Testimony of

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Introduction

Thank you, Chairman Pallone, Ranking Member Rodgers, Subcommittee Chairman Rush, and Subcommittee Ranking Member Upton, for inviting me to participate in today's hearing to discuss the best policy pathway to a clean energy future. I applaud your attention to this important subject and recent work to develop an ambitious plan to get us on this path, including development of the CLEAN Future Act.

I am Craig Gordon, Senior Vice President of Government Affairs for Invenergy. I have nearly 20 years of power industry experience, and I have been with Invenergy for more than half of its 20-year history in a range of roles. Prior to joining Invenergy, I spent over eight years with a large Midwestern utility, where I held multiple positions, including power trader and power plant dispatcher. My industry experience is largely shaped by the commercial activities of the power sector, and I am now drawing on these experiences to inform Invenergy's governmental affairs efforts.

Invenergy is the leading independent and privately held clean energy company in the United States. Our headquarters is located in Chicago, Illinois, and we have regional development offices throughout the United States, Mexico, Canada, Europe, and Japan. Invenergy develops, owns, and operates large-scale renewable and other clean energy generation facilities, as well as energy storage and electric transmission, throughout the country and around the world. Starting with just six employees in 2001, Invenergy plans to employ more than 1,500 full-time employees by the end of this year. Invenergy employees possess a wide range of specialties, including wind and solar technicians, power plant operators, project and construction engineers, wildlife and environmental impact specialists, and many more. These jobs are spread throughout the country and around the world, especially in the communities where our projects are located. Approximately 50 percent of our employees work at project sites, while the others work in our corporate headquarters or in one of our satellite offices. We are also proud to say that approximately 10 percent of our workforce are U.S. military veterans.

In the two decades since its formation, Invenergy has developed 175 utility-scale clean energy projects that produce over 27,000 megawatts of generation capacity, and we have completed more than $40 billion in financing transactions to support this growth. The vast majority of our projects are located in the United States, and many of our projects are located within some of the districts of the members of this Subcommittee. For example, in Congressman Kinzinger's district in Illinois, Invenergy owns and operates a 600-megawatt combined cycle natural gas plant, a series of wind farms that produce nearly 210 megawatts, a series of energy storage facilities rated at 36.5 megawatts, a 20-megawatt solar farm, and

a test facility for new solar prototypes. We are also conducting a pilot project for producing hydrogen from our renewable resources in the district. In Congresswoman Lesko's district in Arizona, Invenergy is working on a utility-scale energy storage project called El Sol for Arizona Public Service. El Sol is a 50-megawatt project and will provide up to 200 megawatt hours of clean energy per cycle. And, in Congressman Wahlberg's district in Michigan, Invenergy recently completed construction on Crescent Wind, a 166-megawatt wind facility that was purchased by Consumers Energy. Further east in Congressman Latta's district, Invenergy recently completed construction of the 150-megawatt Hardin Solar project in Hardin County, Ohio; we are also currently building a second 150-megawatt phase of Hardin Solar (Hardin II), as well as other solar and storage projects in early stages of development in his district.

In Congresswoman Schrier's district on the West Coast, Invenergy owns the Vantage wind facility, which is a 90-megawatt project in Kittitas County that sells its output to Pacific Gas & Electric. Immediately south, Invenergy is developing up to 400 megawatts of solar in Congressman O'Halleran's district in Navajo County, which may also include an energy storage component. We also have other solar and storage projects across his district in various stages of development. Back on the East Coast, in Rep. Butterfield's district, Invenergy is developing a 75-megawatt solar project called Edgecombe Solar in Edgecombe County, North Carolina. Aside from the specific examples mentioned so far, Invenergy has wind, solar, and storage projects in various stages of development in the districts of the following Congressmen: McEachin, Upton, Griffith, Buschon, Pence, and Armstrong. Collectively, these utility-scale projects represent billions of investment dollars, millions of dollars in payments to local communities and states, and thousands of construction, operation, and maintenance jobs.

Invenergy is widely recognized as a leader in the clean and renewable energy space. Our focus on meeting the needs of our utility and commercial and industrial (C&I) customers has enabled us to stay competitive and ahead of the curve. In recognition of our leading role in the clean energy industry, Invenergy's President and Chief Operating Officer, Jim Murphy, was recently chosen as the interim Chair of the Board for the newly created American Clean Power Association (ACP), the nation's premiere clean energy trade association focused on transforming the U.S. power grid to a low-cost, reliable, and renewable power system. By uniting the power of wind, solar, transmission, and storage companies and their allied industries, ACP is championing policies that enable the continued growth of renewable energy in this nation.

Summary

Throughout the first decade of the 21st Century, the renewable energy sector struggled to establish itself, constantly battling high costs, unproven technology, low efficiencies, and the perception held by many utilities that renewables were inferior and unreliable. Today, the world looks very different. The current pace of growth in the renewable industry is largely due to the fact that costs have dropped significantly, the technology and efficiencies have improved dramatically, and utilities now regard renewable energy as integral to satisfy their present and future energy needs. In fact, utility holding companies, such as American Electric Power, Berkshire Hathaway Energy, Duke Energy, Nextera and Xcel Energy, are now some of the biggest owners of renewable energy. Many of these companies and other smaller utilities have established their own aggressive renewable energy or decarbonization goals.[1]

While the economics of renewables have vastly improved over the last decade, the lack of a consistent national energy policy has impeded the growth of the industry. In this void, over 25 states have created a

[1] Race to 100% Clean (detailing utility emissions targets), https://www.nrdc.org/resources/race-100-clean.

patchwork of policies intended to address climate change or emissions from the power sector. Without a national policy that would guide states towards the same goal, overall progress on decarbonization of the energy sector has been and will continue to be limited with incremental improvements in total emissions. It is also is largely undisputed that decarbonization goals must be paired with major investments in new transmission infrastructure to achieve success. And, from a technical perspective, there is simply no way the energy industry can achieve the ambitious decarbonization goals of this Subcommittee and the Biden administration absent massive transmission infrastructure investments to make the grid more efficient, reliable, and resilient. Federal incentives (which reduce customer costs, as opposed to increase investor returns) are necessary to spur development of new transmission needed to meet these goals. In addition to the need for a national energy policy and policies that encourage massive investments in transmission, there are also a variety of other policies tangential to the work of this Subcommittee that we believe can promote clean energy investments, including monetization of tax credits, federal incentives for transmission, and additional investments in military and weather radar technology. Finally, as described in more detail below, these policy recommendations are critical to address the Subcommittee's goal of promoting environmental justice and equity, because they will promote investments in clean energy infrastructure, create good jobs, and address carbon emissions that have a disproportionate impact on disadvantaged communities.

The need to identify a national policy is clearly recognized in the CLEAN Future Act's ambitious comprehensive proposal of sector-specific and economy-wide solutions that aim to transition the nation to carbon-free energy.[2] Hopefully, Congress shares the interest of this Subcommittee in addressing climate change, and plans to seriously consider new policy tools, like those mentioned above, to help drive this transition. As a representative of the country's largest private clean energy developer, owner, and operator, and as a member on behalf of the largest renewable energy industry group in the nation, I offer the following observations and recommendations for Congress to consider as it weighs the best policies for decarbonizing the electric sector in the most cost-effective and reliable manner.

1. Accelerating the Clean Energy Transition Requires Massive Investments in Transmission Infrastructure

A robust electric transmission system is an essential part of any credible pathway towards a zero-emissions electricity sector that will form the foundation for a decarbonized economy. In fact, attaining the climate and clean energy goals set forth in the CLEAN Future Act, or any other national climate or carbon goals, will not be possible without significant, immediate transmission investment and appropriate policy signals. Multiple studies on realizing the decarbonization of the electric system over the coming decades have noted the critical need for expanded transmission, on the order of 3-5 times current annual investment levels, to meet that goal.[3] For example, a recent report from the Mid-Continent Independent System Operator (MISO) notes that high-voltage transmission will aid reliability in a high-renewables grid.[4]

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[2] Decarbonizing the electricity sector is important not only because the power sector has historically been responsible for a large share of U.S. GHG emissions, but also because many technologies to reduce pollution in other sectors—such as plug-in electric vehicles, clean manufacturing, and zero-emission buildings—rely on clean energy electrification to make them true low- and zero-carbon alternatives.

[3] *See e.g.* Aggarwal and O'Boyle, Energy Innovation Policy Paper for the 2035 Report (2020) at 13-15, https://www.2035report.com/downloads/; Net-Zero America Project (2020) at 10, https://environmenthalfcentury.princeton.edu/sites/g/files/toruqf331/files/2020-12/Princeton_NZA_Interim_Report_15_Dec_2020_FINAL.pdf.

[4] MISO's Renewable Integration Impact Assessment (2021), https://cdn.misoenergy.org/RIIA%20Summary%20Report520051.pdf.

In a separate draft academic report from the National Academies of Sciences, Engineering, and Medicine entitled "Accelerating Decarbonization of the U.S. Energy System," experts state that, in this decade, overall transmission capacity must be increased, "by as much as 60% to interconnect and harness low-cost wind and solar power across the country."[5] It is clear that, without policies that facilitate massive investments in transmission, some of the best renewable resources in the country will be stranded, and many system-wide benefits will be lost. Congress should consider policies that improve interregional planning processes, incentivize improvements and new technology to make transmission more efficient, and improve existing transmission siting and environmental permitting processes.

Renewables have come far despite the limitations of the antiquated electrical grid, but the explosive growth called for in coming years requires will be severely thwarted without an expanded and smarter transmission system. America has abundant renewable energy resources, but in many cases, these resources are "stranded" due to insufficient transmission capacity.[6] Accessing these resources requires paying for and building transmission that, when paired with renewable energy, will produce long-term savings for customers (as well as produce significant environmental and reliability benefits). As the grid has begun to shift to renewable energy, which has zero marginal cost, the generation component of electricity prices has gone down, while the delivery component (transmission and distribution) has risen.[7] Overall electricity rates for customers are holding steady or increasing only modestly.[8]

Investments in transmission - and policies that support timely transmission development and deployment - are highly beneficial. Transmission saves customers money, reduces wasted energy, and improves grid reliability and resilience. Particularly important for reliability and resilience is the ability of transmission to integrate geographically diverse resources with complementary generation profiles. Geographically diverse generation that is interconnected by interregional transmission can reduce the need for rolling power outages resulting from severe local weather conditions because the transmission lines interconnect to areas that are less impacted. This can allow load-serving entities to balance load with available generation from geographically diverse locations, potentially hundreds of miles away, improving reliability and resiliency. In addition to the reliability and resiliency benefits, investment in transmission has historically provided significant monetary returns (in the form of savings on energy costs) to customers – for example, a portfolio of forward-looking projects in the Midwest has provided between $2.60 and $3.90 in benefits for each dollar spent.[9] And the rapid development and expansion of transmission infrastructure will create millions of jobs. For example, one recent report found that with accompanying carbon policy, as many as 1.5 million transmission-related jobs (and over 6 million electric-sector jobs)

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[5] National Academies of Sciences, Engineering, and Medicine at 7, *Accelerating Decarbonization of the U.S. Energy System*, https://www.nap.edu/catalog/25932/accelerating-decarbonization-of-the-us-energy-system.

[6] Utility Dive, Propelling the transition: New and better transmission is key to zero carbon, https://www.utilitydive.com/news/propelling-the-transition-new-and-better-transmission-is-key-to-zero-carbo/582331/.

[7] EIA, Electricity Prices Reflect Rising Delivery Costs, Declining Power Production Costs, https://www.eia.gov/todayinenergy/detail.php?id=32812.

[8] EIA, Average Price of Electricity to Ultimate Customers, https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_03

[9] *See* Pfeifenberger, Improving Transmission Planning: Benefits, Risks, and Cost Allocation (Nov. 6, 2019) at 10, https://brattlefiles.blob.core.windows.net/files/17555_improving_transmission_planning_-_benefits_risks_and_cost_allocation.pdf. *See also* Southwest Power Pool, Value of Transmission (2016) https://www.spp.org/Documents/35297/The%20Value%20of%20Transmission%20Report.pdf (benefit: cost ratio of 3.5:1).

could be created in the Eastern Interconnection by 2050.[10] These jobs are typically high-paying, and because many transmission components are produced domestically, additional manufacturing jobs are likely to be created as a byproduct of expanding our grid.

The Federal Energy Regulatory Commission's (FERC) existing rules have done little to encourage the development of interregional transmission lines, which can provide significant benefits by diversifying energy resources and reaching more customers that want access to clean power. Wind and solar make up the bulk of projects seeking to interconnect to the grid today,[11] and transmission ensures that clean, cheap electricity can be delivered from where it is available to where it is needed. Invenergy appreciates the Subcommittee's work on the CLEAN Future Act, which includes a provision that would encourage FERC to improve the interregional planning process to allow projects benefitting multiple regions to move forward, with costs shared among the customers that benefit from them. It remains imperative that FERC create these new rules that would, in effect, incentivize new lines, and the proposal in the draft bill, or one like, it is a good start in this direction. It is also worth noting that transmission planning today fails to account for resources in new generation interconnection queues, meaning that transmission is not being developed where and when it is most needed. Interregional planning efforts should promote competitive procurements for new transmission and major transmission upgrades to ensure that investment costs are kept in check. Developers like Invenergy are incentivized to keep costs of these important projects as low as possible, which leads to lower power costs for electric customers.

Congress should also consider ensuring that transmission planning fully accounts for current trends and technologies. For example, offshore wind generators are seeking to interconnect close to large population centers, which may require upgrades to existing transmission to accommodate and close coordination between states, grid operators, utilities, and developers, as well as federal regulators to ensure these upgrades are timely and cost-effectively made. Transmission development complements other technologies, including energy storage[12] and distributed energy resources.[13] Interconnection policies need to keep up and accommodate highly flexible "hybrid" resources consisting of co-optimized and jointly operated renewables and storage. Additionally, advanced energy technologies can ensure that existing and new transmission lines are fully utilized; these include dynamic line rating (adjusting the amount of energy lines can carry in real time), power flow controls (routing energy over lines to avoid congestion), and topology optimization (using software to maximize grid efficiency). Congress should consider enacting policies that ensure that tomorrow's grid is not built with yesterday's technology by providing incentives for new technology and allowing for interconnection of hybrid resources.

Finally, Congress should consider reforming existing siting and permitting processes so that projects are developed and built expeditiously, in an environmentally responsible manner, to meet project milestones and timelines. To advance needed transmission buildout, the federal government should establish defined processes for transmission reviews so that necessary transmission and connected generation can be built

[10] Clack, Goggin, Consumer, Employment, and Environmental Benefits of Electricity Transmission Expansion in the Eastern U.S. (2020) at 11-15, https://www.vibrantcleanenergy.com/wp-content/uploads/2020/10/EIC-Transmission-Decarb.pdf.

[11] ACEG Interconnection Report (2021), https://cleanenergygrid.org/wp-content/uploads/2021/01/Disconnected-The-Need-for-a-New-Generator-Interconnection-Policy-1.14.21.pdf.

[12] MISO Renewable Integration Impact Assessment at 90, https://www.misoenergy.org/planning/policy-studies/Renewable-integration-impact-assessment/#t=10&p=0&s=&sd=.

[13] Clack, Vibrant Clean Energy, WHY LOCAL SOLAR FOR ALL COSTS LESS (2020) at 78 https://www.vibrantcleanenergy.com/wp-content/uploads/2020/12/WhyDERs_ES_Final.pdf.

and can come online on schedule and on budget. The transmission review process should ensure early-stage alignment between and across federal agencies, such as the Fish and Wildlife Service and the Army Corp of Engineers, to create a predictable and consistent process for environmental review and permitting. This is particularly critical for projects that cross multiple jurisdictions, where reviews must be coordinated between multiple offices, regions, or districts. For proposed projects on the federal lands, federal land management agencies should be directed to utilize, and improve on, existing tools and best management practices that have been identified to reduce the time needed for permitting. In addition, federal environmental permitting should, to the extent possible, be coordinated with state transmission siting so that developers can meet critical timelines. Transmission developers are prepared to work with local communities and regulators to build trust with state and local regulators and landowners, and to ensure that environmental or economic impacts of transmission lines are fully accounted for, and that those local communities – not just the end customer or the generator – benefit from these projects. To encourage broad community and state support for new transmission, Congress should also consider state incentive programs such as additional broadband funding for "last mile" internet service to ensure rural access to high speed internet. Broadband and new transmission can be sited in the same rights-of-way to reduce costs. The federal government can also ensure that transmission siting on federal lands has a well-defined and consistent process that maximizes certainty while minimizing delays and litigation. Finally, federal agencies could use existing authority to intervene in state siting proceedings as a last resort, in the rare instance where delays become unreasonable.

2. A National Clean Energy Policy is Necessary to Decarbonize the Electric Grid

While the economics of renewables have vastly improved over the last decade, due in no small part to existing federal and state policies, the lack of a consistent national energy policy has impeded the growth of the industry. In the void, over 25 states have created a patchwork of policies intended to encourage clean energy in one way or other. Some have opted for renewable and clean energy standards, while others have attempted to encourage carbon capture and sequestration. Some have tried multiple ways, and all have seen varying degrees of success. Without a national energy policy to guide all 50 states forward, overall progress has been limited. Some states without aggressive clean energy goals have far exceeded them, while other states with aggressive goals have fallen far behind for lack of resolve or due to ineffective policies.

The transition to clean energy is unlikely to happen rapidly on its own because, at least in restructured states, investment and operating decisions are driven by competitive market forces that do not currently account for the cost of carbon emissions. A well-designed market-based mechanism for pricing carbon in the market, as well as other supporting policies, can operate as an efficient means to cut emissions, fostering a shift from the current fleet of generation to cleaner energy resources. In particular, a comprehensive, coordinated, and market-based approach to reduce emissions in the power sector that recognizes the social cost of carbon will provide increased demand for renewable energy and move America toward a cleaner future, identifying the least-cost power, through broad competition, across low-carbon and carbon-free energy sources.

A federal carbon pricing program (direct or indirect) can change the relative cost of resources by making fuels with relatively greater emissions more expensive than those with relatively lower emissions, sending an economic signal that percolates through the entire marketplace. This signal provides an incentive for all decision-makers in the market to look for ways to reduce emissions, and the flexibility to make decisions based on their own information and circumstances.

When applied to the electricity sector, either as part of an economy-wide policy or on its own, an important attribute of a robust carbon pricing program is to ensure that all emissions are priced consistently over time. Another key to guaranteeing the effectiveness of the program is to ensure that the policy is in place over a long-time horizon (10-plus years). This will provide electricity generators of all types and efficiencies a long-term incentive to reduce their emissions in whatever manner makes economic sense, allowing significant flexibility for the power sector overall to reduce its emissions, and provide the certainty for cleaner generation to come online. With development cycles for renewables and associated infrastructure that take years, it is important a federal carbon program provide the stability that it will remain in place for the foreseeable future.

A tradeable clean energy standard (CES) such as the one proposed in the CLEAN Future Act could be a suitable alternative if pricing carbon directly is not possible, or it could also be a complementary policy alongside a carbon price. The CES approach makes use of economic incentives and can be designed to be technology neutral. A well-considered CES can approach the economic efficiency of emissions reductions achieved under a carbon pricing approach.[14] In fact, modeling of proposed CES policies has shown that a CES can put the power sector well on its way to full decarbonization with modest effects on nationally averaged electricity rates.[15]

In comparing climate policy options (with all else being equal), the greater the number of accessible options to reduce emissions, the lower the total costs of the policy will be. In fact, some of these policies could be complementary (*e.g.*, a CES in the electric sector and a carbon tax applied to other areas of the economy). Provided they are well-designed and do not create undue and conflicting administrative burdens on regulated entities, with clear price signals, long time horizons, and broad applicability, any of these carbon-based programs could hold significant promise for decarbonizing the electric grid. Each has its relative benefits, and the challenges with any of them are not insurmountable and all could be transformative in decarbonizing the power sector, as well as other parts of the economy, as long as they avoid unintended consequences (such as causing existing renewables to be prematurely retired, sacrificing the emission benefits they provide).

Market forces have already driven growth in renewables, with many major utilities making the transition to them because of cost advantages which has been supported, in part, energy tax credits that have been available for limited time periods. Over the past decade, non-hydroelectric renewable generation has more than tripled, partly due to declining costs. Between 2009 and 2020, the levelized costs of utility-scale solar and wind have come down by 71 and 90 percent, respectively.[16] Costs for energy storage are similarly falling, with a 35 percent decrease in one year since early 2018, making renewables plus storage competitive with natural gas in many markets.[17] Utilities, in response to these changing conditions and the need to address climate change, have increased the level in which they rely on renewables, and many have even set targets of getting to 100 percent zero emissions by midcentury. This has already resulted in

[14] Resources for the Future, https://media.rff.org/documents/SCCC_Comments_Final_Merged.pdf.
[15] Resources for the Future, https://www.congress.gov/116/meeting/house/110174/witnesses/HHRG-116-IF03-Wstate-PalmerK-20191030.pdf.
[16] Lazard, Levelized Cost of Energy and Levelized Cost of Storage – 2020, https://www.lazard.com/perspective/levelized-cost-of-energy-and-levelized-cost-of-storage-2020/.
[17] Bloomberg (2019). Battery Power's Latest Plunge in Costs Threatens Coal, Gas. Available at: https://about.bnef.com/blog/battery-powers-latest-plunge-costs-threatens-coal-gas/.

a decrease in emissions from electricity generation, which have dropped by over 27 percent since 2005.[18] For instance, in 2017, nearly 50 percent of emissions reductions in the power sector relative to 2005 were attributable to increases in non-carbon generation.[19] With further policies to stimulate renewables and even further lower the cost of renewables, it can be expected that more utilities will accelerate their transition plans to a clean energy future and more emission reductions will be captured.

Renewable energy can also be reliably integrated into the existing power mix without compromising the stability of the power sector and, thus, energy reliability to consumers.[20] Renewables can provide a suite of essential grid reliability services.[21] Other advanced energy technologies, such as battery storage, can provide important reliability services to the grid that promote further adoption of and investment in clean energy generation.[22]

3. Complementary Priorities to Cost-Effectively Ensure a Decarbonized Grid

a. Monetization to Support Lack of Available Tax Equity

Renewable energy projects are unique in that they are eligible for a federal production tax credit (PTC) or investment tax credit (ITC). But, in order to benefit from these credits, projects must secure capital from tax equity investors who claim the credits to offset their tax liabilities. The supply of tax equity has always been limited and highly concentrated, and there is only so much equity available for renewable projects in that market.[23] The proliferation of new solar projects, which are eligible for ITCs, "front ends" the need for tax equity as the full credit needs to be monetized in the year that the project is placed in service. COVID-19 economic impacts have further exacerbated these issues and tightened the tax equity market. Tax equity investors have less ability to offset tax liabilities when an economic downturn lowers their overall tax liability—in other words, they have less "tax appetite." As the pandemic has progressed since spring 2020, economic uncertainty has led to several tax equity firms taking a pause—or exiting altogether—from the tax equity market. In aggregate, a recent Bloomberg New Energy Finance report estimated that the growth of up to 30 GW in renewable projects could be threatened as up to $23 billion in capital becomes unavailable.[24]

To address the crisis of a tightening tax equity market, Congress should enact a policy such as that being considered in the Senate right now that allows clean energy developers to monetize existing tax credits

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[18] Energy Information Administration (2019). Monthly Energy Review Table 11.6., https://www.eia.gov/totalenergy/data/browser/xls.php?tbl=T11.06&freq=m.

[19] Energy Information Administration (2018). US Energy-Related Carbon Dioxide Emissions, 2017, https://www.eia.gov/environment/emissions/carbon/pdf/2017_co2analysis.pdf.

[20] Princeton Report (finding that "the United States could reach 90 percent zero-carbon electricity by 2035 [and] maintain reliability").

[21] *See, e.g.,* DOE 2018, https://www.energy.gov/eere/success-stories/articles/eere-success-story-beyond-power-wind-plants-can-provide-full-suite (wind capable of providing frequency support, ramping and balance, and voltage control); NREL 2017, https://www.nrel.gov/docs/fy17osti/67799.pdf ("Tests showed fast and accurate PV plant response to AGC, frequency, voltage, power factor, and reactive power signals under a variety of solar conditions").

[22] *See* NERC 2021, https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/Master_ESAT_Report.pdf ("[B]attery storage can provide sufficient frequency response to support grid frequency stability and improve frequency performance for large generator tripping events and other frequency disturbances for a future high penetration [inverter-based resource] grid with heavily reduced grid inertia.").

[23] State of Tax Equity Market, https://www.projectfinance.law/publications/state-of-the-tax-equity-market.

[24] Bloomberg, https://about.bnef.com/new-energy-outlook/.

at their *full value*. Allowing developers to monetize the credits would untether the clean energy industry from the constraints placed on the market by tax equity because it would create an avenue for projects to raise capital from traditional sources and claim the PTC and ITC directly from the Internal Revenue Service in conjunction with their annual tax filing. Monetization also allows the industry to access the full spectrum of infrastructure financing options. This gives developers the ability to acquire capital faster and with more certainty, benefits that will immediately inure to the communities that are counting on jobs and investments from these projects. And, providing a monetization option for existing credits comes at no cost to taxpayers—the value of the ITC/PTC is the same, regardless of the entity that claims it. Full value monetization will allow planned renewable projects to move forward more efficiently, and it will allow new market entrants and projects to secure financing. This gives renewable energy developers the maximum flexibility to deploy capital and, in turn, deploy projects to decarbonize the grid.

b. Transmission ITC to Lower the Cost of Transmission

As mentioned above, new long-distance electric transmission is the missing link for delivering the best renewable resources in America to the population centers where that power is desperately needed. Indeed, increased transmission development is essential for the cost-effective and reliable decarbonization of the electric sector. The cost of building that needed transmission can have a large initial price tag, even if those costs are more than repaid in reduced rates over the life of the project. To ease this burden and encourage the much-needed deployment of electric transmission to connect to renewable-rich regions to markets, Congress should consider policies that immediately extend the federal ITC to certain types of electric transmission investments. This would help unleash transmission that can, in turn, unlock renewables that are stranded or support the development of projects that are held up in the expensive and time-consuming interconnection queue process.

Senator Heinrich's S. 3107 (from the 116th Congress) provides a strong starting point by focusing on high-voltage transmission lines and innovative transmission technologies to bring additional clean energy resources onto the grid.[25] Providing a transmission tax credit, especially for long-distance transmission, ensures that the full cost of the delivery of clean power is eligible for federal incentives, thus allowing developers to submit cost-effective bids to those utilities standing on the sidelines. It would also incent developers to build much-needed interregional transmission projects that enable more projects to be built in the most cost-efficient way possible. In other words, the benefits of a transmission ITC are compounded, because it will spur new transmission development as well as new energy generation development as a result of the expanded capacity, both of which will create thousands of new jobs and facilitate huge investments in the communities where the projects are located. While the cost recovery for transmission lines is an area in need of regulatory attention, in the interim, an ITC for certain types of transmission would provide an immediate improvement that will reduce costs to customers and increase regulatory certainty to ensure transmission is able to deliver clean energy to market.

c. Effective Mitigation Policies so that Wind Projects and Military Operations Can Coexist

Decades of experience in developing wind farms in the U.S. and around the world has demonstrated that wind turbines, radar, and military training can coexist. The renewable industry recognizes that, in some instances (depending on location), wind farms can impact military operations. The industry has worked for decades with the military to safely site wind farms to avoid interference to military projects. As the

[25] *See* S.3107 - Electric Power Infrastructure Improvement Act, https://www.congress.gov/bill/116th-congress/senate-bill/3107/text?r=2&s=1.

wind industry continues to expand into the best wind resource areas of the country, the potential for radar interference is rising and must be solved. The federal government must commit to funding the necessary technological upgrades that will ensure that our national security is not compromised. To the extent any issues may arise after a project is constructed, interference can be avoided through mitigation measures.[26]

In order to reach a clean energy future, we need more regulatory certainty regarding the review process for renewable projects related to military projects. The Department of Defense Military Aviation and Installation Assurance Siting Clearinghouse (Clearinghouse) facilitates review by individual military services, major commands, and installations of proposed energy projects to ensure military compatibility. The office has functioned effectively since its creation under the Obama Administration in 2011. However, the budget for the Clearinghouse (approximately $2.1 million) has been flat or declined while the workload has significantly increased. In total, the Clearinghouse facilitated the review of 5,600 wind projects in 2018. This was up from 4,200 in 2017 and 3,700 in 2016. Congress should consider significantly increasing the funding for the Clearinghouse and military services/installations involved in energy project reviews to ensure the timely processing of proposed wind projects needed to meet clean energy goals.

It is worth noting that, for many situations, advances in radar technology could offer clear solutions. For example, scientists at the Massachusetts Institute of Technology's Lincoln Laboratory have designed a faster, more powerful "sidecar" computer processor to solve the interference issue experienced at Shepherds' Flat Wind Project.[27] In addition, multiple radars can be linked together to look on all sides of a wind project, 3-D radar enables military equipment to see through and above wind farms, and infill radar can provide supplemental coverage to an existing radar.[28] Federal investment in new radar systems and accelerated efforts to develop, test, and deploy mitigation options, are efforts that our industry not only supports, but is willing to lend a hand in implementing. The Federal Aviation Administration, Department of Defense, Department of Energy, and the National Oceanic and Atmospheric Administration, in collaboration with industry, need additional resources (dollars, staff and/or consultants) to prioritize development, testing and deployment of options (hardware, software) to reduce potential impacts from land-based and offshore wind turbines on different types of radars. The renewable industry stands ready to assist with data, site access, cost sharing, and mitigation ideas.

Comprehensive Clean Energy Policies Support Workers, Communities, and the Environment

At Invenergy, we are committed to leading workforce development efforts in the fast-growing clean energy field, as well as bringing the benefits of clean energy to everyone, including historically marginalized communities. Our growing workforce is evidence of the fact that the clean energy transition will create a variety of secure, sustainable jobs in clean energy for individuals in communities previously dominated by fossil fuel jobs, as well as for veterans, rural communities, and other otherwise disadvantaged communities. We also believe these jobs, as well as the benefits of clean power generated

[26] In such rare cases, our industry may also negotiate a mitigation agreement with DoD. https://www.energy.gov/sites/prod/files/2016/06/f32/Federal-Interagency-Wind-Turbine-Radar-Interference-Mitigation-Strategy-02092016rev.pdf at 2-3.

[27] DOE, Federal Interagency Wind Turbine Radar Interference Mitigation Strategy, https://www.energy.gov/sites/prod/files/2016/06/f32/Federal-Interagency-Wind-Turbine-Radar-Interference-Mitigation-Strategy-02092016rev.pdf.

[28] *Id.* at 5; DOE, Wind Turbine Radar Interference Mitigation Fact Sheet, https://www.energy.gov/sites/prod/files/2018/04/f51/WTRM_Factsheet_Final_2018.pdf.

by our projects, should be available to everyone, no matter the region or socioeconomic status of the people living there.

The clean energy workforce has skyrocketed in recent years, with the growth of solar and wind sectors rising by 24.5 percent and 16 percent, respectively. For instance, clean energy employment nationwide totaled 3,355,419 at the end of 2019, up from 3,264,383 jobs only a year earlier.[29] As we continue along the path to a clean energy future, we will create millions of additional jobs to develop and construct projects, manage the operations of these projects, and conduct ongoing maintenance of all connected systems. The renewable industry is committed to making sure they continue to be good, secure jobs.

Invenergy values the commitment made by the men and women who have served in uniform, as well as the dedication, strong work ethic, and leadership skills they bring to the renewable industry. Approximately 10 percent of Invenergy's employees are veterans, spanning from wind technicians to plant managers at energy centers across the country. In 2017, Invenergy received the Honoring Investments in Recruiting and Employing American Military Veterans Gold Medallion Award from the U.S. Department of Labor, which recognizes companies who have demonstrated exemplary efforts to recruit, employ and retain our nation's veterans.[30] Invenergy is also a founding partner of Veterans Advanced Energy Summit, a national program affiliated with the Atlantic Council that is designed to address the trends, technologies, and policies that are shaping the energy sector and developing a community of veterans and allies committed to advancing U.S. energy leadership. These types of efforts extend beyond Invenergy; for instance, the U.S. wind industry employs veterans at a rate of 61 percent above the national average.[31]

In addition, Invenergy recognizes that there is incredible untapped workforce potential in low-income communities, communities of color, rural and underserved communities, and communities where fossil resources have been retired. We are committed to investing in training and STEM programs to produce the next generation of workers in these communities. For example, Invenergy created a $30,000 per year scholarship in Deuel County, South Dakota, where we recently completed a utility-scale wind project, to benefit students at the local high school. We also have partnerships or relationships with many organizations across the country that support education programs in areas where our projects or offices are located, including organizations such as the Chicago Urban League and Project SYNCERE in Chicago. And, in 2019, Invenergy made a three-year sponsorship commitment to support Future Farmers of America (FFA) chapters nationwide.[32] Invenergy is the first sustainable energy company to establish a nationwide investment of this scale with FFA, and since more than half of Invenergy's U.S.-based renewable energy projects are in mostly rural areas where there is already an FFA chapter, Invenergy has a unique opportunity to make meaningful connections with like-minded people who believe in FFA's mission.

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[29] *See, e.g.*, Clean Energy Jobs America 2019, https://e2.org/reports/clean-jobs-america-2019; Clean Jobs, Better Jobs, https://e2.org/wp-content/uploads/2020/10/Clean-Jobs-Better-Jobs.-October-2020.-E2-ACORE-CELI.pdf.

[30] Invenergy Services Honored with 2019 HIRE Vets Gold Medallion for Commitment to Hiring Veterans, https://invenergy.com/news/invenergy-services-honored-with-2019-hire-vets-gold-medallion-for-commitment-to-hiring-veterans.

[31] *Winds Powers Job Growth*, Am. Wind Energy Ass'n, https://www.awea.org/wind-101/benefits-of-wind/powering-job-growth.

[32] *Invenergy announces first-of-its-kind 'four-star' sponsorship of the National FFA*, https://invenergy.com/news/invenergy-announces-first-of-its-kind-four-star-sponsorship-of-the-national-ffa

Despite these and other exciting investments Invenergy makes in the communities where we are located, simply creating workforce development programs may not be enough to tackle preexisting economic inequality and deliver meaningful career opportunities and paths to success in our industry. The clean energy industry must ensure that the benefits of clean energy, including jobs and environmental improvements, are available to all communities, including those hardest hit by the impacts of climate change. We also have an opportunity to ensure that the workers we invest in have the physical and social infrastructure and community resiliency to succeed. For example, Invenergy has a number of projects in predominantly low-income rural areas. These projects bring hundreds of jobs and millions of dollars to these communities, as well as other direct investments into the communities (for example, Invenergy often contributes to local education and sports programs and other community benefits). The clean energy industry is a significant driver of job creation and economic growth, and we recognize that these efforts will only be effective if we play our part in investing in the community as a whole—and provide solutions that are bigger than just a single training program or job opportunity.

Finally, I want to highlight that the deployment of renewable energy offers a unique opportunity to address environmental and social justice conditions in low-income communities, communities of color, Tribal and indigenous communities, and rural and underserved communities ("environmental justice communities"), while spurring the American economy. The renewable industry acknowledge that air pollution and other harmful environmental impacts disproportionately affects individuals in environmental justice communities. For instance, asthma rates among communities of color are twice as high as those among White children.[33] Indeed, environmental degradation serves to exacerbate health inequities, which is inextricably linked to the social inequities that exist in our society today. So, while we are rebuilding our economy from the economic downturn caused by the novel coronavirus, we believe that we must invest in clean energy infrastructure with deliberate actions that can advance the lives of environmental justice communities.

Zero-emission renewable energy, like that created by Invenergy's clean energy projects, alleviates the disproportionate share of environmental burdens placed upon low-income communities and helps more equitably distribute environmental benefits to those communities.[34] The low-cost, emissions-free electricity that our industry provides serves environmental justice goals at a community level. These benefits can be furthered by making clean energy more affordable, investing in environmental justice communities, and creating clean energy jobs across the country.

As we proceed on the clean energy path together, we must be vigilant to ensure that road involves smart investments to ensure a "just transition" and an equitable clean energy economy.

Conclusion

Thank you again for the opportunity to address this Subcommittee. The urgency with which we must tackle climate change has never been greater. Fortunately, we already have all the tools that are necessary

[33] *Green Causes Are Not Always Colorblind: Racial Disparity in Energy Issues*, CHESTER ENERGY AND POLICY (Mar. 5, 2018), https://chesterenergyandpolicy.com/2018/03/05/green-causes-are-not-always-colorblind-racial-disparity-in-energy-issues/.

[34] Uma Outka, *Environmental Justice in the Renewable Energy Transition*, 19 J. ENVTL. & SUSTAINABILITY L. 60 (2012), https://scholarship.law.missouri.edu/cgi/viewcontent.cgi?article=1420&context=jesl.

to deal with this challenge and transition to a clean energy future, and they can be deployed cost-effectively and reliably given all the advances of the renewable industry over the prior decades. More than ever before, the private and public sectors are aligned and moving in the right direction. The path to achieving our goals is not mysterious. We need the resolve of the federal government and the cooperation of our state and local governments to facilitate the necessary build-out of the transmission system to deliver clean energy. Transmission is as core to the future of our electrified economy as the interstate highway system has been to interstate commerce today. We need the federal government to establish a comprehensive, long-term energy policy that will serve as a guide for the public and private sectors so that periodic changes in government leadership are not disruptive to achieving the overarching goal of a clean energy future. Finally, we need to take this opportunity to ensure a just and equitable transition for our marginalized communities.

What we have before us is a once in a life-time opportunity to collaboratively tackle the most existential challenge that modern mankind has ever faced. And we must because as our CEO Michael Polsky has said countless times about renewable energy, “it just makes sense.”