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2.4.1 Existing Conditions

2.4.1.1 Climatic Condition

The U.S. National Climatic Data Center (NCDC) maintains climate data for numerous weather measurement station locations throughout the United States, including data collected at nearby Fredonia, New York, which is located approximately 6 miles northwest of the Project Site. The NCDC data for Fredonia is representative of the Project Area and includes normal value averages for the measurement period 1971 through 2000. Based on these 30-year averages, the average annual mean temperature is 48.8°F, average annual daily maximum temperature is 57.0°F, and the average annual daily minimum temperature is 40.6°F. Historically, January is the coldest month with an average daily temperature of 25.6°F, and July is the warmest month with an average daily temperature of 70.7°F (NCDC 2000).

The 30-year average precipitation recorded in Fredonia is 42.08 inches per year. September is historically the wettest month of the year, with an average precipitation of 4.84 inches, while February is historically the driest, with an average of 2.12 inches (NCDC 2007). The average annual snowfall for Chautauqua County (recorded in Fredonia) is 82.7 inches. Historically, January is the snowiest month with 24.4 inches (NYSC 2007).

The hub height of the proposed wind turbine generators is 80 meters above ground surface. This is the height corresponding to the center of the rotor that will harness the flow of wind that will power the Project. The Applicant analyzed wind speeds in the Project Area at this height above ground surface, utilizing a combination of wind resource maps created by AWS Truewind (www.AWStruewind.com) and on-site meteorological towers across and adjacent to the Project Area. These efforts determined that the wind resource in the Project Area is competitive with other established and potential commercial wind sites across New York. They also verified that the prevailing and most energetic wind direction is from the southwest. As described in Section 1.0, the turbines have been sited in arrays roughly perpendicular to the prevailing winds, with sufficient spacing to minimize wake effects on nearby turbines and to maximize the areas that have the greatest wind resources.

Additional climatic information relating to severe weather is discussed in Section 2.10 Public Safety.

2.4.1.2 Air Quality

Within the Project Area, air emissions generated are related primarily to vehicular travel and farm operations. Vehicles produce exhaust emissions along with dust from unpaved road surfaces. Routine odors are associated with farming practices like manure spreading. Although these odors can be perceived as an aesthetic annoyance, they do not have a significant effect on local air quality.

Within New York State, the DEC's Division of Air Resources is responsible for monitoring ambient air quality. Each year it publishes air quality data for New York State that provide a comparison between the ambient air and the ambient air quality standards for a calendar year. The most recent summary of air quality data available for the state is the *2006 New York State Air Quality Report: Data Tables* (NYSDEC 2006a). Included in this report are the most recent ambient air quality data, as well as long-term monitoring trends in air quality that have been collected and compiled from numerous state and private (e.g., industrial, utilities) monitoring stations across the state, assessed according to NYSDEC region number. The Project Area is located within NYSDEC Region 9. The parameters monitored in the ambient air that are collected as continuous measurements include ozone (O_3), SO_2, NO_x, carbon monoxide (CO), and inhalable particulates with diameters less than 10 microns (PM_{10}) and 2.5 microns ($PM_{2.5}$). The monitoring data are used to determine whether various areas are in attainment with the National Ambient Air Quality Standards (NAAQS), which are designed to protect public health and welfare. According to Region 9 air quality data for 2006, a measurement station located in Dunkirk, approximately 8 miles northwest of the Project Site, indicated nonattainment with the NAAQS for O_3 (3 year average of 4th maximum 8 hour average) (NYSDEC 2006b).

At the federal level, the U.S. Environmental Protection Agency (USEPA) publishes the Green Book, which lists nonattainment areas for criteria pollutants. The list is county-specific and the criteria pollutants include 1-hour O_3 and 8-hour O_3, CO, NO_x, SO_2, $PM_{2.5}$, PM_{10}, and lead. All criteria pollutants in Chautauqua County are in attainment, except for 8-hour O_3, which is in basic (Subpart 1) nonattainment (USEPA 2007a).

2.4.1.2.1 Conventional Power Plants and Air Pollution

Across Western New York and the rest of the country, conventional power plants, similar to the one in nearby Dunkirk, are a major source of air pollution, with coal-fired power plants producing 59 percent of total United States SO_2 pollution and 18 percent of total NO_x every year (USEPA 2003). Coal-fired power plants are also the largest contributor of toxic mercury pollution (USEPA 2000) and hazardous air toxics (Clean Air Task Force 2002), and release about 50 percent of particle pollution. Additionally, power plants release over 40 percent of total U.S. carbon dioxide emissions, a prime contributor to global warming (USEPA 2000).

Conventional power plants are second only to automobiles as the greatest source of NOx emissions that are a key component of ground level ozone (USEPA 1998). Of the six major

criteria air pollutants regulated by the USEPA, NOx emissions have historically been the hardest to control. One of the contributing factors is that NOx emissions from coal plants in one region can easily pollute areas hundreds of miles downwind. The American Lung Association estimates that almost half (48 percent or 140.5 million) of Americans live in areas with unhealthy levels of smog.

Coal-fired power plants are also the largest single source of sulfur dioxide, releasing about 2/3 of the total SO_2 pollution each year (USEPA 2003). Sulfur dioxide, which can travel long distances in the atmosphere before falling down to the land, can cause problems on its own or when it combines with other pollution to form other dangerous compounds (USEPA 2000). In addition to acid rain, SO_2 can combine with NOx and other particles to form particulate matter, which is sometimes called soot. Particulate matter, which can also be released directly from the smokestacks of coal-fired power plants, is often divided into categories based on the size of the particles—coarse, fine, and ultrafine—and all three are considered hazardous to human health and the environment (American Lung Association 2006).

Particle pollution is considered by the American Lung Association to be one of the most dangerous air pollutants, and over 64 million Americans are estimated to breathe air that has enough particle pollution to put their health at risk. Particle pollution can trigger heart attacks and strokes, lead to cardiac arrhythmia (irregular heartbeat), cause respiratory irritation, and worsen asthma. Both short-term and long-term exposure can cause premature death. In fact, particle pollution from power plants in the United States leads to over 30,000 deaths each year–compared to the 17,000 homicides committed each year. Cutting power plant emissions by 75 percent could avoid more than 18,000 of the deaths caused by particle pollution (Clean Air Task Force 2000).

In addition to its health impacts, particle pollution is also the number one cause of haze, or reduced visibility, in the United States. Regional haze from airborne pollutants has reduced annual average visibility in the United States from natural conditions to about one-half in the west and to one-third in the east (USEPA 2007b).

Coal-fired power plants are the largest single man-made source of mercury pollution in the United States (USEPA 2000), and are the largest contributor of hazardous air pollutants. In smokestack tests, coal-fired power plants were found to release 67 air toxics, many of which are known or suspected carcinogens and neurotoxins that can cause development problems, respiratory problems, and aggravate asthma (Clean Air Task Force 2002).

Of these air toxics, one of the most dangerous is mercury. Mercury from coal-fired power plants is released into the air through the exhaust system when coal is burned. The primary exposure for Americans occurs when this mercury falls to the earth and runs into lakes, rivers, and streams, contaminating fish and shellfish. Humans, in turn, also can be exposed when they eat

these fish and shellfish (USEPA 2007b). In 2004, 47 states and territories had fish consumption advisories for mercury for at least some of their waters (USEPA 2005).

Mercury is a developmental toxin, primarily affecting fetal development. In unborn children, it can cause brain damage, mental retardation, blindness, and many other problems (Agency for Toxic Substances and Disease Registry 1999). Infants are also exposed to these dangers through contaminated breast milk. While the dangers of mercury are most often associated with women and children, eating fish high in mercury has also been found to put middle-aged men at a greater risk for coronary heart disease (American Heart Association 2004).

Burning fossil fuels such as coal releases CO_2 pollution, making energy use the single largest source of greenhouse gases in the United States and the world. Currently, there is 30 percent more CO_2 in the atmosphere than there was at the start of the Industrial Revolution. CO_2 levels in the atmosphere are expected to double during this century. Although the United States has only 4 percent of the world's population, it emits about 25 percent of the pollution contributing to global warming (Energy Information Administration 2004).

Power plants emit 40 percent of total U.S. carbon dioxide pollution, the primary global warming pollutant (USDOE and USEPA 2000). Although coal-fired power plants account for just over half of the electricity produced in the United States each year, they have been responsible for over 83 percent of the CO_2 pollution since 1990 (Environmental Information Administration 2006). Coal-fired power plants have the highest output rate of CO_2 per unit of electricity among all fossil fuels (USDOE and USEPA 2000).

The atmospheric concentrations of CO_2 and other greenhouse gases reached a new high in the 1990s, the hottest decade on record. Average global temperatures have risen already by one degree Fahrenheit, and projections indicate an increase of two to ten degrees within this century. The Intergovernmental Panel on Climate Change (IPCC) has reported that global warming threatens human populations and the world's ecosystems with worsening heat waves, floods, drought, extreme weather, and by spreading infectious diseases (IPCC 2007a). Global warming problems continue to grow as more greenhouse gases are emitted into the atmosphere.

2.4.2 Anticipated Impacts

2.4.2.1 Construction

During the site preparation and construction phases of the Project, temporary minor adverse impacts to air quality may result from the operation of construction equipment and vehicles. Impacts would occur due to emissions from engine exhaust and from the generation of fugitive dust during earth moving activities and travel on unpaved roads. The increased dust and emissions would not be of a magnitude or duration that would significantly impact local air quality. However, dust could cause localized annoyance and temporary property impacts (such

as creating a coating of dust) at certain yards and residences that are adjacent to Project access roads.

2.4.2.2 Operation

The operation of the Project is anticipated to have a positive impact on air quality by producing approximately 210,000 MWh per annum of emission-free electricity. This is the equivalent to powering approximately 35,000 New York homes (NYSERDA 2005). The power supplied by the Project will generally displace power provided by power plants in the region closest to the Project, such as local coal-fired plants. Such plants routinely come on and off line and adjust their output with changes in electricity demand or the sudden loss of supply (i.e., a power plant goes off-line) regardless of whether wind power is available. These plants are mainly fossil fuel thermal plants with relatively high air emissions. NYSERDA has determined that the addition of 3,300 MW of wind power—potentially including the Project—would not require increased operation of spinning reserve regulation or load-following generation resources. The amount of pollution displaced by the Project's output will vary by time of day and season and with the mix of fossil-fueled generation. Based on EPA's Emissions and Generation Resource Integrated Database (EPA eGRID), average output emission rates for the upstate New York power generators are approximately equal to the following: NOx at 0.995 lbs/MWh, SO_2 at 4.196 lbs/MWh, and CO_2 at 820 lbs/MWh (EPA eGRID). Using these figures and assuming maximum electricity generation of 79.9 MW and a capacity factor of approximately 30 percent, the Project will displace roughly:

- 108 tons of NOx
- 455 tons of SO_2
- 88,960 tons of CO_2

In reducing these and other greenhouse gases, the Project would also have indirect positive impacts on many of the harmful environmental conditions brought forth by these greenhouse gases. In reducing levels of smog, mercury, and sulfur-dioxide that contaminate rivers and streams through precipitation, the long-term benefits to aquatic and terrestrial wildlife would be far-reaching. Reducing emissions of these pollutants is an important environmental benefit because of their role in acid deposition (acid rain), ozone pollution (smog), and global warming, and the resultant health and welfare effects on the public and the environment. Using these assumptions, the proposed Project would have a net positive impact leading to healthier air and reduced climate change impacts associated with fossil-fuel-burning power plants.

Currently, New York hosts some of the oldest and dirtiest coal plants, which remain in operation in part to meet statewide power shortfalls. The Project's clean renewable power will both help meet the upstate region's growing electricity demand and reduce its dependence on existing conventional power plants. This, in turn, would have positive impacts on the health of the region's environment and its inhabitants.

2.4.3 Mitigation Measures

2.4.3.1 Construction

Except for minor, temporary impacts from construction vehicles, the Project will have no permanent adverse impacts on air quality. A Dust Control Plan will be developed and implemented to minimize the amount of dust generated by construction activities. In accordance with this plan, the extent of exposed/disturbed areas at the Project Site at any one time will be minimized and restored/stabilized as soon as possible. Construction traffic will observe a controlled speed to reduce creation of dusty conditions. An environmental inspector will identify dust problems and report them to the construction manager and the contractor. The role of the inspector is further outlined in Section 3.3. Water or other dust-suppression substances approved by local, state, and federal regulators will be used to control dust along public roads, as well as Project access roads as needed throughout the duration of construction activities. In addition to these mitigations, the Project will also employ the following measures:

- Vehicles used during construction will comply with applicable federal and state air quality regulation;
- Engine idling time will be limited and equipment will be shut down when not in use;
- Vehicles will be properly maintained;
- Defective exhaust pipes will be replaced immediately;
- Car-pooling among construction workers will be encouraged to minimize construction-related traffic and associated emissions;
- Disturbed areas will be re-planted or graveled to reduce wind-blown dust; and
- Erosion control measures will limit deposition to silt on roadways.

2.4.3.2 Operation

Operation of the Project would have a long-term beneficial impact on air quality and the environment. The air quality benefits from wind energy are principal drivers in the development of such projects and the mission of the Applicant. In essence, the operation of a utility-scale wind farm and its benefit on air quality can and should be viewed as mitigation for other environmental impacts that may be associated with the Project.

2.5 Aesthetic and Visual Resources

2.6 Historical, Cultural, and Archeological Resources

2.7 Sound

2.8 Traffic and Transportation

2.9 Socioeconomics

2.10 Public Safety

2.11 Community Facilities and Services

2.12 Communication Facilities