

**BEFORE
THE OHIO POWER SITING BOARD**

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| In the Matter of the Application of Kingwood Solar I LLC for a Certificate of Environmental Compatibility and Public Need |)))) | Case No. 21-117-EL-BGN |
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REBUTTAL TESTIMONY OF ALEX ODOM

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2 **Q.1. Please state your name, title and business address.**

3 **A.1.** My name is Alex Odom. I am a Consultant in Acentech's Noise and Vibration
4 Group. The address of Acentech's headquarters is 33 Moulton Street, Cambridge, MA
5 02138.

6 **Q.2. Did you previously testify in this proceeding?**

7 **A.2.** Yes. I provided both direct and supplemental testimony in this proceeding.

8 **Q.3. What is the purpose of your rebuttal testimony?**

9 **A.3.** I am filing rebuttal testimony on behalf of the Applicant, Kingwood Solar I LLC,
10 in response to testimony by Robert Rand.

11 **Q.4. Have you reviewed the Mr. Rand's direct testimony?**

12 **A.4.** Yes, I have reviewed Mr. Rand's testimony marked as Citizen Exhibit 12. I also
13 reviewed Mr. Rand's cross-examination on that testimony.

14 **Q.5. At page 13 of his direct testimony, Mr. Rand states that the best practice is to**
15 **incorporate noise controls into the design build. Do you believe that noise controls**
16 **should be included in Kingwood Solar's final engineering design?**

17 **A.5.** Based on the Project design goal of ambient Leq + 5 dB, no additional noise control
18 was required to meet the Project noise goals. While no noise control has been included,
19 Project noise has been reduced by following the 500-foot inverter setback established in

1 Condition 4 of the Joint Stipulation and Recommendation as to Certificate Conditions (the
2 “Joint Stipulation”). The other method the Applicant will use to ensure the Project meets
3 its design goals is to follow Condition 31 of the Joint Stipulation, which requires additional
4 noise modeling or measurements to verify the Project sound levels when final equipment
5 selections have been made. If it was found to exceed the Project design goals, additional
6 mitigation would be needed at that time.

7 **Q.6. At page 13 of his direct testimony, Mr. Rand states that generally, noise control**
8 **retrofit may be impractical or unachievable due to space and engineering constraints.**
9 **Do you believe that noise control retrofit can occur at the Kingwood Solar project**
10 **post construction?**

11 **A.6.** Unlike a gas-fired power plant or wind farm, post-construction noise control can
12 typically be applied easily. The Project should ensure that the concrete footings and
13 equipment pads around the inverters and substation transformer could support a noise
14 barrier wall to allow for easy post-construction mitigation. Alternatively, they should
15 ensure there are no other engineering constraints (e.g., underground elements) that prevent
16 new structural supports for a noise barrier from being placed next to the existing equipment
17 pad.

18 **Q.7. Mr. Rand discusses achieving tonal inaudibility for the facility at page 12 of his**
19 **testimony, testifying that can be achieved through noise control enclosure buildings**
20 **or a one-mile setback. Do you believe tonal inaudibility is an appropriate design goal**
21 **for the Kingwood Solar project?**

22 **A.7.** Tonal inaudibility is an extremely conservative design goal that requires the sound
23 source to be at least 10 dB below the background sound level across all frequencies. A
24 sound source that is 10 dB below the background sound level does not contribute to the

1 total sound level, which would mean there would be a 0 dB change in sound levels post-
2 construction. I am not aware of any regulation that suggests tonal inaudibility as a design
3 goal. Also, the Ohio Power Siting Board (“Board”) has found some amount of increase in
4 community sound levels acceptable based on the Board’s wind rules that apply a Leq + 5
5 dB standard to wind projects as well as the use of an Leq + 5 dB metric in many certificates
6 issued for utility scale solar projects.

7 **Q.8. Do you believe that the Board’s wind rule standards for wind turbine operational**
8 **noise supports the use of an Leq +5 dBA design goal for Kingwood Solar?**

9 **A.8.** Yes. The specific rule is OAC 4906-4-09-F(2) and the rule states in relevant part
10 “[t]he facility shall be operated so that the facility noise contribution does not result in
11 noise levels at any non-participating sensitive receptor within one mile of the project
12 boundary that exceed the project area ambient nighttime average sound level (Leq) by five
13 A-weighted decibels (dBA). During daytime operation only (seven a.m. to ten p.m.), the
14 facility may operate at the greater of: the project area ambient nighttime Leq plus five dBA;
15 or the validly measured ambient Leq plus five dBA at the location of the sensitive
16 receptor.” There are some differences between wind turbine noise and solar farm noise.
17 Wind turbines are unique in that they produce both infrasound and amplitude modulation,
18 both of which are not captured well by A-weighted sound levels (dBA). Solar farms can
19 be tonal, but their tonal sounds are typically at frequencies in the audible range, which will
20 be captured in A-weighted sound levels (dBA). Regardless of the differences, human
21 perception of hearing is best represented by the A-weighted sound levels. Applying an Leq
22 +5 dB design goal for the Kingwood Solar project is consistent for the Board’s approach
23 for wind farms and also consistent with the Board’s approval of an Leq + 5 dB metric in
24 operational noise conditions for other utility scale solar projects.

1 **Q.9. Mr. Rand states at page 11 of his testimony that L90 + 5 dBA is the threshold for**
2 **complaints for the facility. Do you agree with that statement?**

3 **A.9.** In my experience, it is very difficult to predict complaints solely based on increases
4 over the ambient level. While a 5 dB increase in sound levels is noticeable, just because a
5 sound is noticeable does not mean a complaint will occur. In addition to changes in ambient
6 conditions, the overall Project noise level is a factor in evaluating the impact on the
7 community. A 5 dB increase over the L90 when ambient sound levels are higher (e.g., 50
8 dBA) may be less acceptable given the overall level that results, than a 5 dB increase when
9 the ambient sound levels are lower (e.g., 30 dBA).

10 **Q.10. In your opinion, how would you evaluate the overall expected Project nighttime noise**
11 **levels?**

12 **A.10.** As described in my direct testimony, we were conservative in our estimation of
13 nighttime noise (10:00 p.m. to 7:00 a.m.) because we assumed 100% of the inverters would
14 operate at night when providing reactive power, when in reality, either all inverters would
15 operate at 60% capacity or 60% of all inverters would operate at 100% capacity. All
16 receptors are expected to receive noise levels less than the design goal of $Leq + 5$ dBA,
17 which while not a standard for solar projects in Ohio is a standard for wind projects, and
18 the vast majority of non-participating residences are expected to experience less than 40
19 dBA from the Project operating between 10:00 p.m. and 7:00 a.m. While not applied in
20 the U.S., WHO's nighttime noise guidelines for Europe, established a noise guideline
21 referred to as $L_{night,outside}$ is 40 dBA. This value is the yearly average (i.e., Leq) of nighttime
22 noise level outside of a residence. Per the WHO nighttime noise guidelines, 40 dBA is the
23 lowest sound level at which they have observed adverse effects for nighttime noise. The
24 WHO guidelines are a conservative community noise goal intended to protect the most

1 vulnerable members of society based on studies of European populations, who may have
2 different public perception of community noise. Also, as I previously testified, sound
3 attenuates when passing through the walls or windows of a house. I agree with the WHO
4 nighttime noise guideline report's assumption that a conservative estimate of the reduction
5 of sound levels from outside to inside is about 21 dB. This value assumes that a window
6 would be partially open and still obtain this reduction in sound. Given that the nighttime
7 hours are from 10:00 p.m. to 7:00 a.m., I would expect the sound attenuation from walls
8 and windows to further reduce the Project operational noise inside a residence during those
9 hours.

10 **Q.11. Does this conclude your rebuttal testimony?**

11 **A.11.** Yes it does.

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing was served upon the following via email on
this 14th day of April 2022.

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Summary: Testimony Rebuttal Testimony of Alex Odom electronically filed by Mr.
Michael J. Settineri on behalf of Kingwood Solar I LLC