



November 3, 2014

Office of Energy Policy and Systems Analysis
EPSA-60
QER Meeting Comments
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585-0121

Submitted via email to: QERComments@hq.doe.gov

Dear Quadrennial Energy Review Task Force:

The American Wind Energy Association (AWEA)¹ appreciates this opportunity to submit supplemental comments on the Quadrennial Energy Review (QER)², which is focused on the transportation, transmission, distribution and storage of energy, including electricity. AWEA submitted an earlier set of comments on October 10, 2014. We wanted to submit additional information on a few issues: curtailment of electric generation, the additional benefits of high voltage transmission to access utility-scale renewables, and the resulting benefits for reducing carbon emissions.

Curtailment

As detailed in the 2013 Wind Technologies Market Report³ written by staff at the Lawrence Berkeley National Lab and published by the Department of Energy, curtailment of wind generation has been trending down in some regions, most notably in ERCOT, where curtailment fell from 17.1% of wind generation in 2009 to only 1.2% in 2013. As additional transmission was brought online through the competitive renewable energy zones (CREZ) process and changes were made to improve the efficiency of wholesale electric markets, curtailment declined.⁴

However, curtailment remains a concern in other regions, including MISO, SPP and ISO-NE. Curtailment damages the economics of existing generation facilities and can send a signal that it is risky to invest in additional wind generation. Transmission is the only

¹ AWEA is a national trade association representing a broad range of entities with a common interest in encouraging the expansion and facilitation of wind energy resources in the United States. AWEA's members include wind energy facility developers, owners and operators, construction contractors, turbine manufacturers, component suppliers, financiers, researchers, utilities, marketers, customers, and their advocates.

² Presidential memorandum, Establishing a Quadrennial Energy Review, January 9, 2014, available at: <http://www.whitehouse.gov/the-press-office/2014/01/09/presidential-memorandum-establishing-quadrennial-energy-review>

³ Available at: http://emp.lbl.gov/sites/all/files/2013_Wind_Technologies_Market_Report_Final3.pdf

⁴ For more information, see: <http://www.eia.gov/todayinenergy/detail.cfm?id=16831#>



economically viable and long-term solution to curtailment, hence why a large section of our initial comments focused on the need for transmission infrastructure.

However, grid operators can take steps to make curtailment less harmful in the interim. In some cases, curtailment decisions by grid operators lack transparency, and the risk of curtailment is not being adequately disclosed during the interconnection study process. Other steps that could reduce the need for curtailment and lead to more efficient power system operations include ensuring that conventional generators are reporting their true economic minimum level of generation when making offers in electricity markets, as in some cases there can be an incentive for conventional generators to understate the amount their output can be turned down so that they can continue operating and generating revenue. A 2014 report from NREL provides useful background on the curtailment practices in different regions.⁵

AWEA Recommendation: The QER should survey the curtailment of wind generation and other generation in different regions of the country and discuss solutions to reduce curtailment, including building more transmission, increased transparency of curtailment decisions (including prior to interconnection), and implementation of more efficient market rules, as well as compensating for curtailment when it is necessary.

The benefits of high voltage transmission

While AWEA detailed the wide-ranging benefits of transmission in our original comments, we would like to build on this record by commenting on the additional specific benefits of high-capacity transmission, including high-voltage AC and DC transmission.

Due to their higher capacity, high-voltage lines have a number of economic, environmental and efficiency benefits over lower-voltage transmission.

First, the electricity transmission capacity of a line is roughly proportional to the square of the voltage. For example, a single 765-kV line can carry as much electricity as six 345-kV lines, reducing the amount of land needed by a factor of four. This has obvious benefits for easing the acquisition of right-of-way and for minimizing land use concerns about new transmission.

As a consequence, higher voltage transmission lines are much more cost-effective than lower-voltage lines. Because of the economies of scale in building higher-voltage transmission, it costs two to three times as much to build six 345-kV lines as it does to build a single 765-kV line of equivalent capacity.

Third, higher voltage lines also typically have electricity losses that are many times lower than those from an equivalent capacity of lower-voltage lines. For example, American Electric Power has calculated that a 765-kV grid overlay could reduce U.S. peak load

⁵ Available at: <http://www.nrel.gov/docs/fy14osti/60983.pdf>; a 2010 NREL report also provided useful information on curtailment practices: <http://www.nrel.gov/docs/fy10osti/48737.pdf>



electricity losses by 10 GW or more relative to 345-kV lines by reducing losses by a factor of 10, the equivalent output of 20 typical 500 MW coal-fired power plants, reducing annual CO2 emissions by 16 million tons.⁶

A build out of high voltage transmission lines to access the best wind energy resource areas in the country will be important to achieving the carbon emissions reductions called for in the President's Climate Action Agenda and in the EPA's proposed Clean Power Plan, not to mention the deeper reductions leading scientists say are necessary to avert the most damaging temperature increases that would contribute to catastrophic climate change. The reality is that the carbon emissions reduction targets cannot be achieved (and certainly not be achieved affordably) without significant growth in wind energy, and significant growth in wind energy cannot be achieved without a transmission build out. Asset management firm Lazard recently released their latest levelized cost of energy analysis⁷, which also includes a slide on the cost of carbon abatement from various generation sources. Wind energy has by far the lowest cost of abatement of all the generation sources studied, with wind energy actually having a negative cost of abatement, i.e. using wind energy to reduce carbon emissions is a net economic positive.

AWEA Recommendation: The QER should acknowledge the benefits of high-voltage transmission, urge the replication of successful models like the Texas CREZ process that planned, paid for, and constructed high-voltage transmission to renewable resource areas, and acknowledge the essential role that utility-scale renewable generation, and the transmission necessary to deploy it, must play in achieving our nation's climate protection goals.

Thank you for your careful consideration of these additional issues. Please don't hesitate to contact AWEA if we can provide any clarifications or more information.

Sincerely,

Tom Vinson
Vice President, Federal Regulatory Affairs
American Wind Energy Association

⁶ See <https://www.aep.com/newSroom/newSreleaSeS/Default.aspx?id=1515>, and <http://www.awea.org/files/filedownloads/pdfs/greenpowersuperhighways.pdf>

⁷ Available at: <http://www.lazard.com/PDF/Levelized%20Cost%20of%20Energy%20-%20Version%208.0.pdf>