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Introduction

Chairwoman Castor, Ranking Member Graves, and members of the Select Committee, thank you for inviting me here today and for your interest in solar energy.

I am Abigail Ross Hopper, president and CEO of the Solar Energy Industries Association (SEIA). SEIA is the national trade group for America's solar energy industry with 1,000 member companies. Approximately 250,000 Americans work in the \$17 billion solar industry. We recently celebrated the two millionth U.S. solar installation in May. It took us 40 years to reach the first million installations in 2016 and only three years to double that number. And buckle up because we are about to enter the Solar+ Decade. What do I mean by that? Solar generation currently provides 2.3% of our electricity in the United States; by 2030, we aim for solar energy to be 20% of the electricity generation mix. To get there, SEIA has designated the 2020s the Solar+ Decade, recognizing the fact that the industry will need to both aggressively pursue policies to facilitate solar deployment while also collaborating with other technologies to make it happen.

Our target is aggressive, but we cannot afford to wait to address the climate crisis. That 20%, or something close to it, is what we as an industry need to achieve if we are to meaningfully address climate change and fulfill our role in keeping global temperature rise below 2 degrees Celsius. Climate scientists are clear that electricity generation plays a large part in carbon emissions. Solar deployment can help reduce emissions, support local economies and good jobs, reduce air pollution, and provide low-cost energy to American families and businesses. The solar industry today, at just 2.3 percent of our nation's electricity production, reduces carbon emissions by 73.3 million metric tons per year. That is the equivalent of taking 15.6 million vehicles off the road or planting 1.2 billion trees. The carbon reduction attributes of solar are significant.

To reach our aggressive 20% by 2030, we will need to install an average of 39 gigawatts (GW) each year through the 2020s. That's up from 10.6 GW last year. We'll need an average annual growth rate of 18% and cost reductions across all market segments of nearly 50%.

If we achieve this goal, we will create 350,000 additional jobs and build more systems annually than we have installed to date. That means there will be a total of 600,000 solar jobs in 2030. That's more workers than every single U.S. company except for Walmart, more than the utility industry, and more than the mining and oil and gas extraction industries combined. And when we grow this workforce, it will be with an eye toward diversity and inclusion.

In this scenario, our industry will add more than \$345 billion into the US economy over the next ten years, reaching \$53 billion annually. Our success will prove that climate solutions don't hurt the economy, but instead, are some of the strongest economic growth engines we've seen in decades.

Your Committee is charged with a special task — to advise Congress on opportunities and policies that exist to help address the climate crisis. That's why I'm pleased to be here today representing this vibrant

industry. Solar offers Americans options and answers on climate change, as well as tremendous opportunity for economic growth and job creation across the country.

What Has Worked

How has solar grown so rapidly and successfully? What makes me so confident about the Solar+ Decade? Let me share with you a few examples of policies that have made a real difference, at both the federal and state levels.

Federal

At the federal level, the leading policy that has led to the deployment of solar nationwide is the Investment Tax Credit. To put it simply, the ITC has worked and worked well. The ITC has helped to create hundreds of thousands of jobs and spurred billions of dollars in economic growth. As we come to the end of 2019, we approach an annual step-down in the ITC which will lead to an eventual phaseout of the credit for residential and a much-reduced credit for commercial and utility-scale solar.¹

With the solar industry facing cost increases from tariffs and the most recent Intergovernmental Panel on Climate Change report indicating that rapid decarbonization is necessary to mitigate some of the worst effects of climate change, the timing is not right for a stepdown or phaseout of this extremely valuable tax credit that spurs increased development of renewable energy. Until Congress passes a carbon tax or other comprehensive legislation that addresses climate change, the ITC is the most effective policy we have to deploy clean energy. In short, the ITC is more than just a pro solar policy. It is a pro planet policy.

Solar has also benefitted from other federal policies, including the Public Utility Regulatory Policies Act, which encourages the development of small-scale renewable and cogeneration facilities. Additionally, federal investments in energy research through the Department of Energy have long paved the way for commercialization of technologies. Federal solar research has made the United States a global leader in solar technology development. This includes research on battery storage, which is absolutely part of the future of additional renewable deployment.

State

At the state level, there are numerous examples of state policy that has accelerated the deployment of solar energy. States like Arizona, Texas, Nevada, California, North Carolina, New Jersey and Massachusetts have had enormous growth in solar energy deployment, largely because of policy incentives and programs that support the new development of solar projects.

One example of effective state policy is renewable portfolio standards. In Maryland, for example, the Clean Energy Jobs Act passed in 2017, enacting a 25% renewable electricity standard by 2020. This legislation was a broad success, prompting the creation of thousands of solar jobs. Earlier this year, Maryland doubled down on its commitment, raising Maryland's requirement for renewable energy to 50% by 2030, including a 14.5% requirement for in-state solar by 2030. This legislation had bipartisan support and will continue to catalyze job growth and solar development across the state.

¹ The ITC for both commercial and residential is 30% until Dec. 31, 2019. Thereafter it steps down to 26 percent in 2020 and 22 percent in 2021. After 2021, the residential credit will drop to zero while the commercial and utility credit will drop to a permanent 10 percent.

In South Carolina, Governor McMaster signed legislation in May that lifted caps on the amount of rooftop solar allowed in certain areas and eliminated restrictions on solar-leasing programs. The Energy Freedom Act, passed unanimously by the Republican-led South Carolina House and Senate, also improves opportunities for utility-scale solar developers, including provisions to require the Public Service Commission to review and approve rates and terms provided to utility-scale solar facilities which will ensure contract terms are reasonable for such projects. In addition, the new law will allow large energy customers to negotiate directly with renewable energy suppliers and provide for more transparency and competition in long-term utility-generation planning.

In the Midwest, Illinois passed the Future Energy Jobs Act (FEJA) in 2016 which aimed to grow the solar workforce in the state. FEJA authorized a total of \$30 million to develop three clean energy job training programs. The Act established a solar installation training pipeline. Despite a national trend of contracted solar job growth in 2018 due in part to solar tariffs, Illinois added over 1,300 solar jobs in 2018, and is projected to continue growing.

California also made headlines last year with its enactment of a requirement for newly constructed homes to either have solar panels on the home or be connected to a shared solar system that serves multiple homes. This code will allow homeowners to experience lower energy bills and a projected overall savings when factoring in the cost of the solar array. This standard was groundbreaking and will provide immense benefits to California and its residents when it goes into effect next year.

Two other policies that have supported residential and small commercial solar are net metering and rate design. Net metering, which provides a credit to a system owner for power sent to her neighbors, has been critical in fostering rooftop markets in many states. Similarly, rate design that does not unfairly burden solar owners with unwarranted fees and charges simply because they installed solar, will be critical to this sector as the industry moves forward. Although states with high levels of rooftop solar are rightly beginning to explore successors to net metering, we have unfortunately seen actions in states with very small rooftop markets that attempt to use rate design to stymie a growing industry before it takes hold.

Challenges to Faster Deployment of Solar and Policies That Can Help

Despite these shining examples of federal and state policies, we must acknowledge that our industry still faces major challenges as we drive towards 20% of generation. Despite the solar industry's growth, future deployment still faces challenges. While the cost of solar has dropped dramatically in recent years, added costs from tariffs, extended and unpredictable timelines for permitting and interconnection, uncertainty about the future of tax policy, slower than needed deployment of storage resources, the need for infrastructure investment, and workforce needs pose potential roadblocks to solar growth across the country. There's a lot at stake in getting renewable energy deployment right and facilitating it as rapidly as possible. As the Committee considers options to include in its report, we recommend your attention to the following:

Extend the ITC as We Seek Consensus on Broader Carbon Policy

As I mentioned earlier in my testimony, the federal solar ITC has been an outstanding success and continues to drive major growth in our industry. It has created hundreds of thousands of jobs and, at last count, \$140 billion dollars of investment. And yet, just as Americans demand action on climate change and new markets in areas like the Midwest are opening up and growing, the ITC is scheduled to begin to step down in its value at the end of 2019, phasing out entirely for residential solar by 2022, and falling to just 10 percent for commercial and utility-scale solar. This is a challenge for our industry and for our climate.

One thing that Congress can do now that will absolutely help deploy renewables faster is to extend the Investment Tax Credit. It's that simple. Solar comprises only 2.3% of generation nationwide and we are at an inflection point where strong and proven tax policy can make a difference in the clean energy economy. In order to get where we need to be, and meaningfully cut emissions, the ITC extension is a must. Given the focus of Congress on new sources of economic growth and jobs, as well as renewed spirit in genuinely addressing climate change, now is not the time to diminish support for a core part of U.S. climate policy. SEIA is also participating in ongoing conversations in Congress about broader climate policies through the tax code – from next generation tax credits, such as a technology neutral tax credit, which we have endorsed, to thinking critically about a carbon tax that appropriately prices the externalities of energy generation. As an organization, we are generally supportive of these approaches and think they would comprise a wholistic approach to carbon policy.

However, until there is bipartisan consensus on what comes next to tackle our climate challenges, we urge Congress to use the proven tools it has available. The stakes are far too grave. Tax credits like the solar ITC work and will continue to work if extended. Let's put it in perspective – as mentioned earlier, the solar industry today, at just 2.3 percent of our nation's electricity production, reduces carbon emissions by 73.3 million metric tons per year. That is the equivalent of taking 15.6 million vehicles off the road or planting 1.2 billion trees. Just imagine the impact solar energy can have in the future if we reach our goal of 20 percent of electricity generation by 2030.

Invest in Energy Storage

Energy storage coupled with solar will be a critical part of achieving 20% solar by 2030. Solar + storage is the future of our industry and vitally important for getting more solar on the grid. Storage can ensure that the solar resource can be optimized and provide the reliability required on the grid. Already, solar + storage projects are being built across the country in residential, commercial and utility-scale contexts. In fact, major corporations like Target and Wal-Mart have made significant investments in solar + storage in recent years.²

The Energy Storage Association forecasts that we will reach 35 GW of new storage by 2025.³ That has far-reaching implications for solar and other renewables. However, energy storage needs support to grow and deploy as rapidly as we need.

Congress can help by facilitating energy storage research and deployment through research funding, infrastructure, and tax policies, like the current bipartisan legislation that will codify storage within the Investment Tax Credit. As our nation becomes more energy independent, eliminating the 70% cliff for storage under the solar ITC or full ITC treatment for storage will help integrate renewable energy resources into the larger utility network. Infrastructure legislation can incentivize integrating storage on the grid. Federal research dollars can also help support the development of the next generation of energy storage technology we will need to continue to deploy more renewables.

Foster Trade Policies that Support Renewable Energy

Americans now pay more for solar panels than the rest of the world. Last year, President Trump imposed tariffs on most imported solar modules and cells. These tariffs raised prices of panels by 30% in

² *Solar Means Business*, Solar Energy Industries Association. Available at <https://www.seia.org/solar-means-business-report>

³ *35X25: A Vision for Energy Storage*, Energy Storage Association. Available at <http://energystorage.org/vision2025>

2018, and, despite the rate of tariff stepping down annually, will remain an added cost of panels and cells for developers of solar projects across the United States.

This policy was a major challenge for SEIA's member companies and the industry. Not surprisingly, the industry saw a contraction in deployment, investment, and hiring as a result of the price uncertainty and increases that the Section 201 trade case imposed over 2017 and 2018. As a result of the tariffs, solar lost 8,000 jobs as well as potentially 10,000 more jobs that were never created. We deployed 2 GW fewer than we had expected, and the American economy lost out on billions of dollars of potential investment. Trade policies must support deployment of clean energy and not create roadblocks.

Maintain and Expand Competition in Electricity Markets

Congress and regulatory agencies need to maintain and expand opportunities for competition in electricity markets. In places still served by vertically integrated utilities, discriminatory interconnection practices and other anti-competitive behavior must not be tolerated. Congress should maintain the regime established by PURPA, under which qualifying facilities bring competitive pressure when they can serve load for less than the utility's avoided costs. Attacks on PURPA are attacks on competition; any changes made to PURPA should enhance competition, not stifle it. The Federal Energy Regulatory Commission (FERC), with strong oversight from Congress, should ensure that PURPA is implemented in a transparent and non-discriminatory manner, and that adequate enforcement follows any improper action on the part of utilities or their state regulators.

In regions with wholesale electricity markets, competition must expand to include storage assets and distributed energy resources to bid into and fully participate in those electricity markets. FERC has taken some initial steps with Order No. 841, which addresses storage assets, but we are still waiting for similar action to establish the participation rules by distributed energy resources.

Overall, we must have wholesale market rules that value all the services that solar – whether connected to the transmission or distribution grid – can provide, from energy to frequency regulation, and that anticipate a future with solar + storage resources. Of note, FERC's recently finalized storage rule does not require regional transmission organizations (RTOs) to identify how they will interconnect and accommodate bids from solar + storage resources. This gap must be remedied soon, as the private sector is already deploying assets in this configuration. Capacity market rules must fairly account for solar and solar + storage assets. FERC and RTOs should resist calls to support aging, uneconomic generation resources with out-of-market payments. Even the rules that govern who is allowed to participate in RTO stakeholder processes merit review. In a recent decision, FERC rightly concluded that certain rules for stakeholder participation constitute a barrier to entry for generators and small load-serving entities, and are therefore unjust and unreasonable and must be changed.⁴ Congress and FERC must continue to ensure robust competition in all wholesale markets, as we know competition delivers lower costs to end-use consumers.

Finally, there is room for more competition at the retail level, too. We see corporate buyers and homeowners choosing more solar every year; it is critical that customer demands can be easily met by solar generation.

Invest in Electric Infrastructure

⁴ See American Wind Energy Association and The Wind Coalition v. Southwest Power Pool, Inc., 167 FERC ¶ 61,033 (April 18, 2019)

Our nation's electric grid is in dire need of upgrades, and a push to electrify the economy necessitates additional investments in generation, transmission, and distribution lines. The United States needs massive infrastructure investment to update the grid, improve resilience, and expand transmission. We need to modernize the grid to allow for distributed energy assets to be better integrated and we need to build more transmission infrastructure to allow for more utility-scale solar to be delivered. Moving clean electricity from remote areas onto the grid is a key component of our ability to deploy more renewable energy. One of the primary barriers to solar is the lack of transmission capacity serving areas with quality utility-scale solar resources which are often located in remote rural areas. As demand for electricity grows, transmission will become a more critical issue. Leadership is required to create coordinated and cooperative planning efforts to ensure transmission capacity for renewable energy generation resources like solar. The federal government can also develop guidance and information-sharing portals that make it easier for solar to connect to the distribution grid and reduce interconnection wait times.

As the transportation sector is further electrified, federal policies should also support using renewable energy to power surface transportation infrastructure like the many new charging stations that will be required. These stations must be in every community and take into consideration existing community assets and accessibility.

Analyze Renewable Portfolio Standards

As we have seen in the states, renewable portfolio standards help to spur considerable investment in renewable energy. More than half of all U.S. states have some type of renewable portfolio standard or goal in place. Most state targets are between 10% and 45%, but a growing number, including California, New York, and New Jersey, to name just three, have requirements of 50% or greater. Several pieces of legislation exist to create Renewable Portfolio Standards at the federal level. If Congress chooses to consider a federal standard, we know solar energy will be an important part of any proposed solution.

Cut Red Tape

In some states, installing solar is becoming as common as getting a new air conditioner. While installing solar is routine, safe and simple, the process of getting permits, inspections and permission to interconnect a solar system can often stretch into months. These delays drastically increase the cost of solar deployment compared to other developed countries such as Australia and Germany.

We can do better and are working to improve these processes in the United States, but it is a big challenge that needs support from the federal government. The United States has about 15,000 different permitting jurisdictions and about 3,000 electric utilities that all have their own processes, leading to a highly fragmented and inefficient business environment. To meet our climate goals, we need to drastically streamline these permitting processes to cut as much as 40% off the cost of rooftop solar energy systems. Congress can assist by funding research and initiatives that create voluntary streamlined permitting for solar.

Modernize Policies around Federal Property and Lands Management

The federal government must also look at policies to improve permitting for solar projects on federal lands and make additional opportunities available for solar investment in areas that may be challenging. One of the great things about solar is that it can be installed in a variety of places – rooftops, in fields, and even on previously-developed property known as brownfields. EPA has a Brownfields Program that provides grants and technical assistance to sustainably reuse contaminated property, and several states have similar offerings, including Massachusetts, New Jersey, New York.

Federal buildings can also benefit from solar and save taxpayers money. But additional reform is needed for federal contracting practices that often prevent federal buildings from installing solar. An unintended consequence of the current federal acquisition law is the limited authority of the executive branch to enter into long-term clean energy contracts. For example, most federal agencies cannot enter into Power Purchase Agreements (PPA) with terms longer than 10 years. Unfortunately, this truncated timeline hinders the financial viability of projects that could reduce federal energy costs, meet clean energy requirements, create jobs and promote energy security for the country's most important missions.

Invest in Workforce Development

Solar is also limited by the ability to attract, train and retain a skilled workforce that can meet the industry's growing demands. In the future this issue will become even more dire. For example, rural areas have available land needed to develop utility-scale solar projects. But these companies have challenges building the robust workforce needed to construct a large solar array, making it difficult to expand solar to new areas or markets.

Solar jobs are well-paying careers. In fact, eight states such as Florida, California, and New Mexico list solar installer as their fastest growing job, according to the Bureau of Labor Statistics. Construction workers, project managers, electricians, and engineers are in high demand and labor requirements for a solar project can vary state to state.

Both solar-specific job training and the workforce itself are needed to build the solar needed to reduce emissions from the energy sector and spread the economic benefits of solar to communities across the country. SEIA is also leading work to make sure that as the solar industry grows, we deliberately reach into communities that have not benefitted from renewable energy in the past, to train workers, and bring jobs, economic investment, and clean solar energy opportunities to every zip code. SEIA recently co-published with The Solar Foundation the 2019 Solar Industry Diversity Study as well as a companion guide on diversity best practices.⁵

Congress should support policies that make training for renewable energy jobs more accessible to a wide range of people and communities. SEIA is also working on a diversity initiative through Historically Black Colleges and Universities to ensure there's a pipeline of strong candidates in a range of disciplines that are ready to join the solar workforce. Workforce policies can also build on the skills of veterans, many of whom have grown familiar with solar through their service in the military. Additional policies and programs, like Solar Ready Vets, can help facilitate the transition from military service to clean energy jobs.

Incentivize Solar on New Construction

Building codes have made new homes and buildings safer, more comfortable and efficient. The next step in building evolution is solar. Solar can help meet the energy needs of new homes and make home ownership more affordable. Including solar on new construction may be the most cost-effective way to build residential solar and can cost less than a dormer window or granite countertops. Including solar on new construction saves homebuyers the extra costs associated with retrofitting solar after construction. Unfortunately, the most recent model building energy codes penalize the use of solar as a compliance

⁵ The Solar Foundation and SEIA, *U.S. Solar Industry Diversity Study*. Available at: <https://www.thesolarfoundation.org/diversity/>

measure. This imposes unnecessary costs for homebuyers. Congress can explore ways to eliminate barriers and incentivize solar on new construction to save energy and costs down the line.

Support Clean Energy for All Communities

Too often, renewable energy has not been available to help every community, particularly those that are low-income, urban or rural. Leadership and investment are necessary to make sure that every community is included in the clean energy economy. The benefits in terms of cleaner air, jobs, economic investment and resilience will far outweigh any initial cost.

Community anchor institutions, such as schools, community centers, libraries, post offices and other public buildings can play an important role in meeting renewable energy goals. While some of these institutions are already using solar, much more can be done. The federal government can provide incentives for additional solar installations on these buildings, which not only create an added layer of resilience to communities, but also reduce costs to the local taxpayer through energy savings.

We also urge the Committee to recommend support for community solar deployment, which makes solar energy available to people who cannot put solar on their own homes or who live in multi-unit dwellings. In addition to streamlining interconnection processes and upgrading the distribution system to allow for more deployment of distributed/community solar (both of which are discussed above), the federal government can incentivize states to develop their own community solar programs by providing technical assistance and funding.

Low-income energy assistance programs to help families install solar will also help ensure that every American has access to clean, renewable energy. These programs can be vital for bridging gaps for communities to benefit from clean solar energy. Investments that help low-income communities benefit from solar help make sure that no community is left behind in the clean energy economy. Such programs also ensure we remedy the mistakes of the past, when low-income communities too often bore the brunt of the environmental costs of more traditional energy production and distribution.

Rural America and our nation's farmers also benefit from solar energy. SEIA supports the Rural Energy for America Program (REAP) within the Department of Agriculture. This program can help farmers reduce input cost with a range of renewable energy options, including wind and solar. At a time when many agricultural producers are struggling, REAP creates additional revenue streams and helps support farmer incomes. Some farmers have even begun to co-locate their solar investments with other forms of agriculture production, including sheep grazing and beekeeping.

The Committee must also be certain to consider the unique energy needs of Native American tribes and people living on tribal lands. Policies should be supported that center tribal members in the development and execution of renewable energy projects and help tribes benefit from the jobs and economic opportunities that come with them. This is especially critical in communities that have historically focused on fossil fuel extraction and where many jobs are at stake. Solar projects already exist on tribal lands to provide solar jobs and solar energy. Two such examples include a project Swinerton Renewable Energy is working on with the Navajo Nation in Kayenta, Arizona, and the work of a company called Native Renewables to both provide clean electricity to the Navajo Nation and create sustainable energy knowledge among all age groups. With additional support for hard and soft costs, microgrid development, job training and technical assistance, Congress can help speed deployment on Native lands across the United States.

Conclusion

The benefits of deploying additional renewable energy are enormous. Together, our technologies will provide options for clean energy, offer solutions on climate change, grow the economy, and create hundreds of thousands of jobs.

Over the next 10 years, the Solar+ Decade will be about collaboration and building the partnerships and expertise needed to overcome systemic challenges preventing the widescale adoption of solar. To achieve this goal, solar, wind and storage must work together to transform a complex and interrelated world of markets, customers and electricity systems.

It is incumbent upon renewable industries to create a shared clean energy vision. It won't be just the Solar Decade, but the Solar+ Decade where Solar + Storage, Solar + Grid Modernization, Solar + Wind, and Solar + Overwhelming Public Support combine to define our nation's clean energy future.

Renewable energy industries like solar, wind and storage must work together to aggressively pursue policies to deploy more renewables on the grid and increase access to consumers and businesses looking to lower their energy costs across the country. Together, we'll write a new story for American energy in the 2020s. We invite Congress to join us in sharing this vision. I am confident that together we will provide countless benefits to the American economy and the American people while also creating a livable climate for future generations.

I thank you for this opportunity to testify before the Select Committee on the Climate Crisis. I look forward to answering any questions you may have.