



POSITION STATEMENT

Greening of the U.S. Electric Power Supply

Approved by the IEEE-USA
Board of Directors (16 Nov. 2018)

Electricity and electrification continue to be engines of progress worldwide. At the same time, most fossil-fueled central or distributed facilities create greenhouse gas and other emissions. The “**greening of the electric power supply**” is the process of reducing the environmental impact of electricity generation.

As of 2017, coal generated about 30 percent of U.S. electricity¹, compared to about 40 percent in 2014. In the intervening period, market forces and environmental pressures caused natural gas and renewables to displace coal. In 2017, natural gas generated approximately 32 percent of U.S. electricity, surpassing electricity generated by coal in 2016². Because natural gas combustion produces roughly half the carbon dioxide emissions of coal, the U.S. greenhouse gas (GHG) emissions declined.

Nuclear power is essentially carbon-free and could be one of the elements to drive the decline in GHG emissions. Nevertheless, nuclear plants are being retired due to, in part, difficulties in competing with the lower cost and higher flexibility of natural gas generation and current tax incentives for renewables³.

Greenhouse gas reduction also comes from deploying renewable generation technologies, including hydroelectric, wind, solar, biomass, and geothermal. In fact, renewable energy accounted for about 17 percent of electricity generated in 2017.

¹ U.S. Energy Information Administration, *Monthly Energy Review*, June 2018, Table 7.2a: Electricity Net Generation: Total (All Sectors)

² Ibid.

³ EPC Position Statement on Existing Nuclear Power Plants (<https://ieeusa.org/wp-content/uploads/2018/05/NuclearPlants1116.pdf>) and EPC Position Statement on Electric Markets and Technology Evolution (in preparation)

The principal impediments to renewable resources, such as wind and solar, include costs of technology, need for new electric transmission lines to move power from renewable-rich areas to load centers, and variability and uncertainty of these resources. The higher the penetration, the more serious these issues become. Fast-response generators, demand response, RTO market rules, standards, and applications of energy storage are needed to ease the challenges of reliably integrating these sources into the generation mix.

The growth of renewable resources across the United States is currently dependent on a combination of four enabling factors: federal tax credits, state Renewable Portfolio Standards⁴, encouragement of renewables by state regulators, and utility-by-utility implementation of favorable rate and tariffs. There has been significant growth of renewable resources, especially solar, in states where all four enabling factors have been met. To avoid cost increases and reduce impediments to market development, renewable incentives and energy targets must remain stable and predictable, until the market has matured.

While reduction of environmental impacts is of paramount importance, it should not be imposed at the expense of meeting consumer needs reliably. The United States must pursue a ***balanced portfolio strategy***, paying attention to fully understanding the impacts of any policy-driven substitution of alternative energy sources for traditional electricity generation technologies. The need for diversity should also be reflected in the government longer-term R&D portfolio.

Recommendations

In summary, IEEE-USA recommends the following actions to expand the use of renewable resources for electricity generation:

- **Renewable Technology and Energy Storage:** Government should continue funding R&D of technology advancements for renewable generation, and energy storage to reduce variability and uncertainty of wind and solar generation. R&D should also continue for short-term planning and simulation tools, as well as power electronics to improve the integration of wind and solar generation into the grid. FERC and state regulators should continue joint efforts aimed at regional planning.
- **Market Transformation and Stable Incentives:** Any incentives should be stable, and sufficiently predictable to allow long-term planning by renewable power purchasers, project developers and equipment manufacturers.

⁴ ELECTRICITY GENERATION PROJECTS: Additional Data Could Improve Understanding of the Effectiveness of Tax Expenditures, U.S. Government Accountability Office, GAO-15-302, April 2015

- **Transmission Approval Processes:** Congress should work with state governments to reform the state-by-state approval process for transmission routing and siting to connect renewable rich areas to load centers. This is necessary to ensure that delays in transmission construction do not also delay progress in expanding the use of renewable energy, and the achievement of national greener supply goals.
- **Unintended Market Consequences of Regulations:** While regulations may be based upon good and desirable public policy objectives, they can have unintended consequences in markets. Regulatory entities should consider how the existing and proposed regulations will affect price formation and the likely behavior of market participants to help minimize unintended consequences.

This statement was developed by the IEEE-USA Energy Policy Committee, and represents the considered judgment of a group of U.S. IEEE members with expertise in the subject field. IEEE-USA advances the public good, and promotes the careers and public policy interests of the nearly 180,000 engineering, computing and allied professionals who are U.S. members of the IEEE. The positions taken by IEEE-USA do not necessarily reflect the views of IEEE, or its other organizational units.