Testimony of

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on behalf of the

**U.S. ENERGY STORAGE ASSOCIATION**

before the

**United States House of Representatives**
**Committee on Energy and Commerce**
**Subcommittee on Energy**

Hearing entitled

**"Saving Energy: Legislation to Improve Energy Efficiency and Storage"**

February 12, 2020

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Chairman Rush, Ranking Member Upton, and Members of the Subcommittee—

On behalf of the U.S. Energy Storage Association (ESA), thank you for the invitation to speak today on legislation before you today to promote technological innovation and modernization of the grid with energy storage.

ESA is the national trade association working toward a more resilient, efficient, sustainable and affordable electricity grid enabled by energy storage technologies. With 190 member companies, ESA represents a diverse group of power sector stakeholders, including independent power producers, electric utilities, energy service companies, financiers, insurers, law firms, installers, manufacturers, component suppliers and integrators involved in deploying energy storage systems throughout the United States on the electric grid, in homes and businesses, integrated into critical infrastructure and in military installations. We represent a broad technology base that includes electrochemical, thermal, mechanical, process, chemical, and pumped hydro storage.

*About Energy Storage*

Our electric system is bound to a simple reality of physics—supply must precisely match demand at every moment, everywhere. Energy storage technologies are transformative for the electric system because they enable electricity supplied from any source to be saved for use at a later time, precisely when, where, and in whatever form it is most needed. That simple concept enables an enormous amount of capabilities for the electric grid—be it supplying back-up power, reducing peak system demands, relieving stressed grid infrastructure, firming the supply of variable generation sources such as solar and wind, or maintaining optimal function of inflexible generation sources such as nuclear. These capabilities more efficiently ensure that supply and demand reliably match, which in turn optimizes the use of all grid infrastructure and resources. Energy storage is the critical hub of a resilient, efficient, sustainable and affordable energy system.

Energy storage is central to integrating higher levels of variable wind and solar resources. As a systematic asset, storage can take excess generation from renewables and store it for later use, avoiding waste and filling gaps in supply. This is increasingly important as renewable penetrations increase and constraints in transmission or distribution systems impede full delivery of wind and solar. Moreover, storage is increasingly being procured in portfolios with renewable power to backfill from power plant retirements. Utilities as diverse as Xcel Energy in Colorado, Nevada Energy, Arizona Public Service, and Hawaiian Electric Company have each planned to procure hundreds of megawatts (MW) of battery storage paired with solar power over the next several years, often to replace retiring fossil fuel-based power plants. And it's not just battery storage—there are over 2,000 MW of pumped hydroelectric storage projects currently pending a license before FERC, as well as utilities testing and procuring new flow batteries, thermal storage, and other storage technologies.

Storage is increasingly critical for the reliability and resilience of customer supply, especially in rural areas, island systems and remote communities without a larger grid connection. Co-operative and public power utilities are deploying storage systems on their grids and microgrids, particularly in remote communities with fuel supply risks such as those served by Cordova Electric Cooperative in Alaska and Kauai Island Utility Company in Hawaii.

Storage is also increasingly being deployed as an infrastructure asset, often in more rural communities, to increase the capabilities and extend the life of existing grid infrastructure. In using storage this way, grid operators can avoid far more expensive transmission or distribution upgrades, suppressing cost increases otherwise borne by their customers. Utilities like Duke Energy, Eversource, and National Grid are finding innovative ways to extend the life of their wires infrastructure by installing storage, with innovative projects in some cases that integrate both utility- and customer-sited storage assets into "non-wires alternative" investments. At the same time, installing storage at the distribution level increases their hosting capacity, allowing more rooftop solar and electric vehicles to be used on the existing wires.

Most people think of a battery when they hear "energy storage" — and for good reason. Batteries are everywhere—in our phones, computers, appliances, our cars, and increasingly throughout our electric grid. There are a variety of energy storage technologies—not only different kinds of batteries, such as flow batteries, but also mechanical storage technologies (like pumped hydro and compressed air), thermal storage technologies (like ice storage and molten salt), and power-to-gas storage technologies (like hydrogen and ammonia). Each has its own performance characteristics and best-suited applications, but all do the same job of storing energy for use when it is most needed, be that across seconds, hours, or days. In effect, it decouples the element of time from supply and demand.

For the purpose of today's hearing, I will focus my remarks on the role of battery storage, the fastest growing grid storage technology. Today approximately 2,500 megawatts (MW) of battery storage are installed or under development nationwide, with megawatt-scale installations planned or operating in 29 states. Battery storage technologies—primarily lithium-ion batteries—are declining rapidly in cost, dropping by 50% every 3 to 4 years and projected to continue in the near- to medium-term at perhaps 10% year over year. Driven by these cost declines, U.S. deployments are forecast to triple in 2020, representing over $3 billion in annual sales in the U.S. by 2021. That sharp cost decline is driving greater performance of battery storage more cost-effectively, increasing their range of applications. The largest battery in the world is currently under development in the U.S. and will capable of providing 316 MW of power for four hours—enough to power over 150,000 homes through the peak demands of the day. At the same, aggregations of distributed storage installed in homes and businesses are being operated as virtual power plants, with the largest aggregations currently about 20 MW in size—effectively mimicking a small generator.

Storage is uniquely flexible among all grid resources. *First*, storage is the only resource promoting reliability in every part of the grid: co-located with generation, connected to the high-voltage transmission system, placed on the lower-voltage distribution grid, and located in buildings, as well as in microgrids. It is modular and can be scaled to any size, from a home system of a few kilowatts (kW) to a central facility 100,000 times larger. *Second*, storage provides value to all power sector participants: utilities, independent providers, and consumers can all own and operate storage for a variety of reliability services and other cost-saving applications. *Third*, storage is the only grid resource that operates as both supply and demand in a single resource: supply when discharging and demand when charging, giving it the unique flexibility to mitigate oversupply as well as undersupply conditions. *Fourth*, storage is capable of near-instantaneous response and precise control, able to ramp its output to charge or discharge at full power in milliseconds. It is that precise control that allows storage to efficiently provide essential reliability services of frequency response, voltage control and ramping, as well as enhance resilience during sudden disruptions. *Fifth*, storage can provide a diversity of functions for the bulk power system, the distribution grid, and end-users, even providing multiple services interchangeably over time to meet the greatest need in any given moment. *Sixth*, storage can be deployed quickly, with build times for MW-scale installations in less than 6 months. Importantly, storage is agnostic to the supply of electricity, and its flexibility can be used to optimize grid functions for any supply mix, as it changes over time. That's why we call storage the "bacon of the electric grid"—it makes everything a little bit better. Nuclear, coal, gas, wind, solar, hydro, demand response, wires infrastructure and system efficiency: you name it, storage enhances its utilization.

*About the Promoting Grid Storage Act (H.R. 2909)*

ESA applauds the Subcommittee for considering energy storage legislation to modernize and secure the electric grid while preparing it for greater clean energy deployment. Storage is being used to enhance electric service reliability and resilience and to increase the capabilities of the existing electric infrastructure. The Promoting Grid Storage Act (H.R. 2909) is a productive way to accelerate planning and operational experience among grid operators to best utilize these assets.

The Promoting Grid Storage Act, which was also endorsed by the American Public Power Association and the National Rural Electric Cooperative Association, would create a competitive grant program at the Department of Energy (DOE) for state & local governments, utilities, public power authorities, and rural co-ops seeking support for incorporating storage into long-term planning and grid operations. This approach is new in that, rather than wait for the federal government to identify desired projects, these local entities would be empowered to identify the kinds of modeling support and grid deployments that will best accelerate their learning through experience, share the investment responsibility, and construct a competitive proposal to cost-share those activities.

ESA endorses the Promoting Grid Storage Act, and is pleased to see it has bipartisan, bicameral support. The Senate Energy & Natural Resources Committee has incorporated the major provisions of the bill into an amended version of the Better Energy Storage Technology ("BEST") Act (S. 1602), which it reported favorably last Fall. The House Science, Space, & Technology Committee is also advancing relevant components of the bill for its jurisdiction in its version of the BEST Act (H.R. 2986).

We encourage the Subcommittee to advance the Promoting Grid Storage Act in parallel with these efforts. In particular, we believe that, in creating public-private partnerships to conduct storage demonstrations, the widest range of private partners be eligible to avoid inadvertently limiting the expertise that can be brought to bear on those demonstration. This is why both the Senate Energy and House Science bills make all private sector entities eligible for Promoting Grid Storage Act programs. For that reason, ESA asks the Subcommittee to ensure that the demonstration program eligibility as specified in Section 6(a)(2)(F) is available to all private sector entities. ESA also recommends that Subcommittee harmonize the technology definitions in Section 1, the listed priorities in Section 4, and the listed objectives in Section 6 with those that Senate Energy and House Science have included in their BEST Act bills.

*About the Expanding Access to Sustainable Energy Act (H.R. 4447)*

The Expanding Access to Sustainable Energy ("EASE") Act would create a new program of technical assistance to rural electric cooperatives to undertake planning for energy storage and microgrid projects. While we note that the Promoting Grid Storage Act would accomplish the aims of the EASE Act with respect to energy storage, the EASE Act merits consideration to ensure focused assistance to rural cooperatives in promotion of resilient and sustainable electric service.

*About the S.T.O.R.A.G.E. Act (H.R. 1744)*

The Storage Technology for Operational Readiness And Generating Energy ("STORAGE") Act would amend Section 111(d) of the Public Utilities Regulatory Policies Act to direct states to consider a requirement that energy storage be included in utility resource planning.

ESA notes that there has been remarkable progress in utility planning for energy storage over the past several years. In 2018, the National Association of Regulatory Utility Commissioners ("NARUC") passed a resolution recommending that all state regulators and utilities should explicitly consider energy storage alongside all other resource options in long-term planning, as well as update planning methods to account for storage flexibility. Nine states now have taken action as part of their integrated resource planning process to call on greater evaluation of energy storage: Arizona, California, Colorado, Michigan, Minnesota, New Mexico, Nevada, Oregon and Washington. And utilities in over 20 states have now selected energy storage in long-term resource plans—a remarkable development given that it was only four years ago that the first utilities started selecting storage in resource plans.

ESA encourages appropriate consideration of energy storage as an option in all utility supply and infrastructure investments. Learning-by-doing remains a highly productive way to update planning, and we believe that the planning assistance and demonstration program in the Promoting Grid Storage Act is critical to this end. Moreover, ESA emphasizes that energy storage can perform the services of transmission and distribution assets as well as generation assets. Therefore, it is critical that storage be considered in infrastructure planning, not just supply planning. We would welcome the opportunity to discuss further with the Subcommittee ways in which regulations such as contemplated by the STORAGE Act can complement these programs.

*In Conclusion*

We are at an historic moment where the U.S. can harness energy storage technologies to cost-effectively modernize and secure our electric system and enable more clean energy. I thank the Subcommittee for the opportunity to speak to these critical issues, and I welcome your questions.