PUBLIC VERSION

BEFORE
THE OHIO POWER SITING BOARD

In the Matter of the Application of REPUBLIC WIND, LLC for a Certificate to Site Wind-Powered Electric Generation Facilities in Seneca and Sandusky Counties, Ohio.	))))	Case No. 17-2295-EL-BGN

REPUBLIC WIND, LLC'S RESPONSES TO STAFF'S FIRST SET OF DATA REQUESTS

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1. GE has developed risk mitigation recommendations for ice throw for their turbine models and has recommended the use of an ice detector and other measures. A recommendation derived from an independent study supported by the German Wind Energy Institute (GWEI) suggests locating turbines a distance at least 150 percent of the sum of the hub height and rotor diameter from occupied structures.

The GE siting guidance states:

Setback Distance	Objects of concern within the setback distance
If icing is likely at the wind turbine site: 1.5 x (hub height + rotor diameter)	Public use areas Residences Office buildings Public buildings Parking lots Public roads (more than lightly traveled) Railroads

Will the project comply with this setback?

RESPONSE

Republic Wind LLC ("Republic") intends to comply with the statutory setbacks under Ohio law and setbacks set forth in the Board's rules. Republic also intends to comply with conditions adopted by the Board which relate to setbacks to the extent those conditions are reasonable and consistent with Ohio law. It should be noted that since publication of this siting guidance by GE, turbine ice detection systems have made tremendous advancements. Ice throw is not a risk with a non-operating turbine, and current turbine models feature sophisticated vibration sensors on the turbine blade automatically halt operations when ice begins to accumulate.

2. Will construction require blasting operations?

RESPONSE

Based on the desktop Geotech report by Hull, bedrock depth ranges from 4 to 60 feet below grade. Access roads and underground collection cables will not reach those depths and therefore not require Blasting. Blasting may be required for the turbine foundations if the bedrock is encountered and is not "rippable" by excavation equipment. Weathered rock is erodible and easier to rip with a backhoe. The field Geotech investigation will inform us further about the condition of the bedrock and the need for blasting.

3. What turbine models are under consideration? The models listed on page 8 of the application includes the Acciona AW132 3.3 MW while on page 2 of the noise study the Acciona AW132 is not included but the Gamesa G132 3.465 MW model is included.

RESPONSE

The models listed on page 8 of the application are those under consideration (See Table 03-2 below which reflects the proposed models under consideration). The Gamesa G132 is not under consideration.

(b) *Turbine Dimensions*

Table 03-2 presents the dimensions in feet and meters for each of the turbine models under consideration.

Table 03-2. Approximate Turbine Dimensions by Model

Turbine Model	Rated Power	Hub Height	Rotor Diameter	Maximum Total Height
Acciona AW132	3.3 MW	84 meters (276 feet)	132 meters (433 feet)	150 meters (492 feet)
Vestas V136	3.6 MW	82/105/112 meters (269/344/367 feet)	136 meters (446 feet)	180 meters (591 feet)
General Electric GE 3.6-137	3.63 MW	110 meters (361 feet)	137 meters (449 feet)	178.5 meters (586 feet)

A revised sound of survey of RSG that corrects this discrepancy in the considered turbine models is attached hereto.

4. Please provide shape files of the noise and shadow flicker modeling.

RESPONSE

Shapefiles regarding noise and shadow flicker modeling had been submitted directly to Staff.

5. Table 06-1 on page 33 of the application presents the Applicant's estimates of project costs associated with the proposed facility.
- Please provide a copy of the study or analysis from which the project costs were derived.

Tangible Costs	Details
Turbine	Summation includes turbine purchase, turbine transportation, turbine storage, Turbine installation, commissioning, personnel lifts/climb assists, and turbine SCADA.
Civil and Electrical	Summation includes private access roads, public road upgrade/maint/repair, foundations, underground collection, turbine grounding, pad mount transformers & wiring, junction boxes/sectionalizing cab, and project substation.
Other	Summation includes interconnection substation, met towers engineering, infrastructure civil, crane pads & area grading, transmission line, construction miscellaneous, and contingency.
Total tangible (with rounding)	

Intangible Costs	Details
Development/Management	Summation includes development, owner indirects, and contractor indirects.
Insurance	Insurance.
Legal/Other	Summation includes legal fees, Financing and construction loan commitment.
Total Intangible	
Cost per kW	The cost per kW is the total project cost divided by the capacity of the project 198,000 kW

- Has the Applicant developed updated project cost estimates subsequent to those presented in the application?

RESPONSE

These project cost estimates are current.

- If yes, please provide the most recent updated project cost estimates, in the format of Table 06-1.

RESPONSE

Project cost estimates are current.

6. ***The application, page 33, states "Installed project costs compiled by the U.S. Department of Energy National Renewable Energy Laboratory (NREL) in August 2017 indicate that the capital costs of the Facility are in line with recent industry trends."***

RESPONSE

The full paragraph includes the appropriate citation: "Installed project costs compiled by the U.S. Department of Energy National Renewable Energy Laboratory (NREL) in August 2017 indicate that the capital costs of the Facility are in line with recent industry trends. The NREL compilation shows that capacity-weighted average installed costs in 2016 averaged roughly $1,590 per kW. This represents a decrease of $780/kW or 33% from the apparent peak in average costs of installed projects in 2009 and 2010. Early indications from a limited sample of projects under construction during report preparation and anticipating completion suggest that capacity-weighted average installed costs will remain similar in 2017 (Wiser & Bolinger, 2017)."

The literature cited section of the application provides more information about that report: "Wiser, R. and M. Bolinger. 2017. 2016 Wind Technologies Market Report. U.S. Department of Energy Efficiency and Renewable Energy, Office of Energy Efficiency and Renewable Energy. DOE/GO-102917-5033. August 2017." This is the report the cited data came from. However, the reference to the National Renewable Energy Laboratory is somewhat confusing, as NREL only contributed to this report -- the primary USDOE agency responsible for the report is the Office of Energy Efficiency & Renewable Energy. The underlined text, above, was included in error and should be stricken from the text; everything else is correct.

- Please provide a copy of (or a workable link to) this document.

RESPONSE

It can be downloaded from either of these government sites:
https://www.energy.gov/eere/wind/downloads/2016-wind-technologies-market-report or
https://www.osti.gov/biblio/1375677-wind-technologies-market-report

- Alternatively, please confirm that the referenced document was "2016 Cost of Wind Energy Review", published by NREL in December 2017.

RESPONSE

This was not the referenced document.

7. ***The application, page 33, refers to the average cost of wind energy facilities recently completed by affiliates of the Applicant.***
- Please provide a list of the facilities included in the average, including the name of the facility, the name of the affiliate, and the location (county, state) of the facility.

RESPONSE

- Grant Plains, Southern Power Company, Grant County, OK
- Chapman Ranch, Enbridge Inc., Nueces County, TX
- Cotton Plains, Northleaf Capital Partners, Floyd County, TX
- Old Settler, Northleaf Capital Partners, Floyd County, TX
- Phantom Solar, Northleaf Capital Partners, Killeen, TX

8. The application, page 34, states "These costs will be consistent with the average costs compiled by NREL, as described above."
- Please confirm that the reference to NREL should have been to Berkeley National Laboratory.

RESPONSE

Yes, the document cited in this section of text is again (Wiser & Bolinger, 2017). These authors work out of the Berkeley National Laboratory. NREL was referenced in error (although NREL did contribute to report). It would have been most accurate to refer to this report as a product of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, as was done in the literature cited section. Please refer to additional context in our response to question 6.

- Alternatively, please indicate the NREL document that is being referenced and provide a copy of (or a workable link to) this document.

RESPONSE

This is the same report discussed above; see response to question 6. It can be downloaded from either of these government sites:
https://www.energy.gov/eere/wind/downloads/2016-wind-technologies-market-report or
https://www.osti.gov/biblio/1375677-wind-technologies-market-report

9. Please describe how the staffing and maintenance costs presented on page 34 [section (C)(1)] of the application were derived. Please include in the description the staffing levels assumed and the categories of maintenance activities/costs assumed, with costs for each category.

RESPONSE

We broke down the numbers that were already used in the jedi model provided previously to represent the O&M and maintenance. Referencing the Berkley study these costs fall in line with industry averages for project operations. Without more detailed design, turbine agreements and other contractual requirements identified it is difficult to provide a more accurate number, there are many factors that go in a specific projects cost. While all our currently operating projects costs are confidential, we do believe the costs below are within the industry range for typical wind projects.

- If there is an existing document that provides this information, please provide a copy of the document.

- If these costs have been updated since the filing of the application, please provide the updated costs and an explanation of how the updated costs were derived.

RESPONSE

These costs have not been updated since the filing of the application.

10. Please indicate how the estimate of O&M costs for the facility, in $/kW-year [page 34, section (C)(2)], was derived from (or relates to) the staffing and maintenance costs presented in section (C)(1).

RESPONSE[1]

The O&M costs of [redacted]/kW-year were calculated based on the total O&M costs of [redacted] per year (converted to those units to enable direct comparison to USDOE report). The range of [redacted] per kW-year for O&M costs provides a buffer for our Republic estimates.

11. Please confirm that the affiliate facilities referenced for the range of O&M costs in section (C)(2) on page 34 are the same facilities referenced in item 3 above. If different, please list the differences.

RESPONSE

To incorporate 58 turbine sites included in Republic's application, the JEDI model was run using a 3,448 kW size turbine (which falls close to the average of turbine model capacities considered). Capacity was the metric for the range in costs, rather than specific turbine models.

12. Section (D), on page 35 of the application, presents estimates of the cost of delay during the permitting stage and during construction of the facility. Please provide the assumptions and calculations from which the costs were derived.

RESPONSE

Lost revenue $2.3-3.6M if the project is delayed (COD is pushed back by a month) during development (no construction LDs). This is highly dependent on PPA/SWAP/merchant assumptions.

[1] This response contains confidential projected economic information which was redacted in Republic's application. On February 2, 2018, Republic filed a motion for protective order regarding this confidential information. For the same reasons set forth in the motion for protective order, Republic submits that this information is confidential and a trade secret and, as such, has redacted this information.

We arrived at this range by dividing expected annual revenue by 12 (months). We have given a 50% range due to the subjectivity of our current estimates.

13. Section (E)(1) on page 36 of the application indicates that the JEDI model shows O&M of the proposed facility is estimated to create 12 FTE jobs. Regarding these 9 FTE jobs:

RESPONSE

This data request is unclear with respect to its reference to 9 jobs. As referenced in Section (E)(1) on page 36 of the application, O&M of the proposed Facility is estimated to generate 12 FTE onsite jobs.

- Does this number include the assumed staffing level for the proposed facility?

RESPONSE

Assuming Board Staff is referring to the 12 FTE jobs referenced in Section (E)(1) on page 36 of the application, yes. The 12 jobs discussed in the O&M section consist of staff at the proposed facility. These are 12 onsite, FTE jobs.

- What is the assumed staffing level for the proposed facility?

RESPONSE

12 FTE jobs.

- Please describe the anticipated types of jobs included in the 12 FTE job number that would be in addition to the assumed staffing level.

RESPONSE

All 12 of the FTE jobs are assumed facility staff. Section E(1) on page 36 explains the anticipated job-types: "Based upon JEDI model computations, the operation and maintenance of the proposed Facility is estimated to generate 12 full-time equivalent onsite jobs with combined estimated annual earnings of approximately $0.8 million. These 12 jobs are anticipated to be comprised of Project Management, Technician, and Administrative personnel. Projected wage rates are projected to be consistent with statewide averages which are estimated to be $18.66 per hour for Payroll and Timekeeping Clerks, $25.22 per hour for Industrial Engineering Technicians, and, $49.61 for Industrial Production Managers (Bureau of Labor Statistics, 2016)."

An additional 39 jobs per year could be generated through manufacturing, induced demand, increased household spending etc. These additional 39 jobs per year, which are described in Section E(2) on page 37 of the application, are separate from the 12 FTE jobs associated with Facility O&M staffing.

PUBLIC VERSION

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing Discovery has been served upon the following parties listed below by electronic mail, this 28th day of August 2018.

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Summary: Response of Republic Wind, LLC to Staff's First Set of Data Requests - Public Version electronically filed by Teresa Orahood on behalf of Devin D. Parram