

**Testimony of Abigail Ross Hopper, Esquire  
President and CEO  
Solar Energy Industries Association**

US House of Representatives Committee on Science, Space, and Technology  
Subcommittee on Energy  
*Advancing the Next Generation of Solar and Wind Technologies*  
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Chairman Lamb, Ranking Member Weber and members of the Subcommittee, thank you for having 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.

There is bipartisan support for solar, with policymakers in both parties taking action at the federal, state and local level to advance this clean, competitive, job-creating energy source. The modern solar industry benefits from technology that the Department of Energy helped bring to market. This includes solar plus storage which has achieved higher asset utilization, smart inverters for flexible power control, better communications and data analytics, and improved codes and standards. SEIA's companies benefit from the products of federal research and development, and we support the Committee's draft bill to authorize and fund solar research.

The economic opportunity proffered by the growth of the solar industry is enormous, and the stakes couldn't be higher. My testimony will address the vision we must have and the targets we must hit to tackle the massive challenges this moment demands. We are determined to do our part to meet climate targets. That's why the solar industry is developing a roadmap for exponential growth in the 2020s. Federal research and development is an essential element to helping us reach these ambitious goals.

**The 2020s: The Solar+ Decade**

Solar represents 2.5% of U.S. electricity generation today; the industry has established an aggressive goal to make solar account for 20% of all U.S. electricity generation by 2030. Solar won't be the only source of clean new electricity, but it will be the dominant new source.

To get there, we're going to need to install an average of 39 GW each year through the 2020s, including 77 GW in 2030 alone. We'll need an average annual growth rate of 18% and cost reductions across all market segments by nearly 50%.

If we achieve this growth together, we will create 350,000 additional jobs and build more systems annually than we have installed to date. There will be 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.

This level of employment growth will mean not just a larger, but a more diverse workforce, which will require federal job training support. The need for a larger pool of workers is just one reason I have made diversity and inclusion one of my top priorities. We must ensure that people of all backgrounds,

genders, and abilities have access to both solar energy jobs and solar energy itself. That in turn will lead to a stronger, more creative, more effective and more successful workforce in the next decade.

If we achieve our 20% goal for solar by 2030, our industry will add more than \$345 billion into the U.S. economy over the next ten years, reaching \$53 billion annually. Achieving this goal will also have an impact on Americans every day who will enjoy greater choice, lower cost energy bills and cleaner air.

Solar technology has come a long way in the 45 years my organization has existed, but the next decade will require radical market transformation, an overhaul of the way our power grid operates, and aggressive collaboration to make the industry's vision a reality. We are going to need Solar+ Storage, Solar+ Grid Modernization, Solar+ Cybersecurity and Solar + lower soft costs, to name a few.

### **Where We Are Now**

Think about this: ten years ago, there was 1.5 gigawatts (GW) of solar installed in the United States and solar represented less than 0.1% of U.S. electricity supply. The main problem at the time? Costs. Recognizing that challenge, the Solar Energy Technologies Office (SETO) established its own aggressive goal—to make solar cost competitive with fossil fuels by 2020.

The private sector and DOE rallied around this big cost-cutting goal. For the past decade, the office has funded research programs that have helped bring down costs by 70%. Together, three years ahead of schedule in 2017, the office announced that the solar industry achieved its utility-scale solar cost target. The U.S. economy saw immediate gains from this work and your home states are benefitting from the increased solar activity made possible by advanced solar research:

- In Pennsylvania, there are more than 550 solar companies consisting of manufacturers, installers, developers and other solar related businesses. In the 17<sup>th</sup> district of Pennsylvania alone, there are 26 solar companies. There are more than 50,000 homes powered by solar in Pennsylvania. The current total solar investment in the state amounts to \$1.65 billion and eight active SETO-funded projects receiving \$12 million.
- The state of Texas stands 5<sup>th</sup> overall for the most solar for any state in the United States. Solar powers nearly 350,000 homes in Texas. There are approximately 650 solar companies employing nearly 10,000 people in the state. Texas is poised to become a national leader in solar energy in the next 5 years. There are 10 active SETO-funded projects receiving \$19.6 million.
- In South Carolina, nearly 80,000 homes are powered by solar. The state is home to 80 solar companies and solar provides approximately 3,000 jobs. Several retailers have gone solar, with Target having installed one of the largest corporate photovoltaic systems in the state. There remains an enormous amount of capacity in the pipeline, with more than 805 MW of solar projected to be brought online over the next 5 years. There are two active SETO-funded projects receiving \$2.4 million.
- Illinois boasts 366 solar companies located in the state and nearly 17,000 homes are powered by solar. Illinois is a growing solar market that has benefited from a strong renewable portfolio standard that requires that 25 percent of electricity be generated by renewable sources by 2025. The amount of solar capacity installed in Illinois is expected to grow by more than 1,700% over the next five years. There are 15 active SETO-funded projects receiving \$17.6 million.
- Arizona ranks 3<sup>rd</sup> in the nation overall for the most solar. Arizona has more than 550,000 homes powered by solar and more than six and a half percent of the state's electricity is produced by solar. Arizona has more than 450 solar companies and the state ranks 7<sup>th</sup> in the US for the most solar growth expected in the next 5 years. Arizona boasts over 7500 solar jobs. In the 5<sup>th</sup> district

of Arizona alone, there are 32 solar companies. There are over 20 active SETO projects receiving more than \$25 million, with much of that funding going to Arizona State University.

At the close of this decade, we now have 2 million solar installations across the country and last year we hit 70 gigawatts of installed capacity. That is a 4,700% increase from 2010. SETO's 2020 cost-cutting goal put a stake in the ground and jumpstarted research activity in the solar industry. We're here to do that again.

### **The Role of Federal Research**

Federal investment in solar research and development has long paved the way for commercialization of technologies. Federal solar research has made the United States a global leader in solar technology development. Additionally, as discussed above, the dramatic cost declines in the 2010s happened because of the vision of SETO in setting, and then investing federal research dollars, into meeting that goal. The nation needs continued strong investment in solar research to ensure that the United States remains a global leader in solar technology development and cost reduction.

Through competitions and aggressive milestones built into each project, federally supported research programs bring together diverse partners and encourage efficient and effective research. In some cases, this research can help companies right away. From permitting and finding customers to addressing siting for both residential and utility-scale installations, SETO helps solar companies build businesses faster. For example, finding customers is a major cost for nearly every residential solar company. EnergySage, a SEIA member company, received early support from SETO to build its online solar marketplace which links homeowners who want to go solar with companies that can meet their needs. In this way, SETO research dollars help support hundreds of companies.

SETO also supports startups like SEIA member Aurora Solar which used a research award to develop a sophisticated 3-D modeling program that precisely calculates the solar potential of a building's roof. This research award and the technology it supported has allowed Aurora Solar to grow its customer base and become a thriving solar software company.

SETO and the national labs also provide unbiased, relevant technical information and analysis that will undoubtedly contribute to the industry achieving 20% solar by 2030. Here's just one of many examples of why federal investments in solar research are valuable.

Recently, parts of Hawaii had relatively high solar penetration on the grid compared to other parts of the United States. The utility shut down all additional interconnections. However, with funding from SETO, National Renewable Energy Lab (NREL) with support from the solar industry and Hawaiian Electric (HECO), conducted data modeling and was able to show that Hawaiian Electric could host more than twice as much as they were currently without problems.

As states are dealing with physical infrastructure issues that are more advanced, utilities must be sharper in their analysis. Congress needs to make sure we provide not only funding so that there is more accessibility to this kind of data modeling, but also direct the development of standards incorporating the use of that data so utilities don't just throw up their hands and say "everything has to stop" when it comes to connecting more solar to the grid.

That's why federal support is uniquely valuable. Without federal funding for state-of-the-art data modeling, technology and knowhow, this is the type of risk and expense private industry usually cannot take on by itself. Federal research provides holistic leadership to support the pipeline of research the solar industry needs to meet our ambitious goals. Further, national laboratories such as NREL, Lawrence Berkeley National Laboratory, Sandia National Laboratories, Oakridge National Laboratory, and others serve as critical independent messengers to perform and disseminate complex analyses and they have earned the trust of solar and utility executives.

### **Solar Research for the Solar+ Decade**

While there are many notable areas for further research, to reach 20% solar by 2030, the committee should prioritize funding for the following approaches and areas of solar research.

#### Addressing Soft Costs Through Targeted Research and Programming

Soft costs—the non-hardware costs like permitting, inspection, interconnection, customer acquisition, and labor—are increasingly representing a larger share of the cost of a solar energy system. Funds for these programs have continually been zeroed out by the Administration and we ask that you not only continue funding these programs but increase funding.

Let me give you an example. Siting major utility-scale projects presents a significant risk for developers and requires extremely technical information about the geographic and other characteristics of a possible site. Getting this right is critical and can lead to major cost savings. SEIA member company 7X Energy partnered with SETO to allow the company access to Smart Power Maps, a highly sophisticated software platform that GeoCF developed with support from SETO. This platform combines numerous data sets including geospatial and other characteristics to evaluate potential utility-scale development locations and acquire necessary permissions for development.

As the Department has done for other technologies, SETO has funded and can continue to fund research and analysis to overcome siting and permitting challenges associated with building large facilities, including producing materials that can help stakeholders understand the benefits of having those facilities located nearby and helping put to rest fears about those facilities.

Another way to cut soft costs is streamlining permitting and interconnection processes. More efficient permitting could save customers, \$1 per watt (roughly 40%) on the cost of a residential solar energy system. This includes direct costs such as fees and indirect costs such as the burdensome application process, the time it takes for an inspection and the high cost of losing customers who are frustrated with long approval times. These issues impact both established and emerging markets alike. Solar Automated Permit Processing, or SolarAPP, is an initiative to create a simple, standardized, no-cost online platform for local governments, that not only reduces costs but improves workflows for local governments and allows building officials to focus their efforts where they are needed most. We urge the committee to fund SETO to advance collaborative permitting and interconnection reform efforts like the SolarAPP.

#### Prioritizing the Security, Resilience, and Efficient Operation of the Grid

Easing grid integration should continue to be a top priority. If the solar industry achieves 20% solar by 2030, it's estimated that 15 million solar systems will be connected to the grid including hundreds of gigawatts of large-scale projects. That 20% won't be evenly distributed across all 50 states. Some states might have 70% solar while others might have 5% or 10%.

The grid must be able to handle this influx of variable generation and invest in infrastructure upgrades necessary to hit the target. Investing in cybersecurity technologies for photovoltaic and other grid-interactive systems today will ensure that the systems coming online are not only more secure but can recover faster if there is a cyber or physical disturbance.

#### Advanced Manufacturing

We are also supportive of efforts to advance U.S. solar manufacturing. DOE's program to reward competitors with support from U.S. national laboratories and regional incubators is a pro-competitive way to fund R&D efforts.

The U.S. has the best national laboratories and start-up incubators in the world. Leveraging these resources is essential to improving the competitiveness of U.S. solar manufacturers and the long-term health of the U.S. solar industry.

We've seen hundreds of millions of dollars in recent investments in large-scale solar manufacturing, including new manufacturing plants in Georgia, Florida, Mississippi, and Ohio. As our industry continues to expand, opportunities for new U.S. solar manufacturing will grow as well. Getting to 20% solar energy by 2030 will enable a domestic market large enough to support competitive, scaled solar supply chains in the U.S., from panels to steel and aluminum mounting structures.

#### Storage and Later Stage Demonstration and Deployment

Over the years, we've seen a decline in funding for later stage technologies and field demonstrations. You simply cannot secure customers for a new technology without first verifying that it works as expected. In addition, energy storage will be a vital part of achieving 20% solar by 2030. But few utilities will incorporate large volumes of storage without performing demonstrations. We need to know how these systems will interact with one another and grid operators must be able to effectively use their solar and storage assets. We urge you to support funding for later stage projects.

#### **Conclusion**

Thank you for your time and continued support of the solar industry. The vision I have outlined is bold, but achievable. We're calling on the solar industry to once again come together to overcome the systemic challenges we must face in order to make the 2020s the Solar+ Decade. But we can't do it alone—research and collaboration with the federal government will be key to our success and that means strong authorization language and funding to make sure it happens. Our first steps into the Solar+ Decade start here.

I look forward to answering any questions you may have.