

suggesting that the acoustic characteristics of turbine noise are well suited to disturb the sleep of exposed individuals.”³⁰

IV. Summary and Conclusions

45. I conclude the following.

- a) The “Independent Expert Panel” convened by the Mass DEP and the Governor was not independent. This fact alone is enough to disqualify it as a source of unbiased objective scientific opinion. Given the background of the participants and their advocacy connections to Big Wind, this Panel has produced a document designed to be advocacy, not science.
- b) The “Independent Expert Panel” was not sufficiently expert to preemptorily dismiss or marginalize existing research performed by experts in their relevant areas, research which contradicts the findings of the Panel. The qualifications of the Panel members are certainly no better and in many cases worse than the qualifications of the scientists whose work they dismiss. This dismissal appears to be nothing less than eliminating inconvenient truths about the adverse health impacts of IWTs.³¹
- c) The “Independent Expert Panel” conducted no independent scientific research, even though many sample populations for estimating dose-response models in a before-and-after context were available to it. These sites include IWTs being erected or having been erected in Massachusetts and New England generally. Since the dispersion and potential adverse impacts of noise from IWTs are influenced by the topography and the ambient noise levels of the local areas in which they are sited, these local sites provide better estimates of potential adverse health impacts than sites in Europe and New Zealand. Indeed, at many of the sites at which IWTs already have been erected, there have been substantial adverse impacts.³² If the Governor and the Mass DEP are actually concerned

³⁰ A complete set of references is found on pp. 337-338.

³¹ The advocates of IWTs like to dismiss reports of adverse effects as a “nocebo effect;” that is, an adverse effect that is imagined by the reporting residents. This dismissal is nonsense. As the articles relied upon by the Expert Panel (and many dismissed by the Panel), industrial noises have adverse impacts on the quality of life and health. Go ask someone living near Logan airport whether their sleep is disturbed or they are annoyed by incoming and outgoing jets. That is why there are timing restrictions on the operation of Logan Airport.

I note that the research relied upon by the Panel finds that local residents report IWT noise much more annoying and a much greater sleep disrupter than air traffic. Does the Panel expect us to believe that jet noise and IWT noise are all imagined by local residents? Apparently they do.

³² For examples, Falmouth, Fairhaven, Vinalhaven and now Hoosac.

about adverse impacts of IWTs, they should be paying closer attention to these sites and pause their aggressive efforts to get IWTs sited, until these adverse effects are better understood. I see no evidence of that occurring.

- d) The Panel comes to some very strong conclusions which are simply contradicted by the research they cite as reliable. They are certainly contradicted by the research they improperly dismiss. In sum, the Panel's unsupported conclusions, presented in ¶ 19, are that there is limited evidence that IWTs annoy neighbors; that the annoyance may really be due to seeing the IWTs rather than the noise they make; there is limited evidence that IWTs cause sleep disruption; and there is no evidence that the noise emission from IWTs have adverse health effects.

46. If the results of this Wind Turbine Health Impact Study were not given such widespread credence, these assertions would be comical, given the evidentiary record. Unfortunately, public policy affecting peoples' lives is being determined based upon these conclusions. Most of the research that the Panel dismissed contradicted the Panel's assertions. Their dismissal of this research is unacceptable as a matter of scientific procedure. However, even the research that the Panel allowed to be introduced contradicts their conclusions. I have developed this fact above in Section III.

47. Had the Panel not misrepresented the conclusions of the five studies they cite, the Panel's conclusions would have been similar to those of the studies cited. In this Summary, I reiterate just a few of these findings which are in stark contrast to those unsupported findings of the Panel.³³

- “A statistically significant dose–response relationship was found, ***showing higher proportion of people reporting perception and annoyance than expected from the present dose–response relationships for transportation noise.***”³⁴
- The percentage of the population ***highly annoyed*** increased much more rapidly than other forms of transportation, reaching 35-40% at 40-42 dBA, that is, ***before the other forms of noise (even aircraft at airports) even register annoyance.***³⁵ One can conclude that, for some reason, the proportions of respondents annoyed by wind turbine noise are higher than for other community noise sources at the same A-weighted SPL and that the proportion annoyed increases more rapidly.

³³ The following include direct quotes (which are in quotation marks), some paraphrasing, or description of figures.

³⁴ See Section III.A above.

³⁵ This is a description of Figure 1 above.

At sound category 37.5–40.0 dBA, “20% of the 40 respondents living within this exposure were very annoyed and above 40 dBA, 36% of the 25 respondents.”³⁶

- “When adding the subjective factor of attitude to visual impact as an independent variable, the influence of the noise exposure decreased, but was still statistically significant.”³⁷
- “Most respondents who were annoyed by wind turbine noise stated that *they were annoyed often, i.e., every day or almost every day*. ... the noise intrudes on people’s daily life.” ... “Some of the respondents also stated that they were disturbed in their sleep by wind turbine noise, and the proportions seemed to increase with higher SPL.”³⁸
- “[N]oise annoyance was associated with sleep quality and negative emotions.” Of those respondents who were annoyed by wind turbine noise, 36% reported that their sleep was disturbed by a noise source. ... Respondents who were annoyed by wind turbine noise felt more tired and tense in the morning. They also felt resigned (29%), violated (23%), strained (19%) and tired (19%) when thinking about wind turbines to a statistically significantly higher degree compared with those who were not annoyed.³⁹
- “Annoyance was associated with ... lowered sleep quality and negative emotions” ... which could “lead to hindrance of human restoration.” This, together with reduced restoration possibilities may adversely affect health.⁴⁰
- “[C]ommunity noise is an increasing environmental problem known to cause adverse health effects.”⁴¹
- After considering the possibility that noise, visibility of IWTs and attitudes toward IWTs may be correlated and together act to determine the stated adverse impacts of noise, the authors conclude that “noise immission [sic] levels are possibly still the best predictor of noise annoyance.”⁴²

³⁶ See Section III.A above.

³⁷ *Ibid.*

³⁸ *Ibid.*

³⁹ See Section III.B above.

⁴⁰ *Ibid.*

⁴¹ See Section III.C above.

⁴² *Ibid.*

- ***“Community noise is recognized as an environmental stressor, causing nuisance, decreased wellbeing, and possibly non-auditory adverse effects on health.”***⁴³
 - “The main sources of community noise are transportation and industry. Air transport is the most annoying of the dominant means of transport.”
 - IWT noise is found to be considerably more intrusive and annoying than air transport.
 - The proportion of respondents annoyed and highly annoyed with wind turbine noise above 35 dBA and below 55 dB(A) is larger than the proportion annoyed with noise levels from ***all other noise sources except railroad shunting yards***, at comparable Lden. Shunting yards are rail yards in which trains and train cars are moved back and forth; connected, disconnected and reconnected; at random intervals; creating significant time-variant noise. The percentage of people “annoyed” or “very annoyed” with noise created at shunting yards is significantly higher than railway noise itself.⁴⁴
 - “... the relatively high annoyance with shunting yard noise has partly been explained by the impulsive nature of some yard activities. Wind turbine sound also varies unpredictably in level within a relatively short time span, i.e., minutes to hours. ... It can be postulated that it could be even more important that ***neither type of noise ceases at night***. In contrast, in areas with traffic noise and/or industrial noise, background levels usually return to lower levels at night, ***allowing residents to restore themselves psycho-physiologically***. A large proportion of respondents in the present study reported ***hearing wind turbine sound more clearly at night***, an observation supported by previous findings. ... ***Taken together, this implies that nighttime conditions should be treated as crucial in recommendations for wind turbine noise limits.***”
- “Increasing awareness of the adverse effects of noise has led to noise management recommendations, including [World Health Organization – WHO, 2000] guideline values to limit health effects in various situations and action plans for reducing noise and preserving quietness. ... Wind turbines are a new source of community noise to which relatively few people have yet been exposed.”⁴⁵

⁴³ See Section III.D above for this bullet and its sub-bullets.

⁴⁴ This sub-bullet is an explanation of Figure 2 above in Section III.D.

⁴⁵ See Section III.D above.

- The proportions of respondents annoyed by wind turbine noise were compared with similar data from two previous Swedish studies. However, “***this study found a stronger relationship between immission [sic] levels of wind turbine noise and annoyance than the Swedish studies,***” which may be due to the larger wind turbines included in the present study.⁴⁶
- The probability of being annoyed by wind turbine sound was higher if wind turbines were visible rather than not. Since the annoying audible and inaudible sounds produced by IWTs will increase with line-of-sight prevalence, this finding is not surprising.⁴⁷
- A large proportion of respondents from the turbine group identified turbine noise as a problem and rated it to be extremely annoying. The authors state that “***It should be noted that, in contemporary medicine, annoyance exists as a precise technical term describing a mental state characterized by distress and aversion, which if maintained, can lead to a deterioration of health and well-being.*** A Swedish study reported that, for respondents who were annoyed by wind turbine noise, feelings of resignation, violation, strain, and fatigue were statistically greater than for respondents not annoyed by turbine noise.”⁴⁸
- “We also observed lower sleep satisfaction in the turbine group than in the comparison group, a finding which is consistent with previous research.” “Demonstrably, our data have also captured the effects of wind turbine noise on sleep, reinforcing previous studies suggesting that the acoustic characteristics of turbine noise are well suited to disturb the sleep of exposed individuals.”⁴⁹



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⁴⁶ *Ibid.*

⁴⁷ *Ibid.*

⁴⁸ See Section III.E above.

⁴⁹ *Ibid.*