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Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: Grid Reliability and Resiliency Pricing Rule
FERC Docket No. RM18-1-000

Dear FERC Commissioners:

Continuous electricity is crucial to our modern society. Houston and Puerto Rico are examples of societal damage caused by lengthy power outages. In hindsight, we usually see measures that could have been taken to shorten the outage times. A few customers provided their own backup power when the grid was down. Most customers were not prepared to do this. We can do better.

Currently I am performing reliability studies for NERC concerning the impact of wind and solar in ERCOT, and wind, solar, and hydro in CAISO. A poster session of our IEEE paper is here: http://egpreston.com/poster.pptx. The comments below are my own observations and opinions.

Reliability – NERC is responsible for insuring NERC regions maintain an acceptable level of reliability. Experience shows that significant loss of load events can occur with great harm to the affected areas. I have recommendations for strengthening NERC's role in grid reliability.

Resiliency – NERC describes extreme events as those leading to extensive loss of load in magnitude and duration. Through scenario identification and dialogue with individual regions, the magnitude and duration of severe outages can be addressed and planned for if they do occur.

Market Deficiencies:

PJM has a capacity market and a real time energy market. Logically these mimic the cost of providing service by recognizing there are fixed and variable costs. However, the PJM market is too short term, allowing natural gas to outbid long term energy sources such as coal and nuclear. This results in a closure of industries in the US that are essential to our long term economic health. PJM needs to change its rules to insure some protection of existing base load generation.

ERCOT has an energy only market. The market is a close approximation to economic dispatch and is very competitive. Capital costs are not sufficiently covered in the market. Generators are retiring at an alarming rate. A tightening of NERC metrics is needed to insure ERCOT continues to be a reliable region. Possibly ERCOT could go to weekly scheduling so that optimizations can offer lower costs that do not require as much base load generator cycling.

CAISO seeks to become fossil free and nuclear free. This can only be done through massive infusions of new storage capacity and energy. Retiring existing generators too fast can cause low levels of reliability. NERC needs to insure the CAISO reliability meets minimum requirements.

Recommendations:

1) NERC needs to establish two levels of reliability. The first level is the expected one outage event in ten years as a soft target for a very reliable system. The second level could be ten times that level as an outage event every year level. If reliability assessments show the expected loss of load exceeds one event per year, NERC should be allowed to issue fines until the supply is more reliable than one event per year.

2) Retirement of older generators near load centers is putting too much dependency on the transmission systems. There are elements in the transmission systems with very long repair times. NERC needs to examine more deeply these long repair time elements to insure that a Puerto Rico type of outage event does not happen anywhere in the US. Some load centers are very close to being at risk for an intolerably long blackout.

3) If the US is responsible for helping to repair the grids of US islands, then NERC needs to review the power systems on those islands along with the other regions of the US.

4) Resiliency review by NERC can include extreme event scenarios such as an extended drought, an earthquake, fuel supply shortage, several transformer failures, a hurricane, or any other event that could cause an extended outage time. Regions need to show NERC they have made plans for reducing the recovery time from extreme events.

5) Renewables need considerable battery storage to achieve 100% penetration. Utilities are not likely to be able to finance storage. Individual customers will be purchasing batteries through Power Wall type installations as an integrated system at their homes and businesses. This is essential for the future smart grid and can offer many features to homeowners and businesses utilities cannot provide. The Power Wall type controllers could help improve ERCOT's reliability if the micro grid technology is embraced.

6) In ERCOT there is no market mechanism for financing new generation. Neither is there a way to insure sufficient capacity will be maintained. There is no way to finance storage. There is no way to finance a new nuclear plant. There is no way for ERCOT engineers to insure there will be a reliable supply of generation in the future. All these problems are related and can be fixed without much change to the market design itself.

   Individual financing and ownership of generation is the answer. Here is an example:
   - Begin the home smart system with a 30 kW converter for about $9000,
   - Add a 100 kWh battery for $10,000, which is probably not going to be Li Ion,
   - Add a 6 kW solar panel for $12,000 that will provide 8 GWh annually in Texas,
   - Make a onetime $8000 investment in 1 kW new nuclear to provide 8 GWh annually,
   - Connect to the local provider and pay mostly a monthly fee for the smallest kWh, and
   - Round out this system with one or more EVs costing about $35,000 each.

   The homeowner has purchased all their hardware and power sources to be 100% fossil free. This is probably the only pathway for achieving long term energy independence with good customer reliability. FERC needs to remove barriers so this can happen.

Recommendations Summary:

- NERC needs to enforce rules and expand its dialogue on preparations for minimizing restoration times of extreme events.
- FERC needs to identify barriers for financing high capital cost projects and have those barriers removed. For example the rules not allowing private use networks to invest in their own projects across the grid needs to be dropped for all customers including presently protected municipal customers.

Sincerely,
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