

February 11, 2019

To Whom It May Concern:

**Re: Comments by IEEE-USA for the Senate Energy and Natural Resources Committee
Hearing to Examine the Outlook of Energy Innovation in the United States**

IEEE-USA would like to thank the Senate Energy and Natural Resources Committee for holding this important hearing. For nearly 50 years, the 180,000 engineers, researchers, and technical professionals represented by IEEE-USA have worked at the forefront of energy research and development to ensure that the United States has a secure, reliable, and efficient power supply. We applaud your leadership on this issue, and look forward to working with you to find creative and sustainable ways to address America's long-term energy needs

IEEE-USA recommends that the committee focus its attention on four challenges facing our energy system: securing cost effective power generation and utilization options, supporting the construction and maintenance of reliable and intelligent electric grid infrastructure, strengthening domestic energy security, and ensuring environmental stewardship of energy resources.

Securing Cost Effective Power Generation and Utilization Options

Investing in enhanced power generation systems will drive 21st century energy trends by providing lower cost energy to consumers while improving their access to energy resources. IEEE-USA urges Congress to support federal energy programs that improve power generation, transmission, and distribution in order to lower costs and improve reliability for American consumers. To accomplish this, Congress should invest in research and development programs in areas including energy storage and nuclear power generation.

Energy storage technology, including battery and thermal storage as well as flywheel and compressed air applications, has the potential to revolutionize America's power system. The ability to store large amounts of power would add flexibility and resilience to our grid, while making intermittent energy sources, including solar and wind, more viable. In addition to funding research, Congress should work with the federal agencies to amend regulatory policies to bridge the gap between federal regulation of the transmission grid and individual state regulation of electricity distribution.

Reliable, proven, safe and carbon-free nuclear energy needs to be a part of our energy portfolio. IEEE-USA recommends that Congress prioritize domestic nuclear power generation programs as a means to improve domestic energy generation. Nuclear power plants are cost competitive with fossil fuels and other renewable energy sources. Moreover, these plants provide large amounts of dependable electricity to offset the current variability of renewables. Most existing nuclear plants can safely operate for decades. IEEE-USA strongly recommends that Congress provide funding for further development of Small Modular Reactor technology while federal labs and industry continue developing advanced nuclear plant designs. Additionally, Congress should support advance nuclear fuel reprocessing technology and comprehensive nuclear fuel management programs to reduce the amount of waste produced by nuclear facilities and mitigate the risk of proliferation of nuclear fuels and materials.

Supporting Construction of Reliable and Intelligent Electric Grid Infrastructure

Today's US electric grid is a network of approximately 10,000 power plants, 170,000 miles of high voltage transmission lines, more than six million miles of lower voltage distribution lines, and 15,000 substations. In order to improve the US electric grid infrastructure, IEEE-USA recommends support for federal grid research programs at our national labs and NIST's Smart Grid research programs as well as their development of Smart Grid Interoperability Standards.

In rural areas of the country, renewable energy sources are located far from population centers and transmission lines provide power to consumers. To help address the unique electricity needs of rural American communities, IEEE-USA recommends that Congress promote improved coordination between federal, state, and local governments to develop regional plans that expand the transmission system. This will allow improved transmission capacity that links natural gas plants, offshore and on-shore wind farms, solar energy plants, and other energy resources to customers. Power distribution must cross state lines and political boundaries. To be as effective as possible, the federal government must coordinate with local and state entities to ensure its efficiency and effectiveness.

America's transmission grid is under stress as electricity demand grows faster than supply. While this challenge requires expanded energy generation, Congress can reduce the amount of new generation needed by making our distribution system more efficient. Increased funding for research and development into emerging distribution technology at the DOE national labs is needed to realize these efficiencies and improve grid resilience and reliability.

Strengthening Energy Security

Recent events in Ukraine and elsewhere have demonstrated vulnerabilities in electric grid technology, and the enormous danger that hostile disruptions pose to our nation. Congress needs to act decisively to protect our nation from these threats. To improve our energy security, IEEE-USA urges Congress to support programs that improve integration of renewable energy resources into our energy portfolio, fund research and development in energy storage and nuclear fuel, support federal programs aimed at improving the cyber and physical security of our power and energy infrastructure, and enhance the integration of renewable energy resources into our energy grid.

IEEE-USA recommends that Congress aggressively support programs to improve the cyber and physical security of critical power and energy infrastructure. Threats from cyberspace to our electrical grid are rapidly increasing and evolving. Cyber connectivity has increased the efficiency and safety of our electrical generation and distribution systems, but it has also added complexity to the control systems. The DOE must increase R&D in areas to ensure the security of the algorithms, protocols, and chip-level and applications that support our electrical grid.

Because renewable energy generation facilities can be smaller and more widely distributed across the grid, they have the potential to improve grid reliability, strengthen our national and economic security and improve electricity distribution to consumers –if these resources are properly integrated into the grid. Increasing energy storage will similarly strengthen the resilience of our electrical grid. IEEE-USA strongly supports necessary investments in cybersecurity, R&D and standards development to protect our nation’s grid.

Responsible Stewardship of Energy Resources

IEEE-USA recommends that Congress support programs that diversify our domestic portfolio to improve American energy resources while also protecting the environment. Specifically, we recommend expanding renewable electricity generation, reducing the environmental footprint of power systems where possible, and advancing research development programs.

America’s long-term energy needs will be immense. The capture, transport, utilization and storage of carbon is an enormous infrastructure challenge. However, it is necessary that we consider each of these resources as part of the portfolio of available energy options.

Congress should invest in innovative research across the energy sector, including nuclear power, carbon capture and storage, energy efficiency and emerging energy technologies. We believe that there is a clear role for traditional power sources in our nation’s power grid but also a role for renewables. Moreover, we promote the development of numerous technologies that are not yet viable but could prove invaluable to our nation in the future. We encourage Congress to pursue a balanced approach to energy production, one that considers our current energy needs and the needs of our environment.

Conclusion

Thank you for the opportunity to provide comments to the committee. We hope to be a resource to you as you move forward in developing the policies necessary to help build the next generation energy technology. We look forward to working with Congress to develop the most advanced power generation systems, increase energy storage capacity, improve carbon capture technology, and build nuclear power systems. America’s energy needs are enormous, but so are our energy resources. Together with Congress, we hope to build the next generation energy systems to meet these challenges.

Feel free to contact IEEE-USA’s Government Relations Staff, Aline McNaull, at a.mcnaull@ieee.org if we can be of further assistance.