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Stantec

Memo

To:	John Kuba and Henry Woltag ConnectGen, LLC	From:	Caitlin Barns Stantec Consulting Services, Inc
File:	Preliminary Economic Discussion for Fountain Wind Project	Date:	September 14, 2020

Reference: Local Economic Effects of Wind Energy Projects

Introduction and Summary

This memorandum serves to summarize findings related to economic effects of land-based, utility scale wind energy projects. Documents reviewed include wind industry literature, academic studies and articles in peer reviewed journals, and local economic development analyses. There is a general consensus in this body of literature, based on examinations of wind energy projects in the United States and in Europe, that wind developments serve as sources of increased income for communities, jurisdictions, and individuals through the provision of jobs during construction and operation, payment of property taxes, and annual land lease payments. Jobs and taxes generated are a function of a project's generating capacity. Locally owned projects are estimated to generate more local jobs compared to absentee-owned projects.

There is less consensus on the actual economic impact that wind projects have on property value for houses near turbines. Most studies looking at sale prices of homes in the United States have found no measurable impact on home values from wind energy projects in both rural and urban settings. Some studies based on European housing data indicate that prices of homes at the time of a sales transaction have been negatively affected by proximity to wind turbines.

Each of the above findings is discussed in greater detail below. Where applicable, conclusions supported by literature will be discussed in the context of the proposed Fountain Wind Project site or its broader setting.

1. The wind industry is employing an increasing number of Americans and Californians.

Wind energy projects require labor for construction, manufacturing, and project operation and therefore create what are referred to as "direct" jobs. They also support jobs in the retail, commercial, and industrial sectors that support such projects through the provision of supplies or services ("indirect" jobs) or jobs created by increased economic activity associated with direct and indirect jobs ("induced" jobs). The wind industry has long touted the job creation component of utility-scale wind energy projects. The 2017 American Wind Energy Association (AWEA) publication, "Wind Brings Jobs and Economic Development to All 50 States," which summarizes research by Navigant Consulting, highlighted wind energy's current economic and employment benefits.[1] Of specific note:

- The wind industry directly and indirectly employed 102,500 workers in 2016. This number is expected to reach 248,000 by 2020, when including induced economic activity. AWEA estimates $85 billion in national economic activity from wind energy development by 2020.
- Citing the U.S. Department of Energy (DOE), AWEA reports that more Americans work in wind energy than in either the nuclear, coal, natural gas, or hydroelectric power generation sectors.[2] The DOE also reports that the wind industry hires veterans at a 50% higher than average rate among U.S. industries.

In California, AWEA estimates that the wind industry supported between 3,000 and 4,000 jobs in 2017, and that there has been, through 2017, $12.6 billion in capital investments made in California from wind energy development.[3]

2. Job creation associated with wind energy projects can be expressed in terms of jobs/MW, and job creation ratios are higher for locally-owned wind energy projects.

Analyses have documented or estimated jobs created by wind energy projects as a function of generating capacity, either as part of a predictive modeling exercise or econometric, post-project evaluation. This is expressed in terms of jobs per megawatt of output (job/MW). A 2012 comparison of built wind projects across nine U.S. states found nearly 0.5 jobs/MW during operation for the period 2000-2008.[4] This measurement of direct, indirect, and induced jobs generally exceeds projections or estimates based on models, such as those published by the Government Accountability Office (GAO) in 2004 for 11 projects nationwide, assuming a 150 MW project owned by an out-of-area energy company (the slight majority of which were estimated to generate 0.4 or fewer jobs/MW).[5] It also exceeds projections made for specific locations (e.g., a 2006 study suggesting wind energy development in Umatilla County, OR, would create up to 0.4 jobs/MW in operation[6]), or projects (an estimate prepared for two projects in Kittitas County, WA, totaling 390 MW, suggested 53 full-time or part-time direct, indirect, or induced jobs during operation, or 0.14 jobs/MW, would be generated;[7] similarly, a survey of other estimates identified projections of 0.29 jobs/MW for a 107 MW project in Lincoln County, MN, and 0.36 jobs/MW for a 30 MW project in Culberson County, TX[8]).

Multiple estimates of locally-based wind energy projects suggest equal or higher ratios of jobs/MW than the above numbers: adjusted modeling for the aforementioned Umatilla County projects to account for locally-based wind development indicated a slight increase in operations-based jobs; the GAO study projected an increase by a factor of between approximately two and three; and a scenario for a 10.5 MW project in Minnesota suggested community wind would have 3.4 times the impact on local job creation relative to a corporate owned development.[9] At least one study compared completed community wind projects with hypothetical average out-of-area (or “absentee”) projects. Community wind projects generate between 0.3 and 0.6 jobs/MW during operation, which is 1.1 to 2.8 times higher than out-of-area projects. Comparing the average of the completed projects with retrospective analysis of the first 1,000 MW of wind in Colorado and Iowa showed operations-period impacts are as much as 1.8 times higher.[10]

The Fountain Wind Project would have an out-of-area owner. The job creation multiplier for such projects described above range from the estimated 0.14 jobs/MW to documented 0.5 jobs/MW. This range, applied to the proposed project’s nameplate generating capacity, would yield a range of 49 to 174 direct, indirect, and induced jobs.

3. The tax benefits of wind energy projects are well established.

A recent survey of 30 years of research on wind energy acceptance[11] states that wind energy developments often contribute to local taxes, increasing local tax base and potentially decreasing resident tax rates due to an increase in tax values.[12] Economic modeling for projects has projected substantial increases in property taxes collected upon development of wind energy projects: a case study for a wind energy development in Weatherford, OK, estimated an annual increase of $600,000 in property tax revenue from a 147 MW project;[13] an input-output analysis for Umatilla County estimated a nearly $500,000 annual increase in property taxes collected by the county;[14] and the input-output model for proposed wind projects in Kittitas County estimated an annual increase of $2.8 million in property taxes collected.[15] Overall tax benefits of wind energy projects are affirmed by studies of actual effects such as the 2015 report finding that, between 2004 and 2014, Oklahoma’s 23 wind projects resulted in payment of nearly $134 million in “ad valorem” taxes to Oklahoma counties. Equipment installed in wind energy projects in Oklahoma represents “a significant increase in the taxable property base,” and the combined historical and forecasted payment of such taxes is projected to be approximately $1 billion.[16] Studies of the potential for wind energy projects to cause the net

present value of revenue from property taxes to decline have concluded that the likelihood of such a scenario is low.[17]

4. Lease payments made to property owners are substantial and represent potential local economic activity.

Developers typically lease the land for their projects, and the lease payments represent a substantial potential influx of capital into local communities. AWEA reports that "as the U.S. wind industry continues to grow, Navigant expects land lease payments to local landowners to grow from $245 million annually in 2016 to over $350 million by 2020, with nearly all of the payments flowing to rural America."[18] As a function of national averages, AWEA estimates that $15-$20 million in lease payments are made annually in California.[19]

Studies previously cited here also included estimates of payments that would be directly received by landowners for land leases. The GAO estimated in 2004 that wind energy projects could generate between land lease agreements of $2,000 and $5,000 per turbine, which is consistent with other input-output model estimates. The case study for a 147 MW wind energy development in Weatherford, OK, estimated $400,000 in annual lease payments to landowners.[20] Research is scant on the degree to which there is a multiplier effect related to the land lease payments. That is, it is unclear whether lease payments made to land owners result in increased economic activity within communities. The review of 30 years of wind energy acceptance research conducted by Lawrence Berkeley National Laboratory (LBNL) identifies findings of perceived inequality regarding landowner compensation, citing perceptions of "winners" and "losers," as well as increased intra-community conflict.[21]

5. There is support for an association between wind energy projects and additional socioeconomic benefits.

The LBNL article mentioned previously also summarizes studies showing positive economic aspects of wind energy development in North America. It is seen as a way to protect farmland, sustain rural economies, and reverse economic decline. Other studies have found a perception that wind energy projects help to preserve agricultural lifestyle.[22]

6. Most scientific studies have found no permanent impact on home values in rural or urban settings before or after construction.

While one of the primary concerns about wind energy project development is the perceived negative impact on property values, studies have generally confirmed that wind energy facilities have no such statistically significant effect. For example, a 2010 study at LBNL looked at the effect of proximity and view on sales prices of 7,500 single-family homes situated within 10 miles of 24 existing wind facilities in Washington, Oregon, Texas, Oklahoma, Iowa, Illinois, Wisconsin, Pennsylvania, and New York. Neither the view of the wind facilities nor the distance of the home to those facility was found to have a statistically significant effect on home sales prices.[23] A follow-up to this study in 2013 looked at data from over 50,000 home sales among 27 counties in nine states. The homes were within 10 miles of wind facilities, and approximately 1,200 homes sold were within one mile of a turbine. Again, the study found "no statistical evidence that home values near turbines were affected in the post-construction or post-announcement/pre-construction periods," suggesting that "the property-value effect of wind turbines is likely to be small, on average, if it is present at all."[24]

Other studies have affirmed these findings. A 2009 evaluation of the effects of the announcement of a proposed wind farm development in rural northern Colorado found "insignificant and minimal" impacts to surrounding home values and sales.[25] The study looked at 2,910 single-family home transactions in two rural

census traces adjacent to the proposed project site both prior to and after the announcement of the project. Similar effects were found on home prices in a 2011 study of nearly 1,300 sales in Lee County, Illinois,[26] and in a 2014 study based on 5,414 rural home and 1,590 farmland sales in southern Ontario, Canada.[27]

Studies of wind energy project effects on home values in more densely populated areas (of urban Massachusetts in 2016[28] and urban Rhode Island in 2014[29]) found no direct effect or statistically significant negative impact of wind turbines on home values. The Massachusetts study, among others, also dismissed the concept of "wind farm anticipation stigma," in which homebuyer behavior is influenced negatively by the announcement or likelihood of a wind energy project being developed in the vicinity of an available property.

Some studies have quantified a negative effect from wind energy projects on property value. A 2012 review of data on over 11,000 property transactions over nine years in three northern New York counties found declines in sales prices ranging from 9-16 % for homes within 0.5 mile of a turbine in two of the counties.[30] However, the bulk of the studies providing evidence of any negative effect to property value appears to be concentrated in Europe. A 2013 study found that price premiums in home sales in the vicinity of a Danish wind farm increase as the distance between home and turbine increases, at a rate of 2.4% per kilometer(km).[31] Wind farms reduce house prices in England and Wales where turbines are visible relative to areas where they are not; a price reduction of 5-to-6 % was found for areas within 2 km of visible turbines, falling to less than 2% between 2 and 4 km, and less than 1% by 14km, which is the limit of likely visibility in the study.[32] A 2014 study found a 1.4 – 2.3% reduction in transaction prices on homes within a 2 km radius of a turbine in the Netherlands.[33] A 2016 study in Germany concluded with estimates indicating that "the asking price for properties whose view was strongly affected by the construction of wind turbines decreased by about 9–14%," while properties with a "minor or marginal view" of the wind turbines experienced no devaluation.[34]

Because the Fountain Wind Project would be built entirely within commercial forestlands, very few residences are within 0.5 mile of any proposed turbine location. Further, existing trees are likely to partially or fully obstruct views toward turbines.

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