

To: Chairman Robert Scott and Committee Members
From: Joe Wilkas, Bridgewater, NH
Date: October 3, 2016

Subject: NH SEC Antrim Wind, Docket No. 2015-02

Ref: 162-H:1 Declaration of Purpose. – The legislature recognizes that the selection of sites for energy facilities may have significant impacts on and **benefits to** the following: the welfare of the population, air and water quality....

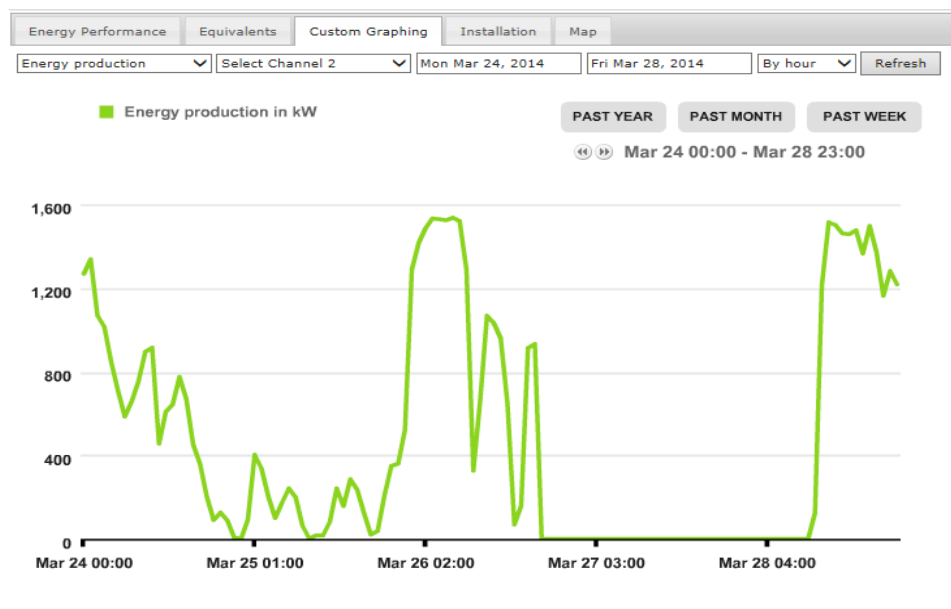
Much time has been spent on impacts, so lets address the proposed benefits.

From Antrim Wind's SEC submission:

“Accounting for all losses, Antrim Wind estimates that the Project will have an average annual net capacity factor of approximately 37.00%. Based on this projected capacity factor, the Project is expected to produce approximately 93,346 Megawatt hours (MWh) of electricity per year. The Project is anticipated to produce enough electricity for the average annual consumption of approximately 12,300 New Hampshire homes.”

For a Capacity Factor(CF) comparison, the Groton Wind SEC application “estimates that the Project will have an average annual net Capacity Factor (CF) of 33.0-36.0%.”, but for the year 2015 it actually produced at 27.3%. Another NH project, Granite Reliable, produced at 27.8% CF. So assuming Antrim Wind's CF would be similar to these other NH Wind projects, Antrim Wind's estimated CF may be almost 40% optimistic, and therefore similarly optimistic about the number of NH homes powered.

Unlike conventional power plants, wind power is unpredictably intermittent, unreliable, changing minute to minute depending on the varying wind speed and direction, occasionally operating at full power but more often at zero output, or anywhere in between. Below is a year 2014 example from 1.5MW Scituate Wind, along the ocean, where winds are usually higher and steadier than inland:



Because of this intermittent power, a quick responding, dispatchable 'backup' power source must operate along with the intermittent Wind power to 'keep the lights on'. This backup power source has to continually adjust to the Wind power output, increasing output when the wind power output drops, and decreasing output when the wind power increases, to maintain an even power level to these NH homes.

So Antrim Wind is proposing to replace power from a conventional power plant with power from their intermittent power source, and we know power from a quick responding backup power plant will also be needed. Since Antrim Wind can provide 100% at peak, but only 37% average of the power needed, the required backup plant must provide the other 63% to equal 100% of the needed power over time.

Most electrical power generation in NH, ignoring Seabrook Nuclear, is from Combined Cycle (CC) Natural Gas powerplants, so Antrim Wind's power, along with it's backup power, would replace power from this type of plant. The cost effective, fast reacting backup power plant used for this is an Open Cycle (OC) gas power plant that emits 50% more emissions than the CC plant to be replaced. Since the backup plant needed with Wind has to generate 63% of the power that was previously generated by the CC plant, and the OC plant emits 50% more emissions than the CC plant, the OC plant used as a backup to Wind will generate ~ the same emissions as the original OC plant running continuously powering these homes. There will be minimal emissions savings from adding Wind Power with the required backup power plant, and no savings if Antrim's optimistic CF is more in line with other NH Wind projects.

So minimal or no emissions savings, but what will it cost the electricity users and taxpayers of NH? We'll have to pay for (prices ~approximate):

1. The Wind Power itself, usually by a 2013 PPA priced in the Northeast at ~\$0.06/KW-Hr
2. Running the required backup powerplant, ~ \$0.04/KW-Hr, typical wholesale price
3. Federal Wind subsidy, PTC, at \$0.023 cents per KW-Hr
4. Renewable Energy Credit (REC) Sales, ~ \$0.005 / KW-Hr
5. Losses from long-distance transmission. Much of the power usually goes to MA , CT.
6. Forward Capacity Market payments (see ISONE).

So significant impacts and increased costs for negligible, if any, savings of emissions.

Summary:

This Antrim Wind project, like others in the relatively low wind Northeast, offers little-to-no power generation or emissions reduction benefits and increases costs to electricity users and taxpayers.

Why not give preference to Biomass, with ~80% + CF and higher employment, and Rooftop Solar?

References:

<http://www.nhsec.nh.gov/projects/2015-02/application/documents/10-02-15-sec-2015-02-antrim-wind-app-site-and-facility.pdf>

Power output from Scituate Wind. This information used to be available in hours, but is now in longer time durations of weeks, months etc., so as not to show the hourly volatility.

<http://scituatewind.weebly.com/>