Readying Michigan to Make Good Energy Decisions

Wind on the Wires Comments
On the Draft Report on Michigan's Renewable Energy

Prepared by:
Sean R. Brady
Regional Policy Manager

October 16, 2013

INTRODUCTION

Wind on the Wires applauds the Public Service Commission and the Michigan Energy Office on the renewable energy report they produced in September. It is an even-handed and detailed synthesis of the current state of Michigan's renewable energy capacity, and it identifies the potential renewable energy capacity that could be built under the current statute's rate cap. This comment will address four issues that were raised in the report, as identified in the table of contents.

Table of Contents

INTRODUCTION i

COMMENTS 1

1. Turbine Siting Issues 1
   - A. Setback Requirements 1
   - B. The Basics of Sound and Measurement of Sound 2
   - C. Current Scientific Data Show That Wind Turbines Do Not Cause Adverse Human Health Impacts When Sited Properly 4
   - D. Property Values 6
2. Levelized Cost of Energy is the Most Effective Comparison of Costs of Different Types of Generation 8
3. The EIA's Capital Cost Estimates for Wind Tend to Overestimate Actual Costs and Should Not Be Heavily Relied Upon 10
4. Recent U.S. Court of Appeals Opinion Regarding Michigan Renewable Energy Standard Does Not Impact the Michigan RES 11

CONCLUSION 12

COMMENTS

1. Turbine Siting Issues

The Draft Report notes that a number of comments were made about siting issues, but that they mostly state preferences on what should be done and did not provide a thorough review of relevant states and regulations that promote or inhibit state-wide siting requirements. In response, Wind on the Wires would like to provide some general information on the impacts of setback requirements and noise limitations on the ability to site a viable wind farm, and then follow that with some data related to the basics of sound, the measurement of sound, and a review of property values in Michigan and how wind has improved them. A practical measure of the attitudes and impacts wind farms have on the community is the change in property values.

While Wind on the Wires has not performed an exhaustive investigation of siting ordinances, regulations or statutes for all the governmental bodies in Michigan, we can state that to the best of our members' knowledge and experiences, there are no sound limitations or setback requirements that would substantially impede wind development in Michigan. Thus, Wind on the Wires recommends that the Final Report state that current ordinances do not impede wind energy development in Michigan, that there are no unreasonable threats to the public convenience, health, and safety and that private property values seem to have positively benefitted from wind development in Michigan.

A. Setback Requirements

Issues of setback and sound are complex, and uninformed decisions beget unintended consequences. Existing wind turbine setback requirements preserve the safety and comfort of residents. If statewide setback requirements are established, they should include both a distance and a decibel component. The distance component addresses safety considerations, such as falling ice, and the decibel component addresses sound levels so people can enjoy their home and property.

Siting standards should ensure that distances and requirements are sufficient to ensure the safety and comfort of residents. Increasing setback distances by multiples does not make the neighboring property multiple times safer. Setbacks need to be set based on known characteristics of turbine operations. To not rely on the specific characteristics of turbines could result in setback distances that unduly impede the ability to site a sufficient number of turbines to allow for a commercially viable wind facility.[1] Current reports show that turbines can be installed at a distance that does not compromise the safety, health and welfare of residents or wildlife and that also allows for the development of commercially viable wind farms.

---

[1] *See* Klepinger, Michael "*Michigan Land Use Guidelines for Siting Wind Energy Systems*" Michigan State University Extension Bulletin WO-1053 (Feb. 2007) at 8, *explaining* how increasing the setback requirement reduces the space for siting operational turbines. It encourages the setback distance to be consistent with the community plan.

B. The Basics of Sound and Measurement of Sound

The following section provides a brief overview of basic terminology and concepts important to understanding that most of the complaints expressed by people at the public hearing are based on scientifically unfounded propositions.

1. The Basics of Sound and Terminology Used When Measuring Sound

All sound travels through the air as vibrations (sound waves). When these vibrations reach our eardrums, we hear them as sound. We perceive changes in amplitude, or the peaks and valleys of the wave, as changes in loudness. Further, we perceive different frequencies (the number of wave cycles per second) as higher or lower pitched sounds.

Frequency (Hz)

Frequency is measured in cycles per second, called hertz (Hz). As an example, the middle C on a piano keyboard is 261 Hz. The human ear can only detect a certain range of sounds, typically in a range between 20 Hz to 20,000 Hz. If the sound is too high, like a dog whistle, we cannot hear it. If a sound has a low enough frequency and is loud (*i.e.*, high amplitude), it can cause vibration that we can feel as well as hear, like the rumbling of thunder.

Low frequencies are typically defined in the range of 10 Hz to 200 Hz. While frequencies below this range are audible, individual sensitivities determine which of these very low frequencies are detected. Very low frequency sound, below 20 Hz, is called "infrasound." Importantly, the mere existence of "infrasound" does not harm to health. In fact, structures, equipment and even human beings continuously emit "infrasound."

Decibels (dB)

Sound typically consists of a mixture of tones with varying amplitude, frequency and duration. The sounds that humans hear are actually waves of varying sound pressures, which are referred to as sound pressure levels. Sound pressure levels are measured in decibels (dB). The decibel is a logarithmic measurement that can accommodate a large range of values attributable to the wide range of sounds detectable by the human ear.

2. Different Measurements of Decibels (dB)

Both frequency ("pitch") and amplitude ("loudness") are factors that can affect how sound is perceived by humans. In measuring sound, different "weighting networks" are used in an attempt to replicate sensitivity to different sound pressure levels. Not all sound pressures are equally loud to the human ear because the ear does not respond equally to all frequencies.

- The **linear-weighted network (dB)** represents the actual sound pressure level received by the sound level meter, which is measured in decibels.
- In contrast, the **A-weighted network** (**dBA**) mirrors the sensitivity of the average human ear to changes in frequencies by putting more weight on middle range frequencies and less weight on those frequencies the human ear does not hear well. For example, at 100 Hz (a low frequency), the A-weighting network filters out about 20 dB from the incoming signal before it is combined with other frequency ranges to produce an A-weighted sound level. dBA is still different from **loudness**, however, because the A-weighting filter does not respond in quite the same way as the ear. To determine the loudness of a sound, one

needs to consult some curves representing the frequency response of the human ear.

- The **C-weighted network** (**dBC**) attenuates sounds less than the A-weighted network, especially at low frequencies; for example, at 100 Hz, the C-weighted network filters out less than 1 dB from the incoming signal.

3. Comparison of Common Sound Sources

As noted above, when decibels are measured using the A-weighting network, the unit of measurement is dBA. The table below lists the pressure levels of several common sounds.

Decibel levels of common noise sources[2] Sound pressure level (dB(A)) of Noise Source		**Common Sound Levels[3] Sound pressure level in dB(A)**
140 Jet Engine (at 25 meters)		
130 Jet Aircraft (at 100 meters)		
120 Rock Concert		120 Threshold of pain
110 Pneumatic Chipper		110 Night Club with band playing
100 Jackhammer (at 1 meter)		100 Passing subway train @ 10' away
90 Chainsaw, Lawn Mower (at 1 meter)		90 Passing bus or truck @ 10' away
80 Heavy Truck Traffic		80 Passing car @ 10' away
70 Business Office, Vacuum Cleaner		70 Vacuum cleaner @ 10' away
60 Conversational Speech, Typical TV Volume		60 Office interior
50 Library		50 Quiet suburban area
40 Bedroom		40 Quiet rural area
30 Secluded Woods		30 Quiet office interior or ticking watch
20 Whisper		20 Quiet house interior or rural evening
		10 Rustling leaves

As sound travels over a distance, it attenuates, or is reduced in amplitude. People perceive this change in amplitude as the sound becoming quieter. When the distance from a point source of sound, such as a wind turbine, is doubled, the sound level decreases by six decibels.[4] For example, if a sound level is 50 dB at 500 feet, it will be 44 dB at 1000 feet.

---

[2] Claflin, Anne, "*A Guide to Noise Control in Minnesota,"* Minnesota Pollution Control Agency (Revised 2008), at 1.

[3] Klepinger, Michael "*Michigan Land Use Guidelines for Siting Wind Energy Systems*" at 10.

[4] Claflin, Anne, "*A Guide to Noise Control in Minnesota,"* Minnesota Pollution Control Agency (Revised 2008), at 1.

C. Current Scientific Data Show That Wind Turbines Do Not Cause Adverse Human Health Impacts When Sited Properly [vct1]

Given the properties of sound and the sensitivities of the human ear, research has appropriately focused on the impacts of audible sounds, low frequency sound, and infrasound when analyzing potential health impacts from wind turbines. Geoff Leventhall, a world renowned acoustic and vibration expert, conducted a study in 2006 on infrasound from wind turbines. According to Leventhall, there is now agreement among peer-reviewed acousticians that infrasound from wind turbines does not adversely affect human health.[5] When studying 1.5 MW wind turbines from a distance of 65 meters (213 feet), Leventhall found that modern upwind turbines produce pulses which are considered infrasound, but only at low levels, which are well below the hearing threshold.[6] Based on his study, Leventhall further concluded that infrasound is inaudible at frequencies below 16 Hz.[7] The threshold which is audible varies by individuals, but Leventhall states that it is "most unlikely" that an individual will be able to hear sound at any frequency which is more than 20 dB below the median threshold for hearing."[8]

Project-specific field studies conducted by Epsilon Associates, Inc. reached similar conclusions.[9] Epsilon studied the two turbine models most frequently installed by NextEra Energy Resources, LLC – the GE 1.5sle (1.5 MW) and Siemens SWT-2.3-93 (2.3 MW). These field studies consisted of outdoor measurements at various reference distances, and concurrent indoor/outdoor measurements at residences within the wind farm. Epsilon independently established all means, methods and testing protocol without interference or direction from NextEra. Based on field measurements and an extensive literature review, Epsilon concluded that wind farms consisting of GE 1.5sle and Siemens SWT 2.3-93 wind turbines sited at distances beyond 1000 feet from residences (i) meet the American National Standards Institute (ANSI) standard for low frequency sound in bedrooms, classrooms, and hospitals, (ii) meet the ANSI standard for thresholds of annoyance from low frequency sound, and (iii) caused no window rattles or perceptible vibration of light weight walls or ceilings within homes.[10] In homes, there may be slightly audible low frequency sound (depending on other sources of low frequency sound); however, the levels are below the American National Standards Institute ("ANSI") criteria and recommendations for low frequency sound within homes.[11] At distance greater than 1000', Epsilon concluded that there was no audible infrasound either outside or

---

[5] Leventhall, Geoff, "*Infrasound from Wind Turbines – Fact, Fiction or Deception*," Canadian Acoustics, vol. 34, no. 2, at 29 (2006).

[6] *Id*., at 32.

[7] *Id*., at 29.

[8] *Id*., at 30. See *Id*. at 29-30 for a discussion of the median threshold for hearing.

[9] O'Neal, Robert, Hellweg, Robert, and Lampeter, Richard, "*A Study of Low Frequency Noise and Infrasound from Wind Turbines*," Epsilon Associates, Inc., Report 2433-01, July, 2009. Epsilon's report included comparisons to the following criteria and standards on low frequency noise and infrasound: ANSI S12.9- Part 4 for annoyance and home vibrations, ANSI S12.2 for home, school and hospitals, ANSI S12.2 for moderately perceptible window and wall vibrations, threshold of audibility for sensitive persons, The UK Department for Environment, Food, Rural Affairs (DEFRA) for disturbance and ANSI S12.71 for perceptible ground borne vibrations in homes.

[10] *Id*., at ES-1.

[11] *Id*.

inside the homes at any of the measurement sites and that no adverse public health effects should be expected from low frequency sound or infrasound.[12]

Research has shown that the human body's non-auditory perception of low frequency and infrasound occurs only at levels above the auditory threshold.[13] According to Moeller and Pederson (2004), it is only possible to feel vibrations in the body at levels 20-25 dB above auditory thresholds. So, while some of the comments at the public hearing have raised the possibility that people are more sensitive to infrasound, current scientific literature on the topic of infrasound has concluded that inaudible levels of infrasound do not have an impact on human health.

In their own independent reviews of available evidence, Ontario's Chief Medical Officer of Health[14] and Australia's National Health and Medical Research Council[15] found that sound from wind turbines does not cause negative health impacts. Furthermore, the Massachusetts Departments of Environmental Protection and Public Health recently commissioned a panel of experts with backgrounds in public health, epidemiology, toxicology, neurology and sleep medicine, neuroscience, and mechanical engineering to analyze "the biological plausibility or basis for health effects of turbines (noise, vibration, and flicker)."[16] The review of existing studies included both peer-reviewed and non-peer reviewed literature. Among the key findings of the panel were[17]:

- There is no evidence for a set of health effects, from exposure to wind turbines that can be characterized as "Wind Turbine Syndrome."
- Claims that infrasound from wind turbines directly impacts the vestibular system have not been demonstrated scientifically. Available evidence shows that the infrasound levels near wind turbines cannot impact the vestibular system.
- The strongest epidemiological study suggests that there is not an association between noise from wind turbines and measures of psychological distress or mental health.
- None of the limited epidemiological evidence reviewed suggests an association between noise from wind turbines and pain and stiffness, diabetes, high blood pressure, tinnitus, hearing impairment, cardiovascular disease, and headache/migraine.

---

[12] *Id*.

[13] Moeller, H. and C. S. Pedersen. "*Hearing at Low and Infrasonic Frequencies*," Noise & Health 2004, v6 issue 23 at 37- 57 (2004).

[14] Chief Medical Officer of Health (CMOH) of Ontario, "*Potential Health Impact of Wind Turbines*", at 10 (May 2010).

[15] Australian National Health and Medical Research Council, "*Wind Turbines and Health: A Rapid Review of the Evidence*", at 5 (July 2010).

[16] Massachusetts Department of Environmental Protection and Massachusetts Department of Public Health, "*Wind Turbine Health Impact Study: Report of Independent Expert Panel*", at ES-3 (January 2012).

[17] Massachusetts Department of Environmental Protection and Massachusetts Department of Public Health, "*Wind Turbine Health Impact Study: Report of Independent Expert Panel*", at ES-6-7 (January 2012).

As part of the wind industry's commitment to examining this issue, the American and Canadian Wind Energy Associations (AWEA and CanWEA) established a scientific advisory panel in early 2009 to conduct a review of current literature available on the issue of perceived health effects of wind turbines. This panel reached the same conclusion that sound from wind turbines does not cause negative health impacts.

Based on these findings, it can be reasonably concluded that wind turbines do not produce low frequency sound or infrasound at levels sufficient to cause adverse health impacts at setbacks suggested by *Sample Zoning for Wind Energy Systems* and typically established by local government in Michigan, such as Huron County.

D. Property Values

There are excellent public reports on the impacts wind farms have had on property value, but we could find none focused specifically on Michigan wind farms. The only Michigan-specific information related to property values we found was an article on county property values. Therefore, we will summarize the conclusions of four documents that have reviewed this subject: "*The Impact of Wind Power Projects on Residential Property Values in the United States"* ("*LBNL Report on Residential Property Values")* by Lawrence Berkley National Laboratories, "*The Effect of Wind Farms on Property Values in Lee County (Illinois)*" by Illinois State University[18], "*Wind Farm Proximity and Property Values (in Illinois)*" by Illinois State University[19], and "*Who's No. 1? County-by-County rankings of property values in Michigan*" from mLIVE. These reports and articles demonstrate that wind farms have a neutral-to-positive impact on property values.

The LBNL Report on Residential Property Values is the oldest of the four documents, issued in December 2, 2009.[20] The *LBNL Report on Residential Property Values* reached the following conclusion:

> …based on the data sample and analysis presented here, no evidence is found that home prices surrounding wind facilities are consistently, measurably, and significantly affected by either the view of wind facilities or the distance of the home to those facilities. Although the analysis cannot dismiss the possibility that individual homes or small numbers of

---

[18] Carter, Jason, "*The Effect of Wind Farms on Residential Property Values in Lee County, Illinois*", Illinois State University (Spring 2011), available at: http://renewableenergy.illinoisstate.edu/downloads/publications/2011%20Wind%20Farms%20Effect%20on%20Property%20Values%20in%20Lee%20County.pdf

[19] Hinman, Jennifer L., "*Wind Farm Proximity and Property Values: A Pooled Hedonic Regression Analysis of Property Values in Central Illinois*" Illinois State University (May 2010), available at: http://renewableenergy.illinoisstate.edu/downloads/publications/2010%20Wind%20Farm%20Proximity%20and%20Property%20Values.pdf

[20] Hoen, Ben, Ryan Wiser, Peter Cappers, Mark Theyer and Gautum Sethi "*The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis*," Ernest Orlando Lawrence Berkeley National Laboratory, Berkeley, CA (Dec. 2009) funded by the Office of Energy Efficiency and Renewable Energy of the U.S. Department of Energy under contract No. DE-AC02-05ch1123. It can also be found on Berkeley Labs website: http://eetd.lbl.gov/sites/all/files/publications/report-lbnl-2829e.pdf

> homes have been or could be negatively impacted, it finds that if these impacts do exist, they are either too small and/or too infrequent to result in any widespread, statistically observable impact. Moreover, to the degree that homes and wind facilities in this sample are similar to homes and facilities in other areas where wind development is occurring, the results presented here are expected to be transferable.[21]

LBNL Report on Residential Property Values looked at three possible impacts (referred to as "Stigmas") that a wind energy facility will have on property values:

> • *Area Stigma*: A concern that the general area surrounding a wind energy facility will appear more developed, which may adversely affect home values in the local community regardless of whether any individual home has a view of the wind turbines.
> • *Scenic Vista Stigma*: A concern that a home may be devalued because of the view of a wind energy facility, and the potential impact of that view on an otherwise scenic vista.
> • *Nuisance Stigma*: A concern that factors that may occur in close proximity to wind turbines, such as sound and shadow flicker, will have a unique adverse influence on home values.[22]

The model used in the *LBNL Report on Residential Property Values* is based on market data. LBNL collected information on a large quantity of residential home sales (i.e., transactions) (*n* = 7,459) from ten communities surrounding 24 existing wind power facilities spread across multiple parts of the U.S. (e.g., nine states). Homes included in this sample are located from 800 feet to over five miles from the nearest wind energy facility, and were sold at any point from before wind facility announcement to over four years after the construction of the nearby wind project. Each of the homes sold was visited to determine the degree to which the wind facility was likely to have been visible at the time of sale and to collect other essential data.[23] Based on the *LBNL Report on Residential Property Values* and other similar studies, the MPSC and MEO can reasonably conclude that future wind developments in the Wind Energy Zone(s) would have little adverse impact on the value of residential property.

The Effect of Wind Farms on Property Values in Lee County had two significant findings: first, that the Mendota Hills Wind Farm and Lee-DeKalb Wind Center did not impact the average selling price of nearby residential real estate and that the GSG Wind Farm increased the value of nearby residential property.[24] Second, public opinion and perception seems to indicate that the presence of wind turbines diminish property values, which is attributed to wind farm anticipation stigma theory.[25]

---

[21] *Id.* at 75
[22] *Id.* at ix.
[23] *Id.* at x.
[24] *The Effect of Wind Farms on Residential Property Values in Lee County, Illinois,* at 25.
[25] *Id*. at 26.

Wind Farm Proximity and Property Values found that the property values of properties near an Illinois wind farm were not affected by the wind farm after it was operational, however there was a loss in property value prior to operation due to fear of the unknown. This phenomenon is called wind farm anticipation stigma theory. A random sample of residents near the wind farm was surveyed when the wind farm was operational and 60% of the respondents claimed that they were not concerned about their property values declining due to the wind farm.[26]

Bridge Magazine ranked Michigan's eighty-three counties by their percentage of property value growth or loss between 2011 and 2012.[27] The top three counties were Gratiot, Sanilac and Huron – which are home to 675 MW of the 986 MW of operating wind capacity in Michigan. Five of the top twelve counties have wind farms. While the study was not focused on the impacts of wind farms, the correlation of increase in property value to operating wind farms is pretty significant. And a recent article in the Huron Daily Tribune found a similar occurrence in Huron County:

> [Jeff Smith, director of the Huron County Building and Zoning Office] "said residents of Huron County first met wind turbines in the area with some skepticism, but the trend in the area seems to be moving forward for renewable energy. 'The first projects came through with about a 60 percent vote,' Smith said. 'The latest projects that have been approved tend to be at participation levels with landowners around 85 to 90 percent. That's where the turbines are located.'[28]

In conclusion, as Townships, local zoning boards or other governmental bodies continue to address issues related to wind development in Michigan, Wind on the Wires and its members stand ready to work with them in their evaluations and to establish, if deemed necessary, reasonable setback requirements and sound limitations. Thus, we recommend the Final Report find that current ordinances do not impede wind energy development in Michigan, that there are no unreasonable threats to the public convenience, health, and safety, and that private property values appear to have positively benefitted from wind development in Michigan.

2. Levelized Cost of Energy is the Most Effective Comparison of Costs of Different Types of Generation

The Draft Report states that the levelized cost of energy (LCOE) should not be used to compare renewable and conventional generation beyond simple screening comparisons because they have different operational profiles and system value. Instead, the Draft Report

---

[26] *Wind Farm Proximity and Property Values: A Pooled Hedonic Regression Analysis of Property Values in Central Illinois* at 85.

[27] mLIVE, "*Who's No. 1? County-by-County rankings of property values in Michigan*" (April 4, 2013).

[28] "*Huron County Wind Turbines Will Double in Number*" Huron Daily Tribune (October 11, 2013); see also, "*Huron County at Tip of Thumb doubling Wind Power*", Fresno Bee (October 13, 2013).

asserts that a *levelized avoided cost of energy* (LACE) metric should be used because it looks at displaced energy and capacity. (Draft Report at 32-33). Wind on the Wires' encourages the MPSC/MEO to place greater weight on LCOE than LACE.

While EIA has noted that LCOE could be more accurate, LACE has its own flaws and inaccuracies. It is a new methodology that, to the best of our knowledge, still has not been perfected. The LACE model attempts to capture a power plant's system value by looking at avoided cost. This results in a comparison of new generation to existing and mostly depreciated generation, which we anticipate would yield a negative benefit in most instances, and would be irrelevant in comparing different technology to meet a need for new generation. It appears to Wind on the Wires that little to nothing would be built under a LACE model.

When adding generation to the grid, the decision maker needs to compare new generation to new generation that would be avoided, or built if wind or another form of renewable energy generation were not chosen. The beauty of levelized cost of energy is that it *already* accounts for the capacity factor of each type of power plant, which makes each power plant comparable on an energy output basis.

The other concern about LCOE noted by the Draft Report is that the operational profiles of variable resources that are not well-suited to LCOE. That concern mostly relates to the variability of the wind or solar resource and the costs related to adjusting the output of existing capacity resources. The LCOE can be adjusted to account for those costs, and those costs tend to be small.[29] In fact, MISO has acknowledged that to date such costs have been almost non-existent. In its response to questions from Governor Rick Snyder's Office, MISO acknowledged that "to date, wind has not been a significant contributor to any system-wide reliability issues" and that "contingency reserves have never been deployed due to a drop in wind output."[30] In response to the question about integration costs related to a higher RES in Michigan, MISO responded that it is unaware of backup capacity costs specifically attributable to supporting an increase in wind generation.[31] MISO also stated that it "does not believe the level of fast-ramping generation in [the Michigan] footprint is currently a driver of significant operational issues" because MISO can meet the variability of wind by controlling its output through its Dispatchable Intermittent Resource program. In addition, MISO can meet the ramping needs of variable resources in Michigan by economically dispatching generation to meet both expected an unexpected demand. MISO concluded its comments noting that "as we [MISO] integrate additional wind capacity into our footprint, ramp capability will become increasingly important. MISO is currently engaged with stakeholders on exploring this issue and

---

[29] LBNL, 2012 *Wind Technologies Market Report* at 64, states the following -- "wind integration costs estimated by the studies reviewed are below $12/MWh—and [are] often below $5/MWh—for wind power capacity penetrations up to and even exceeding 40% of the peak load of the system in which the wind power is delivered."

[30] Draft Report, Appendix C, response to question 2.

[31] It is unclear from MISO's response how the $74M in network upgrade costs were allocated and how they are accounted for in rates. Network upgrades can be allocated to the generator or a region. For example, a network upgrade associated with interconnection of generation is borne by the developer, while baseline reliability network upgrade is passed along to the sub-regional pricing zone. MISO, *Transmission Planning Business Practices Manual*, BPM-020-r9, §§ 7.1 and 7.2 (effective May 28, 2013).

potential solutions."[32] Thus, it appears that there are no significant integration costs to account for in the LCOE and MISO is working to cost-effectively manage those costs if they occur.

LBNL's *2012 Wind Technologies Market Report* states that wind integration costs in an ISO or RTO are lower than costs for projects that do not interconnect into areas with large balancing areas.[33] The *2012 Wind Technologies Report* also found that integration costs stay in a $2/MWh to $12/MWh range up to wind capacity penetrations exceeding 40% of the peak load.[34] This is well above the 10% RPS target in the current Michigan RES.

Thus Wind on the Wires recommends that the Final Report place greater weight on the use of LCOE than LACE, and find that it is possible that integration costs will have little impact on LCOE prices, for wind and solar in Michigan, unless the RPS is significantly increased.

3. The EIA's Cost Estimates for Wind Tend to Overestimate the Capital Costs and Should Not Be Heavily Relied Upon

While Wind on the Wires' supports the use of levelized cost of energy as a way to compare the cost impacts of different types of generation, in contrast, we find the levelized cost of energy for wind that is developed by EIA to typically be higher than actual market rates. The Draft Report found that the most commonly cited cost estimates for renewable energy were from EIA's levelized cost data. The industry has found empirically that the EIA uses an overly conservative capacity factor for wind. Wind capacity factors in Michigan are typically between 40% and 52%, not the 34% that EIA uses. A lower capacity factor increases the capital costs, therefore, reliance on EIA's LCOE overestimates the potential rate for wind energy. EIA also includes the cost of transmission in its LCOE, which are actually borne by the entire MISO network, just like transmission for other generation types. Therefore, we would recommend that the Final Report should recognize levelized cost of wind energy from other sources, such as Lazard's *Levelized Cost of Energy Analysis* published in August of this year.[35]

---

[32] Draft Report, Appendix C, response to questions 4 and 5.

[33] LBNL, 2012 *Wind Technologies Market Report,* at 65, states the following -- "Larger balancing areas, such as those found in RTOs and ISOs, make it possible to integrate wind energy more easily and at lower cost than is the case in smaller balancing areas. Coordination among smaller balancing areas can reduce the cost of wind integration."

[34] LBNL, *2012 Wind Technologies Market Report,* at 64.

[35] "*Lazard's Levelized Cost of Energy Analysis – Version 7.0*" (August 2013) available at: http://gallery.mailchimp.com/ce17780900c3d223633ecfa59/files/Lazard_Levelized_Cost_of_Energy_v7.0.1.pdf.

4. Recent U.S. Court of Appeals Opinion Regarding Michigan Renewable Energy Standard Does Not Impact the Michigan RES

The Draft Report highlights the United States court of appeals recent opinion in Illinois Commerce Commission v. Federal Energy Regulatory Commission (Nos. 11-3421, 11-3430, 11-3584 et al.) when it states the following:

> Michigan's current RPS provisions regarding where renewable energy could be located were characterized as unconstitutional in a federal circuit court of appeals decision issued on June 7, 2013. The court's rationale was that such restrictions fall afoul of the Commerce Clause of the U.S. Constitution. That decision was not in a case that directly challenged the constitutionality of Michigan's current law, however to date, no such direct challenge has been brought." (Draft Report at 26)

The Draft Report captures an issue that has been well tread -- that some renewable energy standards have included locational requirements that could challenge the commerce clause provision of the U.S. Constitution. However, this section of the Draft Report should more clearly explain the matter that was before the court and that the constitutionality of the RES was not at issue. The real issue before the court was whether Michigan ratepayers should pay according to the cost allocation methodology approved by FERC or just pay for the multi-value projects built within Michigan given that the MVP transmission lines were intended to allow states to economically meet their renewable energy standards.

Therefore, Wind on the Wires recommends that this paragraph be modified as set forth below:

PROPOSED LANGUAGE

> A recent federal circuit court of appeals decision (June 7, 2013) characterized a portion of Michigan's current RPS provisions as running afoul the Commerce Clause of the U.S. Constitution. The issue before the court was not a direct challenge of the constitutionality of Michigan's current RES law, but was what methodology should be used for assessing the rate Michigan ratepayers should pay for multi-value transmission projects built in the Midcontinent Independent Service Operator's footprint. Various entities from Michigan argued that the locational requirements of the state RES necessitated that Michigan ratepayers only pay for multi value projects built within Michigan instead of paying for projects pursuant to the methodology approved by the Federal Energy Regulatory Commission. While the court rejected the argument put forth by the Michigan entities, the decisions does not affect the RES since the case did not ~~Michigan's current RPS provisions regarding where renewable energy could be located were characterized as unconstitutional in a federal circuit court of appeals decision issued on June 7, 2013. The court's rationale was that such restrictions fall afoul of the Commerce Clause of the U.S. Constitution. That decision was not in a case that~~directly challenge~~d~~ the constitutionality of Michigan's current

law. We also note that, ~~, however~~ to date, there has been no such direct challenge to the Michigan RES.~~has been brought."~~ (Draft Report at 26)

CONCLUSION

WHEREFORE, Wind on the Wires respectfully requests that the Final Report adopt the comments provided herein.

DATED: October 16, 2013

Respectfully submitted,

_____

Sean R. Brady

Regional Policy Manager -- East
Wind on the Wires

P.O. Box 4072
Wheaton, Illinois 60189
312.867.0609
sbrady@windonthewires.org