

4.5 CLIMATE AND AIR QUALITY

The following comments are all related to the Project displacing emissions from conventional power plants:

Written Comment 4Z:

Another assertion on which the DEIS relies is that wind energy “will displace generation at fossil fueled plants.” This is a very important issue because the ability of wind energy projects to displace emissions from traditional power plants is much more limited than even their poor electricity generation rate would suggest. In terms of the Town’s SEQRA determination that the project can achieve its purposes, and that the project’s benefits outweigh its negative impacts, the DEIS places great weight on the ability of the project to displace conventional power plant emissions, as the fundamental purpose of the project is to:

- Satisfy regional energy needs in an efficient and environmentally sound manner.
- Reduce...the use of fossil fuels in the electrical sector...”

Elsewhere, the DEIS asserts that the environmental benefits of the project are that “[w]ind-generated electricity displaces the use of fossil fuels in conventional power plants,” and this project “will reduce New York’s greenhouse gas emission, helping to achieve the State’s CO₂ reduction goals” and thus will also reduce (in a meaningful way) “the negative environmental externalities associated with fossil fuel based power plant emissions,” specifically “airborne mercury emissions” from coal-fired power plants that are polluting our fish.

Written Comment 4AA:

Electric power plants are responsible for 40 percent of CO₂ emissions in the U.S., more than any other sector, including the transportation and industrial sectors. Coal power plants are responsible for over 80 percent of these emissions. Thus, if wind power could make a significant dent in our need for coal-fired (or natural gas fired) power plants, they could offset such emissions. Very few energy analysts believe that wind farms can meaningfully displace emissions from coal-fired power plants. The primary reason why wind power is unable to meaningfully offset CO₂ and air pollutant emissions from other power sources is that wind power is intermittent and thus requires backup power from more reliable sources like coal-fired and natural gas-fired power plants. Put differently, electricity consumers need power on demand, and wind power not only is unable to provide such power; the more wind power is integrated into the grid, the more backup is needed that can be called upon at a moment’s notice.

Written Comment 4BB:

Because they generate electricity intermittently, European grid operator (and wind farm developer) E.ON Netz reports that “wind farms can only replace traditional power station capacities to a limited degree,” specifically about four percent because reliable generation capacity must be operated in reserve.”

Written Comment 4CC:

The National Academy of Sciences finds that a substantial amount of wind power needs to be backed-up by other generators, depending on the distinctive features of the transmission system into which wind power is integrated:

...the cost of [wind energy's] intermittency (in terms of back-up or reserve requirements) will be less if the generation mix is dominated by power plants with fast ramp rates (gas, hydropower) than if it is dominated by coal or nuclear plants, which have high capital costs and slow ramp rates...Denmark, for example, has access to substantial hydroelectric capacity, which it relies on to balance the intermittent output from wind-energy installations.

Accordingly, the Academy estimates that by 2020 wind-generated energy could displace about 8% of the capacity of more polluting sources, and could displace no more than 2.25% of U.S. anthropogenic CO₂ emissions; and using more wind power increases rather than decreases the need for reserve power, further reducing wind power's net displacement of CO₂.

Written Comment 4DD:

Government policies promoting wind power reduce pollution offsets even further. In states with a Renewable Portfolio Standard like New York, the RPS program creates a closed market for renewables with the result that wind energy does not avoid emissions from other energy sources because it competes only with other, zero-emissions sources in the closed market. Thus, “no avoided air emission benefit exists if wind generation displaces another renewable project generation to meet a state (or future national) renewable portfolio standard.

Written Comment 4EE:

The DEIS emphasis on New York's RPS program, as a basis for concluding the project meets general social and environmental needs, should therefore be seriously questioned. First, the goal of the New York RPS, “an increase in renewable energy used in the State to 25% by the year 2013,” is close to being achieved, as noted earlier primarily because of New York's hydropower resources. Second, the RPS goal does not single out wind power but instead promotes all

renewable energy solutions. Whether there are more effective ways to achieve the goal is an open question, as wind power has yet to prove it can make a *significant* contribution to the goal. For example, the DEIS provides no evidence that wind power has any measureable effect on coal-fired power plant emissions.

Written Comment 4FF:

Unless a region relies almost entirely on coal for power, grid operators do not turn first to coal-fired power plants to accommodate intermittent power sources. Instead, natural gas-fired hydroelectric plants are directed by the grid operator to ramp up or down first because their ability to do so is much greater than that of coal-fired plants. In states like New York where substantial hydroelectric power is integrated into the grid, wind power may displace proven low emissions sources. Little or no emissions reductions from coal combustion can therefore be realized as a result of greater integration of utility scale wind energy.

Written Comment 4GG:

While it is true that, once they are constructed, the fuel for wind farms is free and renewable, as noted earlier regarding the need for government support, the costs of getting there are substantial. Thus, whether wind power can offset emissions from other power plants, and by how much, is a much more complicated question than the simplistic assertion that it displaces fossil fuel emissions in the DEIS. The best information we have is that wind power can offset only a small fraction of the emissions that would be created by the same amount of electricity from other sources, and probably cannot offset a significant amount.

Response to Written Comments 4Z, 4AA, 4BB, 4CC, 4DD, 4EE, 4FF, and 4GG:

Electricity generated by this Project will directly displace the generation of energy at existing conventional power plants, and thereby will displace pollutants emitted by these facilities as indicated in DEIS Section 3.4. This conclusion is supported by a 2008 U.S. Department of Energy, National Renewable Energy Laboratory report that states, "*Wind energy generation results in reductions in air emissions because of the way the electric power system works. Wind energy is a preferred power source on an economic basis, because the operating costs to run the turbines are very low and there are no fuel costs. Thus, when the wind turbines produce power, this power source will displace generation at fossil fueled plants, which have higher operating and fuel costs.*" Air quality benefits occur when wind generated power reduces the combustion of fossil fuels at existing power plants. On the long-term basis, wind generated power also reduces the need to construct and operate new fossil fueled power plants (Jacobson and High, 2008).

Investments in the nation's transmission infrastructure and developing larger load balancing areas are two steps that will aid in the use of more wind power. The NYISO has already taken steps to integrate more wind power into the system by implementing a centralized wind forecasting system in 2008. As technology continues to advance our grid toward "smart grid" technology, wind power (along with forms of generation) will be able to diversify our sources of power and provide lower emission power that has economic and environmental benefits. The Project can contribute clean power to the grid.

With respect to the RPS, NYSERDA estimates that the 30 renewable energy projects from the first three Main Tier solicitations that are supported under the RPS program could generate more than \$2.0 billion of in-state economic benefits over their 20-year expected economic life. These benefits are expected to come in the form of new trade and professional jobs, new property tax revenues to local taxing jurisdictions, royalty payments to landowners, purchases of construction materials and equipment rentals, and various other economic benefits. This estimate of benefits excludes consideration of economic spill-over affects associated with increased local income and increased property tax revenues.

A 2008 report commissioned by NYSERDA shows that "based on the existing resources contracted to date through the first three solicitations, \$25 in total direct benefits is produced as a result of project expenditures in New York for every MWh of renewable energy that is generated for the RPS."

While most of the comment's assertions are unsupported, it should also be noted that in China, the largest producer of greenhouse gases, in 2010 the share of power from renewable sources exceeded 26%, and "the boom in clean energy capacity allowed authorities to close a number of fossil-fuel powered thermal plants in an effort to reduce [emissions](#), cutting output from the sector by 11GW," even though energy consumption increased 14.56% (businessGreen, 2011).

The following comments are related to potential air quality impacts that may occur during the manufacturing of components or during Project construction:

Written Comment 4HH:

Substantial emissions are generated prior to construction of a wind farm, during the life cycle of wind turbine parts, the manufacture of concrete for foundations, and the operation of trucks to transport parts and materials. These life cycle emissions should be considered when evaluating the net benefits of a wind farm.

Written Comment 4II:

For example, cement production is a substantial source of greenhouse gas emissions, accounting for about 2.5% of total global CO₂ emissions, or 5 billion of 220 billion tons emitted annually. These emissions are not primarily from the burning of fossil fuels in the production of cement but rather from the production of clinker, a component of cement, when calcium carbonate is transformed into lime. In terms of units of production, CO₂ emissions from the production of cement are “in the range of 0.85 to 1.35 Mg of CO₂ per MG of clinker” and “900 to 1000 kg/tonne clinker.” That is, every ton of clinker generates approximately one ton of CO₂ emissions.

Written Comment 4JJ:

Modern wind turbines with a rated capacity of 2.5 MW or more require about 500 cubic yards of concrete base per turbine. That is, each modern turbine can be expected to require about 112-170 tons of cement. A 29-turbine wind farm will therefore involve emissions of over 5,000 tons of CO₂ generated by the concrete required alone. If less than eight percent of traditional power plant emissions are avoided, as suggested by the National Academy of Sciences, at a 20% electric generation rate, the project would take years to pay back its concrete emissions.

Written Comment 17C:

How much greenhouse gas is it going to take to build, transport, and put up all of these windmills. How much concrete, one of the greatest sources of CO₂ emission, will it take to set up one windmill? How much will it take to clear an area, cut down trees which help keep our air clean. Will all this be worth the little bit of “clean energy” that might be produced?

Wind energy is not efficient and could cause electric prices to increase by as much as 30% as it did in Britain and increased more than that in Denmark. The lure of receiving **FREE MONEY** for our school, county and town is false. Everything has a price.

Response to Written Comments 4HH, 4II, 4JJ, and 17C:

The costs and “life cycle” impacts referenced by the commenter are associated with all energy generation facilities, and specific to impacts that occur outside the power generation stage of a given facility (e.g., raw material extraction, component manufacture, fuel and material transportation, construction, decommissioning), such impacts would be proportional to the amount of material utilized, distance traveled for delivery vehicles, etc. for a given generation facility. Potential impacts associated with construction are discussed in DEIS Section 2.6 and FEIS Section 4.1.5.

As to the remaining comment, as stated in DEIS Section 5.0 and FEIS Section 4.16., the “action” under review by the Lead Agency is the development of a commercial scale wind electric generating project. The Project does not include the construction and operation of a turbine manufacturing or component facilities. These activities will be taking place outside of New York. The SEQRA review process is constrained to a review of impacts in New York and particularly those in the project area. SEQRA is not intended to account for such “secondary” or indirect impacts outside the State or that do not have a greater nexus to the Project. Such attenuated impacts are outside the scope of the DEIS.

However, life cycle impacts/assessments also look at the impacts that occur during power generation, and therefore a comparison amongst the various forms of energy generation can provide meaningful context. To this end, numerous analyses clearly indicate that wind power (and other generation sources such as hydroelectric and nuclear) provide benefits. For instance, a 2003 University of California, Berkeley analysis found that wind and hydroelectric have the lowest global warming effect over 10, 20, 30 and 40 years of operation (Pacca, 2003). In addition, one of the preliminary conclusions associated with an analysis conducted by the Engineering Physics Department at the University of Wisconsin indicated that CO₂ emissions for fission, fusion, and wind are only 1-2% of coal plants and 2-4% of natural gas facilities (http://fti.neep.wisc.edu/presentations/sww_energy_ctr.pdf).

Specific to concerns regarding cement, the use of cement is not unique to wind power projects. The majority of cement is used to make concrete and concrete products. The manufacturing of and use of cement products make cement one of the most valuable and useful mineral products in the world. About two-thirds of the states in the United States make cement. These states produce about 90 million tons of cements each year; that’s more than 850 pounds of cement for every person living in the United States. The largest cement-producing states are California, Texas, Pennsylvania, Michigan, Missouri, and Alabama. Together these states account for 50% of the annual U.S. cement production. About 75% of all the cement produced is used to make ready-mix concrete, which is used to make buildings, bridges, sidewalks, walls, and all sorts of constructed structures. The rest is used to make building materials such as concrete blocks, pipes, and pre-cast slabs, in road building and repairs, and other assorted uses (<http://www.mii.org/Minerals/photocement.html>).

With respect to emissions such as CO₂, the following is re-stated from Section 2.2 of the DEIS:

“Wind-generated electricity displaces the use of fossil fuels in conventional power plants, producing a reduction in the emission of key air pollutants; sulfur dioxide and nitrogen oxides

(acid rain precursors); mercury; and carbon dioxide (tied to global climate change). NYSERDA found that if wind energy supplied 10% (3,300 MW) of the state's peak electricity demand, 65% of the energy it displaced would come from natural gas, 15% from coal, and 10% from electricity imports. This equates to an annual displacement of 6,400 tons of nitrogen oxides and 12,000 tons of sulfur dioxide (GE Energy, 2005)."

One megawatt-hour (MWh) of wind energy produced reduces CO₂ emissions by roughly 1,200 pounds. The average turbine installed in 2008 was 1.67 megawatts (MW) in size. A single 1.67-MW turbine would produce over 5,000 MWh of electricity per year and reduce CO₂ emissions by over 3,000 tons. Given that the plan for Allegany is to use a 2.5 MW turbine, which will produce even more than 5,000 MWhrs per year, any CO₂ emitted in the production of cement used for the concrete bases will be "made up" inside of a year.