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January 14, 2015

John N. Moore
SENIOR ATTORNEY - SUSTAINABLE FERC PROJECT
Natural Resources Defense Council
20 North Wacker Drive | Suite 1600 | Chicago, Illinois 60606

Re: My comments on the new Carbon Pollution Emission Guidelines¹

Dear Mr. Moore,

Reading through section 9.9 gives the impression that FERC/NERC rules can power through any reliability problems using new engineering and advanced operations of the grid. I will list a few concerns here that might derail the overall objective of the new EPA emissions rules.

- 1) The new rules are written in such a manner as to cause a rapid expansion in natural gas generation to replace coal plants, most likely at existing coal plant locations. The Bureau of Economic Geology at the Univ. of Texas doesn't give a rosy long term outlook for this fuel: http://www.beg.utexas.edu/presentations/presentations/2014_presentation/DTE%20Shale%20Gas%20and%20Electricity%202.pdf Natural gas is a fuel that is quickly mined and quickly depleted. Without fracking gas, our grid reliability will fail, even today. How will we have a reliable system after fracking gas is gone?
- 2) The modeling of wind and solar in reliability models is not easy. There are mistakes being made in the modeling of systems with large amounts of renewable power. Take a look at my presentation to the IEEE best practices working group: <http://www.egpreston.com/LOLE2.mp4> . The reserve margin number becomes a non-dependable measure as we move toward renewables.
- 3) Burning natural gas produces CO₂ and will soon become in short supply itself. We need a non-fossil fuel plan. Jacobson and Lovins have non-fossil plans, but they have not been properly LOLE tested. LOLE is the loss of load expectation. Each day there is a probability that the load will not be served, which takes into account operating features such as generation availability, DSM, storage, contract load reduction, load shifting, battery storage, pumping load shedding, etc. The annual LOLE is the sum of the daily probabilities. An LOLE=0.1 means there is a 10% chance the system might not be able to serve the load during that year. The LOLE=0.1 has become somewhat of an industry benchmark. The US needs to develop non-fossil fuel plans that include the best mix of wind, solar, storage, and nuclear. Until we have such a national plan developed, we are proceeding into the future without a clear map of where we are headed.

¹ http://docs.nrdc.org/air/files/air_14120101b.pdf

4) Wind and solar penetration becomes highly dependent on storage. ERCOT could use 10 GW of energy storage with 8 hours run time. However, that would cost about \$50 billion. Where is ERCOT going to get \$50 billion for energy storage?

5) Wind expansion is highly limited by the transmission system Available Transfer Capability (ATC). I run ATC studies across the US for wind generators. Believe me, the existing transmission system is very weak for large expansions of wind across the US. What we need is a national 765 kV backbone system to take advantage of Great Plains wind as a resource. Who is going to pay for such a system? It's certainly not going to be wind generators nor the utilities or regions. The Federal Government could make this happen. It's much like building an interstate highway system across the US. It will take decades to build and cost billions, however the benefits might be worth it. Where is the economic study justifying the benefits of such a grid?

6) The EPA CO2 rule is a substitute for a carbon tax. There are recent articles on the need for a carbon tax from several industry leaders and even some utilities and oil producing companies. We engineers and scientists prefer the carbon tax (or a carbon fee if that sounds better) to the EPA rules being proposed. Here are two recent articles:

<http://www.houstonchronicle.com/opinion/outlook/article/Webber-It-s-time-for-Republicans-to-pass-carbon-5997549.php?t=9b75c92654&cmpid=twitter-premium>

and

<http://csas.ei.columbia.edu/2015/01/12/golden-opportunity/>

7) The transition off fossil fuels would be greatly sped up if there were an economic advantage to do so. My suggestion is to make zero interest loans available for non CO2 sources of power, including the addition of storage and transmission lines. The payback on the loan principal could match the life of the facility. For example, a 40 year zero interest loan on a new nuclear plant would probably make it economic even in today's highly competitive ERCOT market.

8) Nuclear has several problems. I posted these comments today on linkedin at:

https://www.linkedin.com/groups/SMRs-In-terminal-decline-on-62696.S.5960719414474129412?view=&item=5960719414474129412&type=member&gid=62696&trk=eml_group_discussion_new_comment-discussion-title-link&midToken=AQEKoHqvdXUPWA&fromEmail=fromEmail&ut=2Ae1eYb7SRrmA1

Nuclear has three basic problems: 1) public confidence that it's safe; 2) the ability to fund a new project with a low interest rate; and 3) regulatory support and stability. By regulatory support, I mean the process for licensing is both stable and timely, only requiring a year or so to gain approval of a plant site and plant design. As far as I can tell, none of these three things exist at this time in the US for new nuclear plants. Actually no energy sources are available that meet all three conditions. The US energy industry is in deep trouble and no one knows it - yet.

Sincerely,

Eugene G. Preston

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