October 11, 2019

Via electronic mail: Clean.Future@mail.house.gov

To: House Committee on Energy & Commerce
Attn:
Chairman Frank Pallone,
Environment and Climate Change Subcommittee Chairman Paul Tonko, and
Energy Subcommittee Chairman Bobby L. Rush

Re: Response to Request for Input dated September 23, 2019

Southwest Power Pool, Inc. ("SPP") appreciates the Committee's invitation to provide input on key considerations for U.S. climate policy. Many of the questions set forth in the Committee's September 23 communication do not apply to SPP, but SPP is pleased to provide input, where appropriate, based on SPP's experiences in reducing carbon emmissions and integrating renewable energy resources and the opportunities and challenges they present.

A. SPP's Perspective as a Regional Transmission Organization

SPP is a non-profit corporation approved by the Federal Energy Regulatory Commission ("FERC") as a Regional Transmission Organization ("RTO"). SPP currently has 99 members[1] and administers transmission service over approximately 66,892 miles of transmission lines in a 546,000 square-mile service territory across all or part of 14 states.[2] As an RTO, SPP's services include reliability coordination, tariff administration, regional scheduling, transmission expansion planning, compliance, and training. SPP also administers the Integrated Marketplace, a centralized day-ahead and real-time Energy and Ancillary Services market with locational marginal pricing and market-based congestion management.

Of all of the services SPP provides, maintaining reliability is the most important. SPP is the registered Planning Coordinator, Reliability Coordinator and Balancing Authority for its region and performs these functions pursuant to its Open Access Transmission Tariff and the applicable reliability standards promulgated by the North American Electric Reliability Corporation ("NERC"). Section 215 of the Federal Power Act requires NERC to develop mandatory and enforceable standards that contain the reliability-related requirements for planning and operating the North American bulk power system. NERC monitors entities' compliance with these

[1] SPP's members include 16 investor-owned utilities, 14 municipal systems, 20 generation and transmission cooperatives, 8 state agencies, 15 independent power producers, 12 power marketers, 11 independent transmission companies, 1 federal agency, and 2 large retail customers.

[2] SPP's service territory covers portions of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming.

mandatory standards and enforces compliance through financial penalties and other sanctions for violations.[3]

B. Renewable Energy in SPP

Renewable energy, particularly wind-based energy, plays a significant role in the SPP region. It should be noted, however, that SPP, in its role as independent market administrator, is required to be neutral as it relates to the fuel sources utilized in its footprint. The market determines which resources are utilized by dispatching the lowest cost energy first, subject to requirements necessary to maintain reliability.[4] SPP is not authorized to dictate the types of generation to be built in its region. However, as an RTO, SPP is required to study how new generation will reliably connect to its grid and plan accordingly.[5] While not all of the generation under study will be constructed, SPP is currently studying more than 85,000 MW of new generation, and all but 331 MW of that is based on renewable forms of energy. Specifically, generation under study includes 49,000 MW of wind, 29,244 MW of solar, 6,836 MW of storage, and 331 MW of natural gas.

The SPP region contains the highest concentrations of wind in the U.S. SPP's region includes more than 11,000 wind turbines across more than 200 wind farms providing a combined installed capacity of approximately 22,000 MW. SPP has observed significant increases in wind generation being produced in its region and expects that trend to continue over the next several years. In 2015, wind generation represented 13.5% of SPP's energy mix. By 2018, wind generation represented 23.5% of SPP's energy mix, an almost two-fold increase over three years. On April 27, 2019, SPP experienced a renewable energy penetration record of 71.4%. Of that renewable energy, 67.3% was wind. And on October 9, 2019, SPP beat that record with a renewable energy penetration of 73.67%. SPP's most recent record for maximum wind output was 17,109 MW, which occurred on September 30, 2019.

The benefits of wind generation are accompanied by operating challenges that can arise due to wind's variable nature. SPP's record for variation in wind output occurred on March 15, 2019, when SPP lost 13,300 MW of wind energy in 22 hours—which is the equivalent of turning on approximately 26 coal-fired or gas-fired plants. SPP's maximum one-hour swing from wind energy is 3,700 MW. Because of their ability to quickly inject real and reactive power into the system, rapidly responding natural gas-fired generators are useful in facilitating reliable integration of increased levels of renewable generation and its associated variability. In 2015, SPP called on such "fast-start" units 4,577 times. By 2018, however, as more wind came online, SPP called on

[3] *See, e.g.*, 16 U.S.C. §824o.

[4] Since the launch of the SPP Integrated Marketplace in March 2014, greenhouse gas emissions in the SPP region have been reduced by approximately 27%. SPP anticipates even further reduction as additional renewable generation is built and registered in SPP's market.

[5] Over the last decade, SPP has issued notices to construct nearly $10 billion in new high voltage electric transmission, of which nearly $8 billion is now in service. Much of this transmission was planned to connect wind generation to the grid and provide it a path to the market.

fast-start natural gas generation 6,563 times to balance against generation variability and to ensure reliability of the grid. SPP anticipates the need for and the reliability role of fast-start generation will increase as the amount of capacity in SPP from renewable generation, including wind, increases.

Predicting generation fluctuations is already a complex undertaking. As distributed generation increases, it may also become increasingly difficult to predict fluctuations in load. SPP currently has about 200 MW of solar generation on its system, and more is planned, as stated above. It is SPP's understanding that grid operators with a substantial number of solar resources are facing reliability challenges with solar similar to what SPP manages today with high concentrations of wind. While battery storage can potentially help mitigate such variability in the future, practical usage of large, utility-scale storage is not yet readily available. For example, SPP will be adding battery storage to the grid later this year, but it is only a 2-hour, 10 MW battery on a system with a peak load of 50,662 MW.

C. Conclusion

Based on SPP's experience, as discussed above, one of the largest technical issues to address in considering a net zero greenhouse gas emissions policy is the ability to mitigate the unpredictability of renewable-sourced generation in a large portion of the country. As discussed in these comments with regard to fast-start natural gas generation, SPP has experienced circumstances in its region that demonstrate a growing need to rely on resources capable of supplying energy quickly in response to sudden or rapid changes in electric system conditions, including changes associated with the variable nature of renewable resources. Electricity storage presents a potential mitigation option by allowing excess electricity production to be captured and used at a later date and time. To be effective, however, investments in such storage would need to be large-scale. Within SPP, this type of investment would be made by independent entities or vertically integrated utilities and not under direction by the RTO.

Respectfully submitted,

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