant and technical assistance program at $250 million over 10 years, to support eligible entities in designing distributed energy resource programs. The CFA also creates a program to deploy solar energy for low-income communities, authorized at $2.5 billion over 10 years, and another program ($200 million over 10 years) to deploy distributed energy resources in places where state, local, or tribal governments have adopted policies to streamline permitting of distributed

energy resources. These provisions are a great start, but the new grant and loan programs need much larger funding levels and a clearer focus on equity and electrification. Similarly, the loan and technical assistance program for distributed energy resources should be much larger to unlock the benefits of demand flexibility.

LIHEAP

The Low-Income Home Energy Assistance Program (LIHEAP) is crucial for reducing energy burdens borne disproportionately by low-income and Black and Brown households. In light of the high utility bills many electricity consumers are facing in Texas after February's crisis, this is a very critical program. We are pleased that the bill included reliable support for this important program via a 10-year reauthorization of funding. In concert with our ally the National Energy and Utility Affordability Coalition, we recommend that additional funds be made available for near-term COVID relief and funds delivered by LIHEAP be expanded to households at 80 percent of the State Median Income or 200 percent of the Federal Poverty Level and that 15 percent of funds be available for administration to ensure effective implementation.

Efficiency

Our homes and buildings are responsible for around 40 percent of all U.S. climate emissions. Lower-income communities of color bear the brunt of not only substandard housing conditions, but also spend a larger percentage of their income on energy costs and are disproportionately affected by the effects of climate change. This was the case in the recent Texas disaster as well, with low-income communities of color suffering disproportionate negative impacts.[1] The Biden-Harris administration's commitment to achieving a 100 percent clean energy economy by 2050 includes a promise to upgrade the efficiency of at least 4 million buildings and weatherize at least 2 million low-income homes in the next four years. This will drive down the climate impact of buildings while saving households and businesses money and getting people back to work in the clean energy economy.

Energy efficiency lowers both consumer and business utility costs, while making buildings more comfortable and resilient. A well-insulated building will stay cooler on the hottest days or warmer on the coldest days, even in the event of an extended power outage. Improved efficiency in buildings is also a crucial component to improving grid resilience and reliability. Efficient buildings create less demand on the energy grid, so fewer grid resources are needed at the times of highest demand or during an extreme weather emergency. To have the greatest impact on the grid, energy efficient buildings should have electric appliances and equipment (which are often more efficient and emit less carbon and other pollutants than fossil-fueled furnaces, water heaters, and other equipment that burn the fossil fuels onsite), combined with demand flexibility. This can include measures like an air conditioner than can be cycled on and off at times of highest demand, or a storage water heater that can heat water when demand is low and store that hot water for later use. Combining efficiency, electrification, and demand response can spread limited energy supplies in times of crisis, to help reduce the need for widespread blackouts.

[1] https://www.usatoday.com/story/news/nation/2021/02/20/texas-ice-storm-blackouts-minorities-hardest-hit-recovery/4507638001/

The CFA includes a number of provisions related to energy efficiency, including energy-saving building codes. Some provisions in the bill will support and leverage initiatives and investments by cities across the country. Specifically, the Energy Efficiency and Conservation Block Grant program reauthorized to deliver $35 billion over 10 years is an important tool for mayors and city officials leading the way in tackling climate change. We note that the addition of "alternative fuels" as a covered topic is currently unclear, and we note that local governments should have the discretion to use this funding for building electrification projects as well. Additionally, we have heard reports of challenges with the formula calculations for allocations as local governments that provide supportive services for an entire metro region but with smaller populations within its borders receive smaller allocations than local governments whose borders encompass more of the metro area. As these funds are allocated, we encourage equitable investments to ensure the true needs of communities are captured. Lastly, we commend the bill's sponsors for including $35 million a year explicitly for administration of these new investments, a welcome provision for local jurisdictions still recovering from fiscal collapses due to the economic crash.

On another note, the CFA reauthorizes the State Energy-Efficient Appliance Rebate Program, updates the language for eligibility and authorizes $300 million per year from FY 2022-2031. While this program can be beneficial for overall efficiency efforts, rebate programs have proven ineffective in driving efficiency in harder to reach properties and often remain inaccessible to low-income families and renters.

Further, we support the Facilities Energy Resiliency section that authorizes $3.6 million for the Secretary of Energy to distribute grants through the State Energy Program for technical assistance, project facilitation, and administration for building projects that increase resiliency, energy efficiency, renewable energy, and grid integration at public facilities. We are heartened that this section directs the states to use not less than 40 percent of grant funds received to implement covered projects in environmental justice communities or low-income communities, however, there is no guidance on how to engage those communities. If 40% of the funding is going to low income/EJ communities, it should be clear in this section they have a seat at the table as to how those funds are spent. Section 601 of the CFA defines "Meaningful" involvement of communities, and this language should likewise be integrated into this program.

There are two critically important policy tools that are glaringly absent from the CFA – electrification and weatherization.

Electrification

Electrification of buildings and vehicles is crucial to avoiding the worst impacts of the climate crisis. We must rapidly replace fossil fuel use in buildings and transportation systems with clean electricity to cut emissions at the necessary pace. While the carbon emissions of fossil fuel equipment will remain consistent throughout its lifetime, vehicles and equipment powered by electricity benefit from a cleaner, lower-carbon electricity grid. Electric vehicles and highly efficient electric appliances can also help us weather worsening storms.

Electric heat pumps are three to five times more efficient than typical gas and electric resistance equipment for home heating. Widespread adoption of heat pumps would reduce overall electricity demand and limit the surge in power demand during extreme weather events. Efficient, electric building

appliances also provide a source of demand flexibility that can help keep the grid running. For example, heat pump water heaters can both reduce total energy use from buildings and act as batteries to help grid operators reliably balance supply and demand. Air conditioners can be managed to precool homes and then reduce output in critical hours on the hottest days of the year, allowing for more homes to remain safe and cool while balancing demand on the grid.

Electric vehicles can similarly provide demand flexibility that can help enable a cleaner, more resilient grid. Charging electric vehicles at strategic times can reduce strain on the grid and maximize use of renewable electricity sources. Electric vehicles can also send power back to the grid and serve as distributed batteries to help prevent outages during emergencies. A handful of pilot projects have showcased this strategy and demonstrated its potential.

The CFA Transportation Title reauthorizes the Diesel Emissions Reduction Act at $5 billion over 10 years; authorizes $25 billion over 10 years for clean school bus deployment, including direction on vehicle-grid integration strategies; and reauthorizes the clean cities program. The title also includes several provisions to accelerate buildout of transportation electrification infrastructure, including new and expanded grant programs, funding for state transportation plans, and requirements to include vehicle electrification considerations in DOE's model building energy codes. As mentioned previously, the CFA Energy Efficiency Title includes a reauthorization of the State Energy Efficient Appliance Rebate Program, which is expanded to allow greater eligibility for electric appliances but contains very little else to advance building electrification.

The CFA should be strengthened to better promote building electrification. With simple amendments, virtually every section of Title III could be modified to allow for or promote buildings, appliances, and equipment that emit less carbon and take full advantage of a rapidly decarbonizing electricity grid. Without such change, we risk unnecessarily locking in carbon emissions for years into the future, making it significantly more difficult to achieve President Biden's goal of a net-zero emissions economy by 2050.

Weatherization

Many households in the United States are currently experiencing a dual crisis related to the affordability and quality of residential housing. Nearly two-thirds of renters nationwide say they can't afford to buy a home, as home prices are rising at twice the rate of wage growth while more than 11 million Americans spend more than half their paycheck on rent. Struggling families sometimes spend more than 20 percent of their incomes on electricity and heat—far more than the national average of 2.7 percent. Nearly one-third of households in the United States have struggled to pay their energy bills, while about one in five households has had to choose between purchasing food, medicine and other necessities or paying an energy bill. If Texas had been able to fully weatherize the state's residential buildings, they could have reduced energy demand by 50 percent--greatly reducing stress on the grid during last month's freeze.

The CFA directs the EPA Administrator to develop and carry out the Commercial and Multifamily Building Benchmarking and Transparency Initiative. This initiative will advance knowledge about building energy and water performance and inform efforts to reduce related greenhouse gas emissions. However, the CFA does not actually include any specific weatherization provisions. The bill should include a major increase in the DOE Weatherization budget, authorized through 2031 and ramping up from its current level, increasing over a period of 5 years to a minimum of $7 billion annually. Today, only about 35,000 homes can enroll in WAP on a yearly basis with a maximum per unit expenditure of

just over $7,000 per unit for weatherization and $2,000 for solar installation. Currently, WAP can only fund 0.1 percent of eligible applicants each year. Even if the annual budget for WAP were increased tenfold, it would still take 100 years to support weatherization of all eligible homes.

Ramping up WAP investments to a much higher plateau both in terms of investment per house and in terms of number of houses weatherized will achieve the president's commitment to weatherize 2 million homes as part of his Build Back Better plan and finally serve the more than 40 million homes that qualify but have yet to receive weatherization assistance. This will deliver climate resilience that consumers deserve and serve as a crucial and easily overlooked complement to increased grid resilience investments. In addition to increasing the overall budget, the per unit spending caps on weatherization and solar installation should be increased to enable larger projects and deeper retrofits as well as higher pay for workers who are completing the projects.

Conclusion

There is an urgent need to enact federal policies to improve the resiliency of our electricity system to better withstand the impacts of increasing extreme weather events. Climate change is exacerbating the severity of these events, so it is imperative that the nation focus on decarbonizing our grid with greater deployment of zero-emission resources. The February Texas catastrophe was the latest and most extreme example of what this nation will continue to face if action is not taken. Key tools to help us address these issues are policies to: facilitate better transmission planning and greater expansion; drive investments and greater access to a diverse portfolio of renewable sources, efficiency, and demand flexibility; and, provide assistance and support to low-income communities and communities of color to reduce the burdens and negative impacts from disasters and harmful pollution. The CLEAN Future Act includes a number of good provisions that address some of these issues, but the bill needs to go further. We will be submitting additional comments on the bill as a whole and look forward to working with the committee to improve the bill to better address these critical issues.