August 9, 2010

Chairperson Eric Callisto
Commissioner Mark Meyer
Commissioner Lauren Azar
Public Service Commission of Wisconsin
610 N. Whitney Way, PO Box 7854
Madison, WI 53707

Re: Final Wind Siting Council Report
Proposed Wind Siting Rule (PSC 128)

Dear Chairperson Callisto and Commissioners Meyer and Azar:

Enclosed for your review is the Final Report of the Wind Siting Council. Over the last four months, the diverse stakeholders on the Council convened together at 20 meetings and held respectful discussion about the myriad of wind energy siting issues in Wisconsin that the rule will ultimately address. This report is a summary of the Council's work and their subsequent recommendations. On behalf of the Council, I wish to thank you for the opportunity to provide this report as input as you promulgate draft wind siting rules for Wisconsin.

As you review this report, I'd especially like to highlight that on a variety of wind siting issues, the Council found areas on which all members did reach consensus. First and foremost, the Council unanimously agreed that wind development in Wisconsin needs to be conducted responsibly. Many recommendations were arrived at only after significant discussions held in the spirit of working toward consensus. The recommendations in this report reflect the input of all Council members. There are areas on which the Council did not reach consensus, but for which Council members shared their diverse experiences and expertise with Commission staff and the Commission for consideration during the final stages of the rulemaking process. In these few instances, individual Council members have opted to include dissenting opinions in the final report for your additional consideration.

This process would not have been successful without the dedication of a variety of individuals. First, in addition to the long hours, committed research and discussion of the Council members, I was especially grateful for the assistance provided to the Council by Commission staff. In particular, Deborah Erwin not only worked diligently behind the scenes to provide unfailing Council support, she was an indispensable, unflappable in-person resource at Council meetings. I additionally offer my thanks to the Commission staff that provided support at key moments within our aggressive time schedule to assist with our work product and process. Staff that repeatedly helped us meet our goals includes Joyce Dingman, John Lorence, Dan Sage, John Shenot and Lisa Stefanik. Finally, I also wish to recognize the efforts of Elizabeth Hanigan from Foley & Lardner. Elizabeth volunteered her time to the Council early in the process and attended nearly every Council meeting. She provided high levels of support to Commission staff during both the Council report and minority opinion drafting process.

The discussions I have heard over the past few months while having the privilege to lead this Council through its work has reinforced for me that wind energy siting issues often evoke strong opinions from all interested and affected parties. However, the time this Council has spent sharing these opinions and learning from each other – and the list of consensus opinions that rose from this effort -- additionally reinforces that common ground **can** be found in Wisconsin as it relates to wind energy siting. I look forward to the Commission's promulgation of these much needed wind siting rules.

Sincerely,

/s/ Dan Ebert

Dan Ebert
Wind Siting Council Chairperson

Enclosure

Wind Siting Council

Final Recommendations
To the Public Service Commission

Wind Siting Rulemaking
Pursuant to 2009 Wisconsin Act 40

August 9, 2010

1.0 EXECUTIVE SUMMARY

The Wind Siting Council offers this report and the attached straw proposal to the Public Service Commission for its consideration.

Since the siting of the very first modern wind turbines in Wisconsin in 1998, the issue of how and where to site wind generation has prompted considerable debate and discussion throughout the state. From Ashland to Kenosha and Land O' Lakes to Prairie du Chien, local governments have struggled with how to balance the many competing priorities and interests involved in the siting of wind turbines. The outcome of this struggle through 2009 was a patchwork of local ordinances and zoning and permitting processes that threatened to grind wind development in Wisconsin to a halt and send wind developers and significant economic development opportunities to neighboring states.

On October 1, 2009, Governor Doyle signed into law 2009 Wisconsin Act 40 (Act 40), which creates a policy framework to allow uniform local regulation of wind energy systems in Wisconsin. Act 40 directs the Public Service Commission of Wisconsin (Commission or PSC) to promulgate rules to specify maximum restrictions that a municipality can impose on installation and use of wind energy projects throughout the state of Wisconsin and further directs the Commission to appoint a Wind Siting Council to provide advice and counsel during the rulemaking process.

The 15 members of the Wind Siting Council began their work in March of 2010 and have spent hundreds of hours preparing for and attending the 20 official meetings. They have heard from a variety of outside experts and reviewed thousands of pages of reports, studies, and other analysis on the wide range of issues that impact the siting of wind turbines.

While the Council membership includes the stakeholders required by the Legislature – property owners, wind developers, realtors, environmental organizations, public citizens, utilities and local government experts – we have also sought to represent the wide variety of other groups and interests that united to support Act 40. This includes:

- Utility customer groups concerned about the rising costs of energy;
- Farmers and farm organizations fighting to protect family farms and rural economies in Wisconsin;
- The hundreds of small, medium and large companies in Wisconsin that are already employing hundreds of workers around the state supporting the wind industry;
- The tens of thousands of unemployed manufacturing workers around the state that stand to gain from increased employment in the manufacturing of wind turbines and towers.

The Council understood that the diversity of its membership and the significant volume of research, reports and expert opinion on the subject of siting wind turbines on all sides of the debate would present challenges. Accordingly, the Council agreed at the outset to base its investigation and review on facts and science, supported by detailed analysis (with a preference for peer-reviewed analysis, where available).

And, while the legislature intended the Council membership to reflect the diversity of opinions surrounding wind siting, the Council organized itself and worked hard to reach consensus. The Council believed it could best help and influence the Commission if it could work through its diversity and develop consensus recommendations. And in large measure we have succeeded. Seventy-five percent of the recommendations described in this report reflect true consensus. While the Council has not ultimately reached consensus on every single item, a significant majority (11-4) supports this report in its totality and the policy framework recommended here. This includes a non-participating landowner, a local government expert, a University of Wisconsin faculty member, as well as the public, energy, wind developer and environmental sector representatives. The recommendations presented here reflect significant accommodations from each of the individual Council members' personal opinions and should be viewed by the Commission as a strong compromise.

Two key considerations guided the work of the Council.

First, wind energy is now and will be for the foreseeable future an essential element of Wisconsin's energy and economic policy.

Wisconsin has joined a growing number of states throughout the country in requiring utilities to generate a portion (10% by 2015) of its energy needs from renewable resources. By 2015, our state utilities may need to add an additional 1000 megawatts (MW) of renewable energy to our energy portfolio. Biomass, landfill gas, manure digesters, solar and other renewable energy sources will help utilities meet this requirement. But the economics of renewable energy today are very clear; wind is by far the most cost effective way to meet our state requirements. In fact, technological advances in wind turbine and blade design over the last ten years allow wind generation to compete favorably with other traditional generation sources. This is usually not true for other renewable generation technologies.

Wind energy also provides considerable value as a preferred emission-free source of generation under another Wisconsin law affecting our state's utilities, the energy priorities law (Wis. Stat. § 1.12(3)(b)). Under the energy priorities law, it is the official goal of the state that, to the extent that it is cost-effective and technically feasible, all new electric generating capacity installed in the state be based on renewable energy resources, with non-combustion options such as wind power taking precedence over combustion options such as biomass. Furthermore, as many observers note, it is likely only a matter of time before national policy – either through an act of Congress or the Environmental Protection Agency (EPA) – requires utilities to control carbon emissions in one form or another. Utilities across the country will increasingly turn to renewable energy solutions to help mitigate adverse impacts of carbon regulation.

Wind generation is also a leading component of our nation's clean energy economy, one of the only sectors that has continued to grow during the recent economic downturn. Individual states and countries around the world are competing vigorously to gain a share of the economic growth associated with wind generation. With its wide-ranging patchwork of local government wind ordinances, Wisconsin had developed a reputation as an anti-wind state, leading turbine and component manufacturers to think twice before locating jobs in Wisconsin. Reversing this trend was a leading factor in the legislative debate that culminated in Act 40.

In addition, the technical benefits of locating wind generation in proximity to where it is consumed – reduced electrical losses and reduced uncertainties of transmission availability – coupled with the direct economic benefits to manufacturers, farm family revenue, labor, contractors, and local job creation demonstrate why Wisconsin must address this critical public policy question.

Second, the issues surrounding wind siting are complex and involve many competing policy priorities – promoting health and safety, complying with regulatory mandates, protecting our environment, preserving local government control, considering impacts to private property, providing a reliable and affordable supply of energy, etc. Each individual member and the seven stakeholder groups represented on the council have their own unique view about how to balance these priorities. Throughout our four month review, Council members have listened to each other, challenged each other and sought to identify a reasonable balance among these priorities.

After four months of intensive debate and discussion among council members, the Council would make the following observation for the Commission's consideration.

At the heart of the controversy surrounding wind siting lies the tension between wind developers, utilities and participating landowners seeking to meet state regulatory mandates and cost-effectively develop wind projects, and non-participating landowners seeking to protect their property from one or more of a range of potential impacts – views, value, sound, shadow flicker, or safety. In these circumstances, local governments are put squarely in the middle of the controversy. Each and every issue identified in this report can trace its origin to this tension.

The single most important thing the Commission can do with this rule is to begin to address this underlying tension between parties. The creation of uniform and transparent rules will, in and of itself, address many of the root causes of the most serious siting controversies that arose during early projects. But the rules should also give non-participating landowners a greater sense of control and opportunity to participate in siting decisions while promoting cost effective wind development and supporting developers of all sizes.

The Council recognizes that a number of factors have created an extraordinarily hostile environment in Wisconsin, where each side in the debate seizes upon the slightest misstep or mistake of the other as ammunition in their regulatory, legislative, legal and public relations battles. If we are to move beyond this divide and work together to truly balance competing policy priorities while supporting a reasonable expansion of wind energy in this state, we must move beyond this hand-to-hand combat posture.

And that is what the Council has attempted to do with its recommendations. After four months of intensive review and debate, the Council concludes there is very little policy basis – i.e. health impacts of wind turbine sound and shadow flicker or property value protection – to support some of the more restrictive controls advanced by some for the siting of wind turbines. But the Council does recognize that the state's goal of promoting responsible wind development could best be strengthened if we could address some of the underlying tensions between parties.

The Council recommends that the Commission consider a combination of performance-based standards and financial compensation for non-participating landowners adjacent to turbine host landowners as the means to address this tension.

The performance-based standards would address the two most significant complaints made against wind turbines – sound and shadow flicker. The Council has concluded that the scientific evidence does not support a conclusion that wind turbines cause adverse health outcomes. But the Council does agree that the establishment of minimum standards covering sound and shadow flicker would address the two most significant complaints raised by impacted property owners.

Additionally, although the Council concluded that there is not sufficient evidence to warrant requiring a property value protection plan for properties neighboring wind turbines, the Council acknowledges this is still an area of fairly significant concern. In lieu of establishing any kind of property value protection requirement and in recognition of a variety of other concerns, the Council concludes that developers should, as a standard practice, offer non-participating landowners a financial stake – a wind easement – in a project. Such offers give traditional "nonparticipating" landowners an opportunity to "participate" in a project and gain some control over developer's siting decisions.

The Council's complete list of recommendations is detailed below.

Summary of Key Recommendations

The Council worked diligently for more than four months to bring together various interests and strive toward consensus recommendations to the Commission. The Council unanimously agreed that wind development in Wisconsin needs to be conducted responsibly. The Council found many areas on which members did reach consensus. There are other areas on which the Council did not reach consensus, but for which Council members shared their diverse experiences and expertise with Commission staff and the Commission for consideration during the final stages of the rulemaking process.[1] While unable to reach consensus on all points, all of the Council's final recommendations reflect the input of all Council members. As the Council's work progressed, it became apparent that Council members were divided on several key issues – notably the setback distances, sound and shadow flicker performance standards, and property value protection plans. However, these differences of opinion should not overshadow the fact that the Council succeeded in reaching general agreement on most of its other recommendations, and was unanimous or nearly unanimous in support for its recommendations with respect to the following:

- Signal interference
- Complaint resolution
- Decommissioning
- Construction and operation standards
- Emergency procedures

[1] For additional discussion prepared by several Council members regarding those major items where consensus was not achieved, see the attached Minority Report (Appendix E).

- Notification requirements
- Application process
- Political subdivision process[2]
- Stray voltage
- Pre- and post-construction noise testing
- Use of shadow flicker computer modeling

The following are some of the key recommendations of the Council. A more detailed summary of the Council's recommendations is attached to this report as Appendix B.

- The rules should establish three system size categories, with some of the procedural, notification, and application requirements varying among these categories (as specified in the Council's detailed recommendations). Small wind energy systems should not exceed 300 kilowatts (kW) in total and should consist of individual turbines not exceeding 100 kW. Community wind energy systems should not exceed 15 MW in total and should either be locally owned or designed to meet local needs for electricity. All other systems should be considered large.
- For all system size categories, the minimum setback from the center of any turbine to any nonparticipating property line, participating or nonparticipating residence, or occupied community building should be 1.1 times the maximum blade tip height of the turbine.
- For all system size categories, the noise attributable to the system should never be allowed to exceed 45 dBA at night or 50 dBA during the day, as measured at the outside wall of any nonparticipating residence or occupied community building.
- For large systems and community systems, the shadow flicker that would fall on any pre-existing or planned nonparticipating residence should not exceed 40 hours per year under any circumstances. Developers of these systems should be required to offer mitigation of shadow flicker if unmitigated flicker would exceed 20 hours per year for a nonparticipating residence. Small systems should not be subject to shadow flicker limitations or mitigation requirements.
- Property owners at their own choosing should be allowed to waive the noise and/or shadow flicker performance standards. Property owners should also be allowed to waive the minimum setback distance from property lines. Property owners should not be allowed to waive the minimum setback distance from a residence or occupied community building, except in the case of small systems.
- Developers of large systems should be required to notify the PSC, all affected political subdivisions, and all landowners adjacent to host properties or within one mile of any planned turbine at least 90 days before filing a construction application. Developers of community systems should be required to notify the PSC, all affected political subdivisions, and all landowners adjacent to host properties at least 90 days before filing a construction application. Developers of small systems should be required to notify all affected political subdivisions and all landowners adjacent to host properties at least 60 days before filing a construction application.

[2] The Council was in nearly complete agreement regarding the political subdivision process generally, with the exception of whether to impose a cap on application fees.

- Developers/owners of wind energy systems should be required to establish a complaint resolution process, provide general notice of avenues for making complaints, and initially respond to any received complaint within 30 days. Political subdivisions should also be responsible for implementing a complaint resolution process. Complainants should be allowed to take their complaints directly to the PSC, without using the developer's or political subdivision's process, if they choose.
- The rules should not specify mandatory content requirements that must be included in leases and easements. Additionally, developers should not be subject to any licensing requirements in order to negotiate with landowners regarding leases and easements.
- Developers should not be required to offer property value protection plans to any landowner.

In addition to the key recommendations summarized above, the Council reviewed the Commission's entire draft rule and made recommendations regarding how to approach signal interference; decommissioning; construction and operation standards; emergency procedures; conflicts of interest; application process; political subdivision process; and stray voltage.

2.0 THE COUNCIL AT WORK

Directives from the Wisconsin Legislature

According to 2009 Wisconsin Act 40 (Act 40), the Public Service Commission of Wisconsin (Commission) shall, with the advice of the Wind Siting Council, promulgate administrative rules that specify the restrictions that a political subdivision (a city, village, town or county) may impose on the installation or use of a wind energy system consistent with the conditions specified in Wis. Stat. § 66.0401(1m) (a) to (c), namely:

> **66.0401(1m)** Authority to restrict systems limited. No political subdivision may place any restriction, either directly or in effect, on the installation or use of a wind energy system that is more restrictive than the rules promulgated by the commission under s. 196.378 (4g) (b). No political subdivision may place any restriction, either directly or in effect, on the installation or use of a solar energy system, as defined in s. 13.48 (2) (h) 1. g., or a wind energy system, unless the restriction satisfies one of the following conditions:
>
> (a) Serves to preserve or protect the public health or safety.
> (b) Does not significantly increase the cost of the system or significantly decrease its efficiency.
> (c) Allows for an alternative system of comparable cost and efficiency.

In Act 40, the Legislature also specified certain items which must be included in the administrative rules promulgated by the Commission and identified items that could be included in the rules. Specifically, Act 40 states that rules shall include all of the following:

- Setback requirements that provide reasonable protection from any health effects, including health effects from noise and shadow flicker, associated with wind energy systems. Wis. Stat. § 196.378(4g)(b)
- Decommissioning, which means removing wind turbines, buildings, cables, electrical components, roads, and any other facilities associated with the wind energy system and restoring the site of the wind energy system. *Wis. Stat. §§ 196.378(a)2., 196.378(4g)(b)*
- Specify the information and documentation to be provided in an application to demonstrate that a proposed wind energy system complies with the rules. *Wis. Stat. § 196.378(4g)(c)1*.
- Specify the information and documentation to be included in a political subdivision's record of decision under Wis. Stat. § 66.0401(4)(b). *Wis. Stat. § 196.378(4g)(c)2.*
- Specify the procedure a political subdivision shall follow in reviewing an application for approval under Wis. Stat. § 66.0401(4). *Wis. Stat. § 196.378(4g)(c)3.*
- Specify the requirements and procedures for a political subdivision to enforce the restrictions allowed under the Commission's rules. *Wis. Stat. § 196.378(4g)(c)4.*
- Require the owner of a wind energy system with a nominal operating capacity of at least one megawatt to maintain proof of financial responsibility ensuring the availability of funds for decommissioning upon discontinuance of use of the wind energy system. *Wis. Stat. § 196.378(4g)(d)*

The Legislature further stated in Act 40 that the administrative rules promulgated by the Commission may include the following:

- Provisions relating to any of the following:
  - Visual appearance;
  - Lighting;
  - Electrical connections to the power grid;
  - Setback distances;
  - Maximum audible sound levels;
  - Shadow flicker;
  - Proper means of measuring noise;
  - Interference with radio, telephone or television signals; and,
  - Other matters. *Wis. Stat. § 196.378(4g)(b)*
- That proof of financial responsibility can be established by a bond, deposit, escrow account, irrevocable letter of credit, or other financial commitment specified by the Commission. *Wis. Stat. § 196.378(4g)(d)*

In addition to advising the Commission in its promulgation of the administrative rules, in Act 40 the Legislature directed the Council to survey the peer-reviewed scientific research regarding the health impacts of wind energy systems and study state and national regulatory developments regarding the siting of wind energy systems. Additionally, no later than October 1, 2014 and every five years thereafter, the Council must submit a report to the chief clerk of each house of the Legislature, for distribution to the appropriate standing committees. This report shall describe the research and regulatory developments and include any recommendations of the Council for legislation that is based on such research and regulatory developments.

Wind Siting Council Membership

Act 40 directs the Commission to appoint a 15-person Wind Siting Council (the Council) to, among other things, advise the Commission in its rulemaking process. Recognizing that there are many complex, diverse, and sometimes controversial issues involved in wind siting, the Legislature prescribed a very diverse and explicit membership of the Council. Specifically, the Legislature requires the following representation on the Council:

- Two members representing wind energy system developers (Developer Members)
- One member representing towns (Towns Member) and one member representing counties (Counties Member)
- Two members representing the energy industry (Energy Members)
- Two members representing environmental groups (Environmental Members)
- Two members representing realtors (Realtor Members)
- Two members who are landowners living adjacent to or in the vicinity of a wind energy system and who have not received compensation by or on behalf of owners, operators, or developers of wind energy systems (Landowners)
- Two public members (Public Members)
- One member who is a University of Wisconsin System faculty member with expertise regarding the health impacts of wind energy systems (UW Faculty Member)

Consistent with the Legislature's directive, the Commission appointed 15 people of diverse backgrounds and experiences, satisfying the explicit legislative criteria. Specifically, the Commission appointed the following individuals to the Council:

- Bill Rakocy, Emerging Energies of Wisconsin, LLC – Developer Member
- Tom Green, Wind Capital Group – Developer Member
- Doug Zweizig, Union Township –Towns Member
- Lloyd Lueschow, Green County – Counties Member
- Andy Hesselbach, We Energies – Energy Member
- Dan Ebert, WPPI Energy – Energy Member
- Ryan Schryver, Clean Wisconsin – Environmental Member
- Michael Vickerman, RENEW Wisconsin – Environmental Member
- George Krause Jr., Choice Residential LLC – Realtor Member
- Tom Meyer, Restaino & Associates – Realtor Member
- Dwight Sattler – Landowner Member
- Larry Wunsch – Landowner Member
- David Gilles, Godfrey & Kahn – Public Member
- Jennifer Heinzen, Lakeshore Technical College – Public Member
- Jevon McFadden, UW School of Medicine & Public Health – UW Faculty Member

Organization

The Commission appointed the members of the Council on March 16, 2010. Commission staff immediately began working with the Council members to find availability for all 15 Council members and schedule the first meeting of the Council. The Council's first meeting was held on Monday, March 29, 2010 at the Commission offices. Commission Chairman Eric Callisto welcomed the Council and thanked each Council member for his or her service advising the Commission on the wind siting rulemaking.

Immediately at the first meeting Council members began to share their perspectives on wind development. Each Council member had an opportunity to introduce him or herself and share his or her background, experience and thoughts on wind development. The Council members quickly recognized that while the Council membership represented a broad, diverse group of interested parties, each of the members also had a responsibility to represent others who were neither appointed to the Council nor sitting around the table.

At the first meeting of the Council, the Council voted to elect Dan Ebert as Chair and Doug Zweizig as Vice Chair. The Council decided it would like official minutes prepared for the Council meetings. At the suggestion of another Council member and with the Council's approval, Mr. Ebert agreed to serve as both Chair and Secretary. At the Council's request, Commission staff agreed to assist the Secretary in preparing official minutes for the meetings.

The Council agreed to an aggressive schedule of meetings, sometimes two meetings a week, in order to work together to provide timely recommendations to the Commission. Within a month of being appointed, the Council met seven times. To date, the Council has had 20 meetings and met together to work toward consensus for over 60 hours.

Administrative Matters

At the Council's first meeting, Commission staff described some administrative considerations for the Council.

Open Meetings. Commission staff explained that the Council is considered a governmental body under Wisconsin law, and as a result, the Council is subject to open meetings laws and public records requirements. The Council meetings must be publicly noticed at least 24 hours in advance of the meeting to comply with open meetings laws. Commission staff gave a brief overview of the open meetings and public records requirements.

Electronic Regulatory Filing System. Commission staff explained that the Electronic Regulatory Filing System (ERF) would be used to post all materials relating to the wind siting rulemaking docket (1-AC-231), including Council meeting notices and handouts and all public comments submitted to the Council and the Commission.

Administrative Rules Process. Commission staff gave a brief overview of the Administrative Rules Process that would be used for the wind siting rulemaking.

Broadcast and Taping of Meetings. At the request of some members of the public, in addition to permitting members of the public to attend the meetings in person, the Commission arranged to have a live audio broadcast of Council meetings on the Commission website whenever practicable. Commission staff agreed to accommodate this request to the extent possible based on meeting room availability and technical limitations of some of the meeting rooms. The Council did not prohibit videotaping of the meetings by members of the public, and in fact many of the Council's meetings were videotaped by members of the public. Furthermore, Wisconsin Public Television and Wisconsin Eye sometimes videotaped meetings of the Council.

Draft Outline of Rules

At the first meeting of the Council, Council members began providing meaningful input to Commission staff regarding a rough outline of the draft rules prepared by Commission staff for the Council. Commission staff explained that the draft rules outline that was shared with each Council member was organized to chronologically follow the process of developing a wind energy system. Commission staff further explained the draft outline was intended to give the Council an idea of what Commission staff was planning to include in its first draft of the rules to be distributed to the Council. Each Council member had an opportunity to ask clarifying questions regarding the draft outline and recommend additional topics for inclusion in the outline. The Council had an opportunity during four meetings – spanning two weeks – to provide general guidance to Commission staff as staff prepared the first draft of the rules.

Guiding Principles

The Council decided that a good way to work toward consensus and stay focused to accomplish as much as possible at each meeting would be to develop guiding principles. Based on conversations between the Chair and the Vice Chair, the Chair introduced five general guiding principles for the Council to consider and discuss. The Council discussed the proposed guiding principles, made some modifications to what Chair Ebert initially presented, and agreed to add three additional high level guiding principles. The final guiding principles on which the Council unanimously agreed are as follows:

1. We will organize ourselves to arrive at consensus positions, and we will respect minority and majority positions throughout the process. In each area, we will first focus on those areas of broad agreement in arriving at a position. To the extent there are strong minority positions, we will reflect these positions in our advice to the Commission.
2. We recognize the state's Renewable Portfolio Standard.
3. We support the responsible development of additional wind resources in Wisconsin.
4. We understand that the Commission must balance a number of competing priorities in arriving at rule recommendations. We recognize these competing priorities – regulatory, economic, environmental, land use, health and safety, business development, landowner protections – and will arrive at recommendations that seek to achieve a balance between competing priorities.
5. We seek pragmatic, common sense solutions.
6. We encourage the development of efficient, open and transparent regulation.
7. We recognize that various governmental agencies regulate wind siting, and we will be mindful of jurisdictional boundaries. We will work to ensure that the Commission's regulations interact effectively and efficiently with those of other agencies.
8. We will be cognizant of the size of the wind energy system to which individual requirements apply.

In addition to the eight high level guiding principles, the Council discussed and agreed that the Council was not going to debate existing law. The Council agreed to rely on legal and policy experts to explain the law. Within two weeks following the Council's first meeting, the Council agreed on the following guiding principles for: (i) Developer/Owner Responsibilities; (ii) Siting; and, (iii) Local and Commission Process.

Wind Siting Council's Guiding Principles – Developer/Owner Responsibilities

1. Identify clear method for determining or defining what is part of the "project area."
2. Provide appropriate and timely notice to those who are reasonably anticipated to be affected by wind development.
3. Streamline and standardize provision of information to local government.
4. Streamline and standardize decision-making process for local governments.
5. Recognize/identify situations that are not appropriate for standardization.
6. When standardization is not possible, establish guidance of some kind.
7. Standards should be clearly defined, understandable by all parties and easy to enforce.
8. Requirements should have a clear benefit or purpose.

9. Establish clear channels of timely communication between developer and participating and non-participating landowners.
10. Provide free flow of information from developer/owner to the community and political subdivision.
11. Impose lesser levels of regulations for smaller wind energy systems.
12. Identify how to define projects that are smaller, for example, turbine size v. project size; turbines constructed for personal use.
13. Provide clear avenues for resolution of complaints and concerns, and identify clear remedies.
14. Focus on broad general concepts that can address specific situations, rather than attempting to establish an all-inclusive list of specific requirements.
15. Use past examples of wind development as case studies for how best to address concerns.

Wind Siting Council's Guiding Principles – Siting

1. Take local features and resources into account in siting decisions.
2. Address avoidance, mitigation, and remediation of impacts.
3. Clearly identify how to apply siting criteria (i.e. measuring distances).
4. Provide access to information about siting to the public.
5. Political subdivision should accommodate a reasonable amount of siting flexibility for the developer.
6. Developer shall use reasonable efforts to anticipate the needs and requirements of political subdivision and the public.
7. Developer shall be responsive to reasonable local concerns raised during the development process.
8. Siting requirements should be transparent and provide for efficient development of wind resources.
9. Recognize that some aspects of siting are under the jurisdiction of other governmental entities.
10. Provide reasonable protection from noise impacts.
11. Health impacts should be taken into account in all siting decisions.

Wind Siting Council's Guiding Principles – Local and Commission Process

1. Establish an open and transparent process for local government approval and appeal to the Commission.
2. Establish a clear and straightforward process for obtaining local approval and for appeals.
3. Facilitate timely decision-making.
4. Provide appropriate public notice and access to information.
5. Utilize Wisconsin Statutes Chapter 68 (Municipal Administrative Procedure) to the extent possible.
6. Local process should be as thorough and complete as possible to avoid the need for appeal to the Commission whenever possible.
7. Establish a clear process for enforcement of the rules.

First Draft of Rules Released to the Wind Siting Council

On April 13, 2010, Commission staff provided the Council members with a rough draft of the rules (the Rough Draft). Commission staff requested preliminary written comments on the areas, sections, or concepts where Council members had questions or concerns about the draft rules. The Chair explained that in addition to providing feedback on an initial rough outline of the rules, the Council would have three opportunities to comment on the rules themselves, during: (i) the rough draft stage; (ii) the published draft stage; and, (iii) the final draft stage. During the rough draft stage, Commission staff listened to concepts and issues that individual Council members raised in response to the Rough Draft, and considered these comments while preparing the next draft of the rules to be published in the Wisconsin Administrative Register and made available to the public for comment. The Council recognizes this opportunity to review and comment on a rough draft is unusual in an administrative rulemaking, and the Council was appreciative of this unique opportunity to provide advice to Commission staff during the preliminary drafting stage.

Commission staff prepared a summary of the written comments to the Rough Draft submitted by Council members to Commission staff for the Council's April 16, 2010 meeting. Chair Ebert and Commission staff emphasized that Council members should not view the Rough Draft as a floor or a ceiling and encouraged comments on all aspects of the rules. Chair Ebert and Commission staff also emphasized that the comment summary prepared by Commission staff was intended to be a tool for the Council, and additional comments were welcome. Each of the Council members had an opportunity to comment on the Rough Draft and the summary list prepared by Commission staff.

Following the first meeting where the Council discussed the Rough Draft, Council members provided additional written comments. Commission staff prepared and distributed a supplement to the original summary of Council member comments that summarized the additional comments on the Rough Draft received by Commission staff from Council members prior to the Council's April 22, 2010 meeting. For three entire meetings (April 16, 22 and 29, 2010) and over six hours, the Council members discussed their individual comments to the rough draft of the rules.

Specific Subject Matter Presentations

Following a request from Council members, the Council visited Council member Larry Wunsch’s home on May 4, 2010 where Mr. Wunsch presented to the Council his experiences living near wind turbines in the Forward Wind Energy Center. Additionally, on May 4, 2010, the Council members visited the Blue Sky Green Field wind project. Council members had an opportunity to look around the wind project and meet with several personnel working at Blue Sky Green Field to ask questions. These site visits were noticed as a public meeting; however the Council did not have an actual business meeting that day. To further share his experience with Council members, Mr. Wunsch recorded the noise he heard from a wind turbine on a particular morning and provided copies of his noise recording to the other Council members.

The Council members had an opportunity to identify specific topics on which Council members wanted an in-depth analysis and discussion and/or presentation. As requested by the Council, following the wind project site visits the next few meetings of the Council consisted of various presentations on specific topics the Council identified as topics of interest. The Council agreed that the presentations would not represent positions of the Council; rather they were an opportunity for the Council to hear from and ask questions of individuals with particular knowledge and qualifications.

On May 17, 2010, Jevon McFadden, a Council member who, in addition to being a member of the University of Wisconsin faculty, is a physician working as an Epidemic Intelligence Service Officer with the Centers for Disease Control and Prevention and is stationed at the Wisconsin Department of Health Services, Division of Public Health, Bureau of Environmental and Occupational Health, gave a presentation called *Wind Turbines: A Brief Health Overview*. Dr. McFadden described how he assesses studies as a medical doctor and a public health official. Dr. McFadden also summarized his assessment of existing studies relating to health and wind turbines and concluded that the evidence does not, in his professional opinion, support a conclusion that wind turbines cause adverse health outcomes. Dr. McFadden suggested that wind turbines may be associated with annoyance which may impact quality of life, but that annoyance is not the typical threshold at which public health intervention is necessitated.

At the June 2, 2010 Council meeting, James Cowan, Principal Engineer, Acoustics and Noise Control for URS Corporation, gave a presentation titled *Wind Turbine Generator Noise Issues*. Mr. Cowan, a board certified member of the Institute of Noise Control Engineering, explained his belief that different people perceive annoyances differently, and there is no "one size fits all" approach to acoustic annoyance. The Council discussed a recorded presentation on property values given by Ben Hoen of Lawrence Berkley National Laboratory and decided not to watch or listen to the presentation during the Council meeting; however, the power point and a recording of the presentation were made available to Council members. Council member Andy Hesselbach of We Energies then gave his presentation titled *Setback and Siting Analysis, a Case Study: Glacier Hills Wind Park*. One of the major recommendations in Mr. Hesselbach's presentation was to use performance benchmarks rather than setbacks because of the additive properties of sound and shadows. Mr. Hesselbach explained his belief that setbacks set at "worst case scenario" levels will unnecessarily eliminate quality sites for wind energy development.

On June 9, 2010, Kurt Kielisch, ASA, IFAS, SR/WA, R/W-AC and President/Senior Appraiser for Appraisal Group One gave a presentation titled *Wind Turbines & Property Value*. Mr. Kielisch explained his belief that real estate value is based on perception, and perception does not need to be based on a proven, scientific fact. Mr. Kielisch presented findings from a realtor survey and an impact study relating to perceptions about wind turbines. Also on June 9, 2010, Eric Corroy, Zoning Administrator for Red River Township in Kewaunee County, participated in the Council meeting by phone to describe the information and experience of Red River Township with sales of property and construction of new homes in the vicinity of existing wind turbines. Mr. Corroy reported that to his knowledge, wind turbines constructed 11 years ago in his predominantly agricultural township have not had a discernible effect on property values.

First Draft of Rules Released to the Public

At its open meeting on May 14, 2010, the Commission approved the release of proposed draft rules to the public and scheduled three public hearings on the rules as follows: June 28, 2010 in Fond du Lac at City Hall; June 29, 2010 in Tomah at the Holiday Inn; and June 30, 2010 in Madison at the Commission offices. The hearings were scheduled for 1:00 PM and 6:00 PM at each location. The Commission explained in its release of the rules that public comments would be accepted until noon on July 7, 2010, except for faxed comments, which would be accepted until noon on July 6, 2010. The proposed draft rules released to the public were also sent to the Legislative Reference Bureau for publication in the Wisconsin Administrative Register.

Council Participation in Public Comment Period

In addition to providing draft rule suggestions to Commission staff prior to the public comment period, the Council members worked for weeks to formulate a Wind Siting Council Progress Report for submittal to the Commission as part of the public comment period. On June 9, 2010, the Council started discussing a straw proposal presented by Chair Ebert, highlighting areas of apparent general consensus and outlining specific proposals for further discussion. Each of the Council members had an opportunity to submit written comments to the straw proposal in advance of the next meeting, and Commission staff compiled all of the comments for each of the Council members to see. Additionally, each of the Council members had an opportunity to explain his or her thoughts on the framework of the straw proposal and offer various amendments to the straw proposal. The Council members took several straw votes on various issues and worked hard to find areas of general consensus. After over eight hours of Council meeting time, the various amendments of the Council were broken down into 126 questions on which Council members voted on a ballot dated June 25, 2010, evidencing a reflection of the Council members' thoughts at that time. Commission staff drafted a summary of the ballot results, which the Council reviewed and discussed at the Council's July 6, 2010 meeting, and which the Council incorporated into its Progress Report. The Council submitted its Progress Report to the Commission on July 7, 2010 prior to the close of the public comment period. The Progress Report identified consensus opinions, majority opinions, and topics still under discussion by the Council with respect to all of the following topics.

- Wind Energy System Size
- Safety Setbacks
- Noise
- Shadow Flicker
- Signal Interference
- Complaint Resolution and Commission Review
- Property Value Protection
- Leases and Easements
- Decommissioning
- Construction and Operation Standards
- Emergency Procedures
- Conflict of Interest
- Notification Requirements
- Application Process
- Political Subdivision Process
- Stray Voltage

Establishing the Council's Final Recommendations

The June 25, 2010 ballot was a precursor to further discussions on many issues of interest to the Council. After submitting its Progress Report at the close of the public comment period, the Council continued to meet to refine its positions on a wide variety of topics, with an emphasis on trying to achieve consensus in the Council's final recommendations to the Commission. Using the results of the June 25, 2010 ballot and the Council's Progress Report, the Council revised the Chair's original straw proposal in an effort to articulate concise & accurate descriptions of the Council's recommendations. As discussion progressed, Council members made additional revisions to the straw proposal by majority vote while also considering alternatives to the straw proposal's preliminary majority positions. The final version of the straw proposal, as approved by the Council, is attached to this report as Appendix B.

The Council's original guiding principles set a goal of working toward consensus recommendations for all topics. However, the Council also agreed early on that to the extent the Council developed strong minority positions, these positions would be reflected in the Council's advice to the Commission. Ultimately, the Council was able to achieve consensus on most of its recommendations. For those issues where a strong minority position developed, the Council agreed to allow those members holding such a position to submit a minority opinion to the Commission along with the recommendations arrived at by the Council as a whole.

To arrive at their final recommendations, Council members relied on their own knowledge and expertise and that of their fellow Council members, as well as information from outside sources and experts and Commission staff. The Council is confident that its recommendations are prudent and appropriate for the Commission's rulemaking effort at this time. However, the Council recognizes that in the future, wind energy development will continue to expand, the technology will evolve, and over time it may be appropriate to revisit some of the recommendations outlined in this report.

3.0 COUNCIL RECOMMENDATIONS IN-DEPTH

Wind Energy System Size

The Council supports dividing wind energy facilities into three categories for the purpose of differentiating certain regulatory standards placed on them. These categories can be identified as follows: (i) small wind; (ii) community wind; and, (iii) large wind. Council members agreed that the small wind category should be for up to 3 wind turbines no greater than 100 kW in size each. Council members distinguished wind energy systems up to 15 MW in size as community wind, so long as the wind energy system was either locally owned or the electricity was used locally. All other wind energy systems would be considered large wind.

Council members recognize that small wind energy systems are designed to serve individual residences, farms, schools, municipal wastewater treatment plants, commercial facilities and other retail customers. Today's small wind turbines range in fixed height from approximately 100 to 140 ft. Blade lengths range from 20 to 50 ft. Maximum blade tip height rarely exceeds 170 ft. The comparatively smaller turbines in this category are likely to create fewer physical impacts in terms of sound output and shadow flicker relative to large wind energy systems. There are at least seven small wind energy facilities in Wisconsin with more than one small wind energy system.[3] The 100 kW individual turbine size threshold recommended by the Council is consistent with the U.S. Department of Energy's (DOE) assessment of what constitutes a small wind turbine.[4]

In light of their modest physical impacts, the Council recommends that the wind siting rules provide for less rigorous application and notification requirements for small wind systems than for large wind energy systems.[5] Council members believe that exemption from other procedural requirements would also be appropriate. Specific recommendations for different treatment are outlined in this report.

Council members generally support creating a middle category of regulation for community wind, that would, by the recommended definition, fit somewhere between small and large wind energy facilities. This category attempts to cover a single large turbine or small clusters of large turbines either locally owned or that are serving the local load, and are more likely than large wind to be located near an urbanized area. Historically, these smaller community facilities are not necessarily located in prime wind development areas, nor are they likely to be owned by utilities. Rather, they are more likely to be owned by a third party that has a physical presence in the community, and are often constructed with local support based on a desire to reach energy

[3] See table in Appendix D.

[4] *Small Wind Electric Systems: A U.S. Consumers Guide*," last updated on August 2007. Available at: http://www.windpoweringamerica.gov/pdfs/small_wind/small_wind_guide.pdf.

[5] See also the Small Wind Energy System Ordinance (12-06 version) developed by Focus on Energy in partnership with National Renewable Energy Laboratory, Public Service Commission of Wisconsin, Division of Energy, University of Wisconsin Extension Service, and Wisconsin Towns Association. Available at: http://www.renewwisconsin.org/wind/Toolbox-Zoning/Small%20Wind%20System%20Model%20Ordinance%2012-06.pdf.

independence and/or educational goals. This type of development is also uniquely suited to serve municipal electric utilities.

Council members believe that siting standards should provide for these community wind facilities that are likely to be supported by a large percentage of the host community. Council members believe that less rigorous notification and application requirements, as well as other procedural requirements would be the appropriate way for the wind siting rules to facilitate the development of community wind. Specific recommendations for different treatment are outlined in this report.

Furthermore, the 15 MW size threshold for community wind is consistent with the state's definition of distributed generation in Wisconsin Administrative Code Chapter PSC 119, which contains rules for interconnecting distributed generation facilities to an electric distribution system.

Safety Setbacks

The Council invested substantial time and effort researching and discussing the merits and implications of establishing setbacks for wind turbines within a community. Of primary concern were the shadow and noise characteristics of wind turbines, as well as issues of general public safety. After vigorous debate, the Council determined that proximity to wind turbines does not directly correlate with the concerns of shadow flicker or noise. A key concern throughout the Council's deliberations on appropriate setbacks was that a single universal setback distance standard may either fail to appropriately mitigate concerns, or unnecessarily eliminate viable wind sites.

Shadow and noise characteristics provide good examples of the weaknesses of relying solely on distance based setbacks. Shadowing from turbines is not omni-directional (e.g. shadows are predominantly cast east and west of a turbine with essentially no shadowing to the south). Similarly, wind turbine noise is substantially influenced by wind direction, wind intensity, the unique sound signature of different turbine models, and the location of other adjacent wind turbines. For these reasons, the Council determined that shadow and noise concerns are most appropriately managed through the use of performance based standards which are discussed in greater detail later in this report.

With regard to public safety, the Council recognizes there are potential safety issues that may be related to proximity to wind turbines. The Council members considered a number of competing issues when evaluating and determining an appropriate setback to address safety concerns. It unanimously endorsed the prudency of establishing a consistent safety setback for all turbines. To arrive at this conclusion, the Council considered: (i) potential wind turbine dangers; (ii) likelihood of occurrence; and, (iii) balancing potential issues against the backdrop of meeting the broader public policy goals of Wisconsin.

Council members identified and discussed physical and operational concerns that have the potential to compromise public safety. The areas of concern included: turbine blades shedding ice, turbine tipping over at its base, excessive rotor speed ("run-away turbine"), fire, lightning

strike, and general blade failure. Council members provided insight on several of these topics, and Council members discussed areas of concern with operating personnel as part of the Blue Sky Green Field Energy Center site tour. While there was clear evidence that a number of these events have occurred at existing wind developments in the United States or other countries, the frequency of occurrence among the 20,000 turbines operating in the United States and 90,000 worldwide was extremely low and evidence of damage or harm to public or private structures or injuries to the public could not be found.[6] In light of the apparent risks and likelihood of their occurrence, Council members determined that the commonly employed safety setback of 1.1 times turbine tip height is prudent and appropriate to address concerns of public safety.

The Council endorses granting landowners the flexibility to enter into waiver agreements that reduce the safety-based setback to non-participating property lines. However, the Council feels that in the interest of protecting public safety, landowners (whether participating or non-participating) should not be permitted to grant safety setback waivers to have turbines from a large wind energy system placed closer to their residence or an occupied community building than 1.1 times turbine tip height. For small wind, the Council believes that the potential safety risks are reduced, therefore the Council endorses allowing landowners to grant small wind safety setback waivers from residences or buildings.

Noise

The Council recognizes that wind energy development, like all forms of energy development, will have both positive and negative impacts on Wisconsin residents.[7,8] Noise from wind turbines is one of the most commonly reported complaints.[9] An important issue of consideration when assessing the impact of noise is that perception of noise and the degree to which it is considered objectionable depends on individuals exposed to it.[10] The Council recognizes that in comparison to traditional sources of environmental noise such as road traffic, aircraft, and railway noise, there is substantially less research available regarding the health impacts of wind turbine noise.[11–16] Furthermore, the Council recognizes that while wind energy projects are not unique in

[6] US and Worldwide turbine count figures are approximations based on the total installed wind generation capacity figures in the Renewable 2010 Global Status Report and assuming an average turbine size of 1.8MW. Renewable 2010 Global Status Report available at http://www.unep.org/sefi%2Dren21/documents/pdf/Renewables-GlobalStatusReport2010_pre-release_en_full.pdf.

[7] Markandya A, Wilkinson P. Electricity generation and health. *The Lancet*. 2007;370:979-990.

[8] National Research Council of the National Academies. Hidden Costs of Energy: Unplanned Consequences of Energy Production and Use. Washington D.C.: National Academies Press, 2010.

[9] Eltham DC, Harrison GP, Allen SJ. Change in public attitudes towards a Cornish wind farm: implications for planning. *Energy Policy*. 2008;36:23-33.

[10] National Research Council of the National Academies (NRC). Impacts of Wind-Energy Development on Humans. Washington D.C.: National Academies Press, 2007, p. 175.

[11] van den Berg F, Pedersen E, Bouma J, Bakker R. Project WINDFARMperception: Visual and acoustic impact of wind turbine farms on residents. Final report, FP6-2005-Science-and-Society-20, Specific Support Action project no. 044628. June 3, 2008. Retrieved July 16, 2010. Available at: http://www.windaction.org/?module=uploads&func=download&fileId=1615.

[12] Pedersen E, Persson WK. Perception and annoyance due to wind turbine noise—a dose-response relationship *J Acoust Soc Am*. 2004;116 3460–347.

[13] Pedersen E, Persson WK. Wind turbine noise, annoyance and self-reported health and well-being in different living environments. *Occup Environ Med*. 2007;64(7): 480-486.

their impacts on people,[17] there are some characteristics of wind turbine sound that are different from most other sources of environmental noise.[18,19]

In looking for the best evidence to inform its recommendations, the Council reviewed standards from organizations at the state, national, and international levels.[20–24] The Council recognizes that most standards recommended for protecting the health and welfare of the public from the effects of environmental noise are based primarily on studies of the impacts of road traffic, railway, and aircraft noise. The Council further recognizes that intermittent noises such as these are known to be more disruptive of sleep than continuous noises.[25,26] Because of this, the Council believes that traditional recommendations for thresholds of environmental noise to prevent sleep disturbance may not be the best basis upon which to make policy recommendations specific to wind turbine noise. Nevertheless, the Council believes that the evidence specific to wind turbine noise and health is sufficient to inform the development of evidence-based wind siting rules.

The Council believes that the rules should establish noise performance standards that will allow for reasonable protection from potential health effects from wind turbine noise. The standards should apply uniformly to all categories of wind energy systems. The Council does not believe that the rules should include a noise-related setback requirement. Setback distance is only an indirect measure of exposure to noise, and noise levels at a single setback distance can vary according to weather, topography, and other modifying factors.[27]

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[14] Pedersen E, Persson WK. Wind turbines—low level noise sources interfering with restoration? *Environ Res Lett*. 2008;3:015002.

[15] Pedersen E, van den Berg F, Bakker R, Bouma J. Response to noise from modern wind farms in the Netherlands. *J Acoust Soc Am*. 2009;126(2):634-643.

[16] Wolsink M, Sprengers M, Keuper A, et al. Annoyance from wind turbine noise on sixteen sites in three countries. Proceedings of the European Community Wind Energy Conference, Lubeck, Travemunde, 1993. p. 273-276.

[17] NRC, 2007, p. 140.

[18] van den Berg GP. Effects of the wind profile at night on wind turbine sound. *J Sound and Vibr*. 2004;277(4-5):955-970.

[19] van den Berg GP. The beat is getting stronger: the effect of atmospheric stability on low frequency modulated sound of wind turbines. *J Low Freq Noise Vibr Active Control*. 2005;24(1):1-24.

[20] Environmental Protection Agency (EPA). Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," EPA/ONAC 550/9-74-004, March, 1974. Accessed July 14, 2010. Available at: http://www.nonoise.org/library/levels74/levels74.htm.

[21] World Health Organization. Guidelines for Community Noise, 1999. Retrieved July 16, 2010. Available at: http://whqlibdoc.who.int/hq/1999/a68672.pdf.

[22] World Health Organization. Night noise guidelines for Europe. Copenhagen. 2009. Retrieved July 16, 2010. Available at: http://www.euro.who.int/document/e92845.pdf.

[23] Ramakrishnan R. Wind Turbine Facilities Noise Issues. Aiolos Report Number: 4071/2180/AR155Rev3, December, 2007. Retrieved July 15, 2010. Available at: http://www.ene.gov.on.ca/envision/env_reg/er/documents/2008/Noise%20Report.pdf.

[24] Oteri F. An Overview of Existing Wind Energy Ordinances. National Renewable Energy Laboratory. Technical Report NREL/TP-500-44439, December, 2008. Retrieved July 16, 2010. Available at: http://www.windpoweringamerica.gov/pdfs/policy/2008/ordinances_overview.pdf.

[25] Ohrstrom E, Rylander R. Sleep disturbance effects of traffic noise — a laboratory study on after effects. *J Sound Vibr*. 1982;84(1):87-103.

[26] Griefahn B, Spreng M. Disturbed sleep patterns and limitation of noise. *Noise & Health*. 2004;6(22):27-33.

[27] Embleton TFW. Tutorial on sound propagation outdoors. *J Acoust Soc Am*. 1996;100(1):31-48.

The Council believes that the rules should establish absolute noise limits (as opposed to noise limits relative to ambient noise levels). Measurements using above ambient noise levels may be helpful for assessing potential for annoyance,[28] but are not correlated with known adverse health effects. The overwhelming majority of studies relating to noise and human health have assessed effects from absolute noise levels rather than relative noise levels. As a result, the Council believes that use of absolute noise limits in the rules is a practice based upon a larger volume of scientific evidence.

After surveying the peer-reviewed scientific research regarding the health impacts of wind energy systems, the Council favors a noise performance standard which limits the noise attributable to wind energy systems to a year round standard of 45 dBA at night and 50 dBA during the day. This recommendation is a departure from past practice for wind projects reviewed at the state level in Wisconsin; however, the Council believes that this departure is in the public interest.

The best available scientific evidence specific to wind turbine noise suggests that 45 dBA (measured outside of a residence) is the noise threshold above which there is a small but statistically significant increase in self-reported sleep disturbance.[29] This evidence does not allow for a conclusion regarding whether there are seasonal differences in self-reported sleep disturbance.[30] As a result, the Council believes this noise performance standard should be applied year-round for nonparticipating landowners. The Council believes that property owners should be permitted to waive the noise performance standards. The Council did not find any data regarding specific health impacts of wind turbine noise in excess of 50 dBA. Evidence from studies of other sources of environmental noise, suggests that a daytime noise threshold of 50 dBA is well below the threshold at which measurable adverse health effects (e.g. hearing impairment, high blood pressure) from noise are seen.[31,32] The Council believes these proposed noise performance standards are moderately conservative when compared with similar standards found in most other states.[33,34]

The Council recognizes that annoyance may be associated with wind turbine noise.[35–37] The World Health Organization (WHO) characterizes annoyance as an "adverse health effect" based on a broad definition of health which includes features of well-being.[38] However, the Council recognizes that elimination of the risk of annoyance is in practice unattainable, and that the rules

[28] Rogers AL, Manwell JF, Wright S. Wind turbine acoustic noise – a white paper. Renewable Energy Research Laboratory, Department of Mechanical and Industrial Engineering, University of Massachusetts at Amherst, January 2006. Accessed July 16, 2010. Available at: http://www.ceere.org/rerl/publications/whitepapers/Wind_Turbine_Acoustic_Noise_Rev2006.pdf.
[29] van de Berg, 2008.
[30] van de Berg, 2008.
[31] Passchier-Vermeer W, Passchier WF. Noise exposure and public health. *Environ Health Perspect*. 2000;108(S1):123-131.
[32] Stansfeld S, Matheson M. Noise pollution: non-auditory effects on health. *Brit Med J*. 2003;68:243-257.
[33] Ramakrishnan, 2007.
[34] Oteri, 2008.
[35] Pedersen, 2004.
[36] Pedersen, 2007.
[37] Pedersen, 2009.
[38] WHO, 1999.

should instead establish a noise performance standard level that provides reasonable protection from the risk of annoyance for the majority of the population.[39] Furthermore, the Council realizes that noise annoyance is a complex human reaction that depends not only on physical noise levels, but also on a host of personal and situational factors.[40] While some have suggested that noise exposure creates annoyance which then leads to more serious psychological effects, this pathway has not been confirmed.[41] Recent evidence suggests that some non-acoustical characteristics of wind turbines may be more strongly associated with annoyance than specific noise levels.[42–46] Non-acoustical factors can include things such as visual/aesthetic interference, concern about property value diminution, perceived control, trust in authorities, voice (the extent to which people feel they are listened to), general attitudes (including fear of adverse effects), attitudes about the source of the noise, personal benefits/compensation, noise sensitivity, and accessibility to information about projects.[47,48]

This evidence is consistent with studies of other sources of environmental noise that demonstrate a stronger association between non-acoustical factors and annoyance than between specific noise levels and such reports.[49–53] Because of this, the Council believes that noise performance standards are only one component of limiting community annoyance to reasonable levels, and that as with other sources of environmental noise, mitigation of non-acoustic factors may ultimately be more important in reducing risk of annoyance and annoyance-related effects. [54–56]

[39] Smith A. The concept of noise sensitivity: implications for noise control. *Noise & Health*. 2003;5(18):57-59.
[40] Fields J. Effect of personal and situational variables on noise annoyance in residential areas. *J Acoustic Soc Am.* 1993;93:2753-2763.
[41] Stansfeld, 2003.
[42] van de Berg, 2008.
[43] Pedersen, 2004.
[44] Pedersen, 2007.
[45] Pedersen, 2008.
[46] Pedersen, 2009.
[47] Flindell IH, Stallen PJM. Non-acoustical factors in environmental noise. *Noise & Health*. 1999 ;1(3) :11-16.
[48] van de Berg, 2008.
[49] Job RFS. Community response to noise: a review of factors influencing the relationship between noise exposure and reaction. *J Acoustic Soc Am*. 1988;83(3):991-1001.
[50] Guski R. Personal and social variables as co-determinants of noise annoyance. *Noise & Health*. 1999;1(3):45-56.
[51] Stallen PJM. A theoretical framework for environmental noise annoyance. *Noise & Health*. 1999;1(3):69-79.
[52] Flindell IH, Stallen PJM. Non-acoustical factors in environmental noise. *Noise & Health*. 1999 ;1(3) :11-16.
[53] Staples SL. Public policy and environmental noise: modeling exposure or understanding effects. *Am J Public Health*. 1997;87(12):2063-2067.
[54] Flindell IH, Witter IJ. Non-acoustical factors in noise management at heathrow airport. *Noise & Health*. 1999;1(3):27-44.
[55] LVNL (Air Traffic Control Netherlands). Research Report: Noise annoyance mitigation at airports by non-acoustic measures. 2007, Amsterdam. Retrieved July 21, 2010. Available at: http://www.wylelabs.com/content/global/documents/ResearchReportNonAcoustic.pdf.
[56] Swofford J, Slattery M. Public attitudes of wind energy in Texas: local communities in close proximity to wind farms and their effect on decision-making. *Energy Policy.* 2010;38:2508–2519.

Shadow Flicker

Shadow flicker is caused when sunlight shining through moving turbine blades casts moving shadows on the ground or other structures resulting alternating changes in light intensity.[57] Shadow flicker complaints are less common than those related to wind turbine noise.

The primary health concern relating to shadow flicker is whether or not it can induce seizures. Photosensitivity epilepsy is most commonly induced from flickering lights in the frequency range of 5–30 Hz.[58] Shadow flicker from wind turbines is in the frequency range of 0.6–1.0 Hz.[59] The best available evidence suggests that limiting flicker frequencies to levels below 3.0 Hz provides adequate protection from the risk of photosensitivity epilepsy.[60,61] The Council found no evidence supporting an association between shadow flicker and any specific human health conditions.

Shadow flicker may be associated with annoyance. However, the Council found no evidence to support any maximum allowable duration of shadow flicker exposure as a way to minimize the risk of annoyance. Furthermore, the Council believes the available evidence is not sufficient to allow for an accurate estimation of annoyance levels corresponding to specific durations of shadow flicker exposure. The Council recognizes that preconstruction shadow flicker modeling should allow for a precise estimation of cumulative impacts of shadow flicker on any residence.[62]

The Council recognizes that shadow flicker standards are not included as part of most wind energy ordinances in the United States.[63,64] The most commonly cited shadow flicker standard internationally is a limit of 30 hours annually, which is considered a reasonable level for limiting risk of annoyance.[65]

The Council recommends that the rules include an absolute shadow flicker performance standard limit, along with a limit for duration of exposure above which mandatory mitigation will be required. The Council believes that small wind energy systems should be exempted from this standard. The Council believes that the rules should allow for a maximum allowable standard of 40 hours annually, with mandatory mitigation required for exceeding 20 hours of shadow flicker annually. Property owners should be allowed to waive the shadow flicker performance standard.

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[57] NRC, 2007, p. 160.
[58] Epilepsy Foundation. Photosensitivity and Seizures. Retrieved July 19, 2010. Available at: http://www.epilepsyfoundation.org/about/photosensitivity/.
[59] NRC, 2007, p. 161.
[60] Harding G, Harding P, Wilkins A. Wind turbines, flicker, and photosensitivity epilepsy: characterizing the flashing that may precipitate seizures and optimizing guidelines to prevent them. *Epilepsia.* 2008:49(6):1095-1098.
[61] Smedley ARD, Webb AR, Wilkins AJ. Potential of wind turbines to elicit seizures under various meteorological conditions. *Epilepsia*. 2010;51(7):1146-1151.
[62] NRC, 2007, p. 161,176.
[63] Oteri, 2008.
[64] NRC, 2007, p. 161.
[65] Environment Protection and Heritage Council of Australia and New Zealand (EPHC). National Wind Farm Development Guidelines – Draft. July 2010, p. 157. Retrieved July 16, 2010. Available at: http://www.ephc.gov.au/taxonomy/term/25.

Although the state's past wind siting decisions have neither included an absolute shadow flicker ceiling nor required mitigation for as little as 20 hours of shadow flicker annually, the Council believes this standard is in the public interest and will provide reasonable protection from shadow flicker-related annoyance.

The Council believes that developers of large wind energy systems should be required to use shadow flicker computer modeling in designing wind energy systems, but that small and community wind energy systems should not be required to use such modeling.

The Council recommends that the rules should require developers to include a plan describing shadow flicker mitigation measures in their application, but that the rules should not specify what types of measures constitute reasonable mitigation.

Signal Interference

Signal interference as a result of wind turbine construction is an unintended, but potential reality for Wisconsin residents and business owners near wind energy sites. The Council believes that the rules should require a developer to use reasonable efforts to avoid causing television, radio, cellular telephone and line-of-sight communications interference at the wind energy project's inception. In the instances where signal interference does occur around a wind energy site despite reasonable efforts to avoid it, the Council supports requiring a developer or owner of a wind energy system to remedy television, radio and cellular telephone signal interference for the life of the wind energy system.

The Council recommends that the rules should not include a definition of what constitutes a "reasonable effort" to avoid signal interference.

Complaint Resolution and Commission Review

As the Council deliberated on numerous facets of wind generation, discussions often turned towards the issue of resolving potential complaints that may arise. The most pressing concern identified by the Council was facilitating a clear path for individuals to achieve prompt resolution of a complaint. The Council believes that a new process is not necessary, as political subdivisions and the PSC have already established ways of processing complaints. However, the Council did see a benefit from requiring the developer / owner of a project to: (i) notify area residents of a proposed project; (ii) notify residents of the complaint process available via the political subdivision and the PSC; and, (iii) document complaints it receives and steps taken to resolve the complaint. The Council recommends that the PSC should be positioned to utilize existing PSC processes to review issues that are elevated beyond the political subdivision. Further, the Council feels that the entity issuing the primary permits and approvals (i.e. the political subdivision) should manage the process at the local level and help facilitate issues elevated to the PSC.

In addition to the complaint resolution process decisions noted above, the Council recommends several additional complaint resolution measures. The Council recommends that the scope of issues that can be addressed through the resolution process should not be limited prescriptively

by the wind siting rules. However, the Council advises that the resolution process should quickly dismiss complaints associated with activity that is clearly permitted under a siting approval or the wind siting rules. Lastly, given the unpredictable nature of complaints and the potential that the resolution timeline could vary substantially, the Council recommends a specific timeline of 30 days in which a complainant is to receive an initial response to their complaint but no deadline for final resolution of complaints.

Property Value Protection

The Council recognizes that some citizens have expressed concerns that a wind energy system built near their home will reduce the value of their property. And the Council devoted all or parts of three meetings discussing the subject and hearing from outside experts. The Council does not find a causal relationship between the siting of wind turbines and a measurable change in property value. In fact, significant questions arose during the Council's deliberations regarding the validity of the methodology employed by those seeking to establish such a link. For example, the expert proposed by the proponents of property value protection admitted his analysis was conducted during the last three years, which coincides with single largest drop in real estate values since the Great Depression. And the Council is not aware of a single study that attempts to study all of the potential impacts on property values, those perceived to negatively impact values as well as those that may positively impact property values. Accordingly, the Council would urge the Commission to reject a property value protection component to the rule.

Consistent with its goal of creating an environment that fosters more wind development and eases the tension between non-participating landowners and developers, the Council would urge the Commission to encourage developers to offer non-participating landowners adjacent to turbine host properties a wind easement payment. We believe a wind easement payment, when coupled with the property tax relief supported by developers' payments to local governments required under other Wisconsin laws, would significantly reduce the potential for concerns related to property values to impact wind siting decisions. The Council believes that by voluntarily offering wind easement payments to adjacent landowners, developers can give traditional "nonparticipating" landowners a valuable opportunity to "participate" in a project and to gain some control over the developer's siting decisions, as the landowner would have an opportunity to negotiate the terms of his or her wind easement.

Leases and Easements

The Council discussed whether the rules should address the content of wind leases and easements, and if so, in what respect. The Council discussed concerns that landowners may not have the personal knowledge necessary to understand the terms and conditions of a wind lease or easement proposed to them. The Council also discussed whether the wind siting rules should prescribe the terms and conditions of a contract, and concerns over any requirements that would prohibit developers from keeping potentially proprietary information confidential. The Council believes that the specific lease and easement requirements in the draft rules should not be included in the final rules. The Council is also opposed to including additional specifications about the content of a lease and easement. This recommendation is based on a belief that it is

inappropriate for the Commission as a third party to dictate the terms of contracts between consenting private entities.

The Council discussed whether the rules should require the developer to give general public notice prior to signing any binding leases or easements. The Council believes that giving general public notice prior to signing binding leases or easements should not be required. Many members are concerned that such a requirement would put developers at a strong disadvantage in negotiating with landowners and give an unfair advantage to competitors to benefit from the groundwork already done by the developer.

The Council also discussed whether real estate broker licenses and licenses to conduct real estate activities should be required for people engaging in lease and easement discussions with landowners. Some Council members felt that including such a requirement would guarantee that these discussions adhered to normal professional standards for real estate transactions in terms of credibility, accountability, and consequences for unprofessional behavior. However, the Council as a whole believes that such licensing should not be required for a person negotiating or presenting a wind lease on behalf of a developer. Licenses are not required for negotiating other types of real estate transactions, and the Council feels that leases and easements for wind turbines should be treated no differently.

Council members agree that if the rules do not contain any or only a limited number of provisions addressing wind leases and easements, the Council should establish recommendations for wind lease and easement best practices.

Decommissioning

The Council unanimously supports a requirement for decommissioning a wind energy system when it has not been operational for a defined period of time. Aside from defining the time when decommissioning should be initiated, the Council also discussed other decommissioning specifics. The Council put the most emphasis on the following decommission elements: (i) recommended industry standards; (ii) costs of component removal; and, (iii) the desired end result after a decommissioning process.

The logical first item the Council needed to tackle was determining when decommissioning should be required. Ultimately, the Council offers a consensus recommendation that any turbine not operating for 18 consecutive months should be decommissioned by the responsible party.

Other recommendations give direction regarding the extent of the decommissioning process. Council members recommend that the rules should require removal of turbine foundations during decommissioning. The Council favors requiring removal of turbine foundations to a depth of at least four feet below grade, as this is should be sufficient to not impede agricultural activity at a reclaimed site.

Council members agree that the rules should require removal of other underground structures in addition to the foundation, except that underground collector lines should not be required to be removed. The Council concluded that underground collector lines are likely to exceed a depth of

four feet at the time of their original installation, and if collector lines are not removed, they already must be maintained in a safe condition.[66] Component installation at that depth does not interfere with agricultural activities when the turbine is online; that does not change if the turbine is not operational. Finally, the Council supports requiring site restoration to preconstruction condition, to the extent feasible.

Assuring that decommissioning funds are available in advance of initial project construction was a key point of consideration for the Council. The Council recommends the following decommissioning components related to fiscal responsibility:

- If the rules require removal of turbine foundations and underground improvements, a plan and an estimation of costs for the removal of these structures should be included in an application to a political subdivision.
- The rules should require an applicant to provide the political subdivision with proof of financial assurance to complete decommissioning in a form and amount based on a cost estimate by a mutually agreeable third-party.
- The rules should require the responsible party to submit a filing upon completion of decommissioning. The rules should stipulate that penalties for decommissioning non-compliance should be handled by the political subdivision using the political subdivision's existing authority.

Construction and Operation Standards

In general, the Council supports the draft rules provisions regarding physical characteristics of a wind energy system. Key to the discussion among Council members about construction and operation standards was an emphasis on balance. The Council's intent is to leave wind developers with the flexibility to make logical construction and operation choices while assuaging public concern regarding operation standards and wind turbine appearance. The Council believes that the approach to physical characteristics, electrical standards, and construction, operation & maintenance standards in the draft rules should be included in the final rules. In addition to these standards, the Council agrees the rules should require the wind energy system owner to provide as-built specifications for the wind energy system to the political subdivision granting approval.

Emergency Procedures

The Council discussed whether the possibility of an emergency situation at the wind energy system needed to be addressed in the wind siting rules. Council members believe that the rules should set forth default areas of responsibility for providing emergency services at the wind energy system, with the owner of the wind energy system responsible for providing services starting at the base of the wind turbine. Emergency services up to the wind turbine base would naturally be the responsibility of area emergency service providers. The Council believes that the rules should require the applicant to provide a copy of a project summary and site plan to the local emergency services provider, as designated by the political subdivision reviewing the

[66] National Electric Safety Code, Section 31, Rule 313.B.3.

application. The Council also believes that the rules should require the applicant to cooperate with local emergency services providers in developing an emergency response plan for the wind energy system upon the request of the political subdivision.

Establishing a division of responsibilities between the owner/developer and the local Emergency Medical Service (EMS) provider at the base of the tower reflects the relative tools and training available to the project owner or operator and a reasonable expectation of the local EMS providers' skills and resources. While some EMS providers may elect to be trained and maintain equipment for wind tower-based rescue, the Council did not find it reasonable to expect or require such a level of expertise from what is often a volunteer part-time service organization.

Conflict of Interest

The Council discussed whether the rules should include specific provisions to prevent conflicts of interest among public officials involved in siting approvals or the ongoing regulation of wind energy systems. This question arose primarily out of a concern that local officials in some cases may have (and in the past, perhaps, actually have had) a financial interest in the approval or denial of a wind siting application.

Council members feel that it is not necessary to include specific provisions related to conflicts of interest in the wind siting rules. All Council members agree that the existing provisions of Wisconsin Statutes Chapter 19, Subchapter III (Code of Ethics for Public Officials) apply to siting approvals and the ongoing regulation of wind energy systems. A majority of members feels that it is therefore redundant and/or unnecessary to address the same questions in the wind siting rules. A minority, however, feels that local public officials and residents of affected communities might not be aware of the Code of Ethics for Public Officials, or have the Code in mind when wind energy systems are being considered. The minority would therefore prefer to see conflict of interest issues addressed in the wind siting rules.

If this issue were to be addressed specifically in the wind siting rules, the Council believes that the rules should only state that compliance with the above mentioned statutory provisions is required.

Notification Requirements

Council members support differentiating the appropriate form and timing of giving public notice of a planned wind energy facility based on its size. The Council discussed general public notice as an important factor in facilitating responsible wind development in Wisconsin. However, the Council also discussed concerns about imposing notice requirements too early in the development process, before plans for a wind energy system have become sufficiently certain and no longer subject to material change. For large wind energy facilities, community wind, and small wind energy facilities, Council members support a requirement for developers to use commercially reasonable efforts to notify the appropriate political subdivision and adjacent landowners in advance of filing an application. For large and community wind, the Council supports a concurrent requirement to notify the Commission.

For large wind energy facilities and community wind, Council members support a general notification period of 90 days before filing a construction application. For small wind energy facilities, Council members support a general notification period of 60 days before filing a construction application.

Application Process & Political Subdivision Process

In general, the Council supports the approach outlined in the draft rules applicable to the application process requirements.

The Council also supports the general approach outlined in the draft rules applicable to political subdivision review of applications. Council members believe that the rules should prohibit a political subdivision from placing any condition or regulation on a wind energy system except as provided in the rules. However, this statement should not be construed as a desire to prohibit a political subdivision from exercising its authority over usual and customary local government matters as otherwise authorized by law and in compliance with Wis. Stat. § 66.0401, provided such condition or regulation: (i) does not overtly apply only to wind energy systems; (ii) does not only apply to wind energy systems in purpose or effect; and, (iii) does not disparately impact wind energy systems compared with other types of structures.

The Council supports the approach outlined in the draft rules regarding the assessment of fees to reimburse the subdivision for reasonable expenses incurred in reviewing an application to construct a wind energy system. However, the Council does not recommend that the rules should specify numerical limits to the amount of reimbursement sought. The Council discussed the possibility of caps on what a political subdivision could charge for reviewing and application and ultimately did not include fee caps in its recommendations.

Stray Voltage

Stray voltage is a *difference in potential* (voltage) between two points that an animal can touch simultaneously.[67] This is often referred to as *cow contact* because it's most often detected in cow confinement areas. Elevated levels of stray voltage can cause behavioral changes, like flinching and avoidance.[68] According to the U.S. Department of Agriculture, action should be taken at 2-4 volts. Wisconsin's *level of concern* is 2 volts of steady-state, 60 Hz, RMS alternating current. This is far less voltage than a human can detect and should not be confused with higher voltage levels (contact voltage) from a faulty circuit.

The main purpose of grounding is to keep any metallic object that's not intended to be part of an electrical circuit at the same *potential* as the earth (zero volts) - to reduce the likelihood of an electrical shock. The Council acknowledges that the National Electrical Code and Wisconsin law require electrical systems to be *grounded* by using ground rods, pipes, rings, plates, concrete-

[67] Stray voltage does not include other electrical phenomenon like electromagnetic fields (EMF), electrostatic fields, nonlinear loads, harmonic loads, "dirty electricity," "electrical pollution," or natural currents flowing through the ground because of the earth's magnetic field.

[68] Midwest Rural Energy Council website. Available at: http://www.mrec.org/sv-info.html.

encased electrodes (rebar or “ufer” grounds), metal water pipes, and other approved means. In general, better grounding of a system or circuit results in lower stray voltage levels.

Stray voltage can result from either the electrical grid (utility side or "off-farm" sources) or on-site wiring (customer-side or "on-farm" sources). Stray voltage tests conducted by electrical utilities under PSC jurisdiction are required to follow the *Phase II* testing protocol and reporting procedures.[69] These tests check both potential sources of stray voltage by separating the grid from the farm.[70] If the electrical utility is responsible for more than one volt of stray voltage, mitigation is required. If stray voltage originates from the customer-side, rewiring programs and incentives are in place to help the farm resolve grounding and equipment issues.

A wind turbine itself does not cause stray voltage, though improper wiring and poor grounding can cause stray voltage. The Council recognizes that Wisconsin already has significant standards and testing protocols in place to address concerns about stray voltage. The Council recommends that the wind siting rules require the wind energy system developer or owner to offer and pay for pre-construction and post-construction stray voltage testing using PSC’s Phase 2 stray voltage testing protocol. The Council recommends that the electric provider should be given the opportunity to perform the stray voltage testing. If the utility declines to perform the testing, the developer or owner would be responsible for making sure the testing is conducted. The wind siting rules should require the developer or owner to remedy stray voltage problems attributable to the wind energy system, while individual farm concerns not attributable to the wind energy system should continue to be addressed by the electrical utility serving the customer.

[69] Public Service Commission of Wisconsin stray voltage documents. Available at: http://psc.wi.gov/utilityinfo/electric/strayvoltage.htm.

[70] PSC Staff Report: The Phase II Stray Voltage Testing Protocol. Available at: http://psc.wi.gov/utilityInfo/electric/documents/strayVoltage/ph2paper.pdf.

4.0 RECOMMENDATIONS FOR ONGOING COUNCIL BUSINESS & PROCESS

Pursuant to Act 40, the Wind Siting Council will have ongoing statutory duties. The Council's work does not end with the initial promulgation of administrative rules. Accordingly, the Council recommends that its ongoing business include the following tasks:

1. Conduct an annual review of information regarding wind energy system safety.

2. Conduct an annual review of the effectiveness of complaint resolution requirements, processes and practices. Solicit information from affected parties regarding concerns about the complaint resolution process.

3. Conduct a periodic review of literature, studies and other information relating to health effects, decommissioning, and the political subdivision application process.

4. By October, 2014, prepare a report to the legislature describing any Council recommendations for legislative changes. Also by October 2014, provide a report to the Public Service Commission describing any Council recommendations for changes to the administrative code.

5.0 CONCLUSION

In sum, the Council held 20 meetings over the course of more than four months to discuss and debate key wind siting elements. Within this report, the Council has fulfilled one of its key missions under Wisconsin Act 40: to provide recommendations to the Commission about a policy framework that would allow limited and generally uniform local regulation of wind energy systems in Wisconsin. The Council recognized Wisconsin's Renewable Portfolio Standard and understood the importance of representing a variety of stakeholder opinion – including those not present at Council meetings – when conducting its business.

The Council stands unified in this key position: Wind energy in Wisconsin should be developed responsibly. While it is clear that "responsible" wind development is defined differently at times among Council members, when smaller pieces of the larger wind siting whole are examined individually, numerous consensus opinions appear. This report -- in addition to the Council's straw proposal for a draft rule and the inclusion of minority opinions to provide additional detail on issues where Council members did not agree -- will provide Commissioners and other readers of this report a complete overview of Council opinions on a variety of siting issues. The work product represents a clear record, and often strong Council recommendations, regarding how wind siting should proceed in Wisconsin at this important moment in time.

The Council plans to continue its effort, monitor evolving health and industry research and prioritize ongoing, open communication about Wisconsin wind siting in the future. With responsible oversight from the Wind Siting Council in future years, Wisconsin stands to benefit from an increased number of wind energy projects and a greater proportion of clean, renewable wind energy in its energy resource mix. Meanwhile, current and expected future wind siting recommendations and information from the Council serves to provide important siting clarity for stakeholders, and basic health and safety assurances for those surrounding any wind energy project that exists or is planned for Wisconsin.

APPENDIX A: WIND SITING COUNCIL MEMBERS

Member	Affiliation	Category Representing	Appointment Provision
Dan Ebert (Chair)	WPPI Energy	Energy Industry	Wis. Stat. §15.797(1)(b)3.
Doug Zweizig (Vice Chair)	Union Township	Towns	Wis. Stat. §15.797(1)(b)2.
David Gilles	Godfrey & Kahn	Public	Wis. Stat. §15.797(1)(b)7.
Tom Green	Wind Capital Group	Wind Energy System Developers	Wis. Stat. §15.797(1)(b)1.
Jennifer Heinzen	Lakeshore Technical College	Public	Wis. Stat. §15.797(1)(b)7.
Andy Hesselbach	We Energies	Energy Industry	Wis. Stat. §15.797(1)(b)3.
George Krause Jr.	Choice Residential LLC	Realtors	Wis. Stat. §15.797(1)(b)5.
Lloyd Lueschow	Green County	Counties	Wis. Stat. §15.797(1)(b)2.
Jevon McFadden	University of Wisconsin School of Medicine & Public Health	University of Wisconsin System Faculty Member with Expertise Regarding the Health Impacts of Wind Energy Systems	Wis. Stat. §15.797(1)(b)8.
Tom Meyer	Restaino & Associates	Realtors	Wis. Stat. §15.797(1)(b)5.
Bill Rakocy	Emerging Energies of Wisconsin, LLC	Wind Energy System Developers	Wis. Stat. §15.797(1)(b)1.
Dwight Sattler	Landowner	Uncompensated Landowners Living Adjacent to or in the Vicinity of a Wind Energy System	Wis. Stat. §15.797(1)(b)6.
Ryan Schryver	Clean Wisconsin	Environmental Groups	Wis. Stat. §15.797(1)(b)4.
Michael Vickerman	RENEW Wisconsin	Environmental Groups	Wis. Stat. §15.797(1)(b)4.
Larry Wunsch	Landowner	Uncompensated Landowners Living Adjacent to or in the Vicinity of a Wind Energy System	Wis. Stat. §15.797(1)(b)6.

APPENDIX B: STRAW PROPOSAL AS APPROVED BY COUNCIL

Wind Energy System Size Categories

- Establish a category for small wind energy systems:
    - Made up of turbines not exceeding 100 kW in size each
    - Maximum system size of 300 kW in total
- Establish a category for community wind energy systems:
    - Maximum system size 15 MW in total
    - A requirement that the system have at least one of the following (1) local ownership of the wind energy system or (2) local use of the electricity
- In general, the requirements for large wind should apply to community wind except where specified in the rules

Safety Setbacks

- Establish minimum safety setbacks from nonparticipating property lines, participating residences, nonparticipating residences and occupied community buildings
- For large and community wind, measuring from the center of the turbine, these minimum safety setbacks should be 1.1 times the maximum blade tip height of the wind turbine
- For small wind, measuring from the center of the turbine, these minimum safety setbacks should be 1.0 times the maximum blade tip height of the wind turbine
- Safety setbacks from a nonparticipating property line should be waivable by the property owner
- For large wind, safety setbacks from a residence (participating or nonparticipating) or occupied community building should not be waivable
- For community wind, safety setbacks from a residence (participating or nonparticipating) or occupied community building should not be waivable
- For small wind, safety setbacks from a residence (participating or nonparticipating) or occupied community building should be waivable
- Use Federal Aviation Administration guidelines for siting requirements around public airports
- Private airports used by air ambulances should not be treated as public airports for establishing siting requirements

Noise

- Establish noise performance standards that apply uniformly to all categories of wind energy systems as a supplement to (i.e., in addition to) the safety setbacks specified above
- Standards should be absolute noise limits (as opposed to noise limits relative to the ambient noise level)
- Limit the noise attributable to the wind energy system to 45 dBA at night and 50 dBA during the day (year round)
- Noise performance standards should apply to nonparticipating residences and occupied community buildings already constructed or that have filed a building permit at the time general public notification of the wind energy system is given
- Property owners should be allowed to waive the noise performance standards
- Do not specify by rule the measures that may or must be taken when noise standards are exceeded
- Require the use of the Public Service Commission's noise measurement protocol

APPENDIX B: STRAW PROPOSAL AS APPROVED BY COUNCIL

Noise (continued)

- Require pre-construction noise testing at typical ambient conditions
- Require noise testing to the extent technically feasible and appropriate within the limits of currently available sound measurement equipment, as determined by PSC staff

Shadow Flicker

- Establish shadow flicker performance standards that apply to large and community wind energy systems, but not small wind energy systems, as a supplement to (i.e., in addition to) the safety setbacks specified above
    - Shadow flicker falling on any affected nonparticipating residence should not exceed 40 hours per year under any circumstances
    - Mandatory mitigation should be required if shadow flicker would exceed 20 hours per year on affected nonparticipating residence absent mitigation measures
- Shadow flicker performance standards should apply to nonparticipating residences that are already constructed or have filed a building permit at the time general public notification of the wind energy system is given
- Do not specify by rule the measures that may or must be taken when shadow flicker standards are exceeded or mitigation is required
- Property owners should be allowed to waive the shadow flicker performance standards
- Require developers to include a plan describing shadow flicker mitigation measures in their application
- Developers of large wind energy systems should be required to use shadow flicker computer modeling in designing the wind energy system, but small and community wind energy systems should not be required to use such modeling. It is not necessary to establish standards through the rules for required shadow flicker computer modeling.
- The Council agrees that if computer modeling shows eligibility for shadow flicker mitigation, a landowner should not be required to produce any other documentation of shadow flicker to be eligible for mitigation. Council members agree that additional mitigation beyond that required by the rules should also be allowed.
- The rules should not address a landowner's tax liability for taxes assessed due to installation of shadow flicker mitigation measures

Signal Interference

- Require developers to use reasonable efforts to avoid causing television, radio, cellular telephone and line-of-sight communications interference
- The rules should not include a definition of what constitutes a "reasonable effort" to avoid signal interference
- Require developers or owners of wind energy systems to remedy television, radio and cellular telephone signal interference for the life of the wind energy system

APPENDIX B: STRAW PROPOSAL AS APPROVED BY COUNCIL

Complaint Resolution

- Utilize hierarchy of complaint venues:
    - (1) as contemplated in draft rules, require the developer to establish a complaint resolution process and use reasonable efforts to resolve complaints,
    - (2) allow the political subdivision to use its existing authority to deal with complaints it receives and for complaints not resolved by developer, and
    - (3) allow the PSC to use its existing procedures for processing direct complaints & appeals of complaint decisions.
- Complainants should not be required to go through all complaint venues & should be able to go straight to the PSC if they choose in accordance with Act 40. Other legal remedies may exist in addition to the venues described here.
- Require developer to provide notice of these avenues for complaint when giving other general public notice (as contemplated in draft rules), and also at the time someone makes a complaint.
- The political subdivision should be responsible for implementing a complaint resolution process and seeing that complaints are resolved
- The rules should not specify a list of the types of complaints that will be considered
- The rules should require dismissal of complaints from the complaint resolution process if the complaint stems from something clearly allowed pursuant to the political subdivision's approval
- The rules should establish a requirement that the developer or owner initially respond to a complaint within 30 days

Property Value Protection

- Developers should not be required to offer a property value protection plan
- If the Commission were to require developers to offer a property value protection plan, such a requirement should be offered only to nonparticipating landowners adjacent to turbine host properties, and that the requirement should only apply to large wind energy systems

Leases and Easements

- The rules should not specify mandatory content requirements that must be included in leases and easements
- The rules should not require developers to give general public notice prior to signing any binding leases or easements
- Real estate broker licenses or licenses to conduct real estate activities should not be required for people engaging in lease and easement discussions with landowners on behalf of a developer
- If the rules do not contain any or only a limited number of provisions addressing mandatory content for wind leases and easements, the Council should establish recommendations for wind lease and easement best practices

APPENDIX B: STRAW PROPOSAL AS APPROVED BY COUNCIL

Decommissioning

- Decommissioning a wind energy system should be required when it has not been operational for a continuous period of 18 months
- Decommissioning requirements should include removal of turbine foundations to a depth of at least four feet below grade
- Decommissioning requirements should include removal of other underground structures in addition to the foundation to a depth of at least four feet below grade, with the exception of underground collector lines
- The rules should require restoration of the land following decommissioning to preconstruction condition to extent feasible
- If the rules require removal of turbine foundations and underground improvements, require a plan and an estimation of costs for the removal of these structures to be included in the application to the political subdivision
- Require applicant to provide the political subdivision with proof of financial assurance to complete decommissioning in form and amount based on a cost estimate by a mutually agreeable third-party
- Require a filing upon completion of decommissioning
- Penalties for not complying with decommissioning requirements should be handled using political subdivision's existing powers

Construction and Operation Standards

- Retain the provisions in the draft rules regarding physical characteristics of a wind energy system:
    - Prohibit advertising material or signage on wind turbines, with certain exceptions
    - Prohibit attaching to a turbine any flag, decorative sign, streamer, pennant, ribbon, spinner, fluttering, or revolving devices except for safety features or wind monitoring devices
- Retain provisions in the draft rules regarding electrical standards and construction and maintenance standards
- Require the wind energy system owner to provide as-built specifications for the wind energy system to the political subdivision granting approval

Emergency Procedures

- Set forth default areas of responsibility for providing emergency services at the wind energy system:
    - The owner of the wind energy system should be responsible for providing services starting at the base of the wind turbine and continuing up the tower
- Require the applicant to provide a copy of a project summary and site plan to the local emergency services provider, as designated by the political subdivision reviewing the application
- Require the applicant to cooperate with local emergency services providers in developing an emergency response plan for the wind energy system upon the request of the political subdivision

APPENDIX B: STRAW PROPOSAL AS APPROVED BY COUNCIL

Conflict of Interest

- The rules should not impose requirements regarding conflicts of interest for political subdivision regulation of wind energy systems. The requirements of Wisconsin Statutes Chapter 19, Subchapter III (Code of Ethics for Public Officials) already exist and are sufficient.
- If the rules address conflicts of interest, they should just require compliance with Wis. Stat. Ch. 19, Subch. III.

Notification Requirements

- For small wind energy systems, require the developer to use commercially reasonable efforts to notify the political subdivision and adjacent landowners, but notifying the PSC is not necessary
- For large wind energy systems and community wind energy systems, require the developer to use commercially reasonable efforts to notify the political subdivision and landowners adjacent to proposed turbine host properties, as well as the PSC, in advance of filing an application
- For large wind energy systems only, also require developers to notify landowners within 1 mile
- The general public notification period for a large wind energy system should be 90 days before filing a construction application
- The general public notification period for a small wind energy system should be 60 days before filing a construction application

Application Process

- In general, retain the approach in the draft rules regarding the application process requirements
- Require applications to include plans and specifications for the wind turbines being built
- Allow political subdivisions to request information in an application pursuant to detailed application filing requirements specified by the PSC, as well as any other information necessary to understand the proposed wind energy system

Political Subdivision Process

- In general, retain the approach in the draft rules regarding the political subdivision process
- The rules should prohibit a political subdivision from placing any condition or regulation on a wind energy system except as provided in the wind siting rules, however, this should not be construed to prohibit a political subdivision from exercising its authority over usual and customary local government matters as otherwise authorized by law and in compliance with Wis. Stat. § 66.0401, provided such condition or regulation: (i) does not overtly apply only to wind energy systems; (ii) does not only apply to wind energy systems in purpose or effect; and, (iii) does not disparately impact wind energy systems compared with other types of structures

APPENDIX B: STRAW PROPOSAL AS APPROVED BY COUNCIL

Stray Voltage

- Require developer/owner to offer pre-construction and post-construction stray voltage testing using PSC's Phase 2 stray voltage testing protocol
- Require developer/owner to pay for the stray voltage testing, give the utility the opportunity to perform the testing, and if the utility refuses to perform, then the developer is responsible for getting the testing done
- Require developer/owner to remedy stray voltage problems attributable to the wind project

APPENDIX C: LIST OF COUNCIL MEETINGS TO DATE

1. March 29, 2010 – 9:00 a.m.
2. April 1, 2010 – 1:30 p.m.
3. April 7, 2010 – 9:00 a.m.
4. April 9, 2010 – 9:00 a.m.
5. April 16, 2010 – 1:30 p.m.
6. April 22, 2010 – 1:30 p.m.
7. April 29, 2010 – 1:30 p.m.
8. May 4, 2010 – 9:00 a.m. (Tour of Wunsch property & Blue Sky Green Field)
9. May 17, 2010 – 1:30 p.m.
10. June 2, 2010 – 9:00 a.m. (All day meeting)
11. June 9, 2010 – 9:00 a.m.
12. June 15, 2010 – 9:00 a.m.
13. June 21, 2010 – 1:30 p.m.
14. June 23, 2010 – 1:30 p.m.
15. July 6, 2010 – 1:30 p.m.
16. July 15, 2010 – 9:00 a.m.
17. July 19, 2010 – 1:30 p.m.
18. July 26, 2010 – 1:30 p.m.
19. July 29, 2010 – 2:30 p.m.
20. August 4, 2010 – 9:30 a.m.

The agenda and minutes for each meeting are available in Docket 1-AC-231.

APPENDIX D: WISCONSIN LOCATIONS WITH MULTIPLE SMALL TURBINES

Installation Owner	County	Total Capacity (in kW)	Turbine models	Installation date(s)
Village of Cascade	Sheboygan	200	2 Northwind 100's (100 kW)	2010
Lakeshore Technical College	Manitowoc	167.5	1 Vestas V-15 (65 kW) 1 Endurance (50 kW) 1 Entegrity (50 kW) 1 Proven (2.5 kW)*	2004, 2010
Twin Oaks Milling and Lumber	Grant	100	1 Vestas V-15 (65 kW) 1 Vestas V-15 (35 kW)	2004
Wausau East High School	Marathon	110	1 Northwind 100 (100 kW) 1 Bergey Excel (10 kW)	2009, 2010
SCA Tissue	Winnebago	80	4 Renewegy VP-20s	2010
Prehn Cranberry Farm	Monroe	75	1 Endurance (40 kW 3-phase)* 1 Endurance (35 kW single phase)	2009, 2010
Renew the Earth Institute	Portage	23.6	1 20 kW Jacobs 1 3.6 kW Jacobs	2008, 2005

* Indicates planned summer 2010 installation

(Current as of August 9, 2010)

APPENDIX E: MINORITY REPORT

Introduction

We appreciate the opportunity to attach a minority opinion to the Wind Siting Council's final report to the Commission. As described in the report, the Council worked very hard for over four months to make sure that the viewpoints of the varying interested parties were heard, and we have reached consensus on a number of issues. However, there are several issues—which we believe are the most important issues—on which the Council simply was not able to reach consensus. We believe that this inability can in large part be explained by the make-up of the Wind Siting Council and by a process that did not insist on the best quality information and did not elicit critical thinking in the participants.

We acknowledge and respect the vast range of facts, opinions, and interests represented in the Council's membership. The motivation of individual Council members to protect the economic investments of each of the parties involved—property owners, turbine hosts, local governments, developers, and energy companies—is clear and easy to understand. The primary concern of this minority report, written by persons living among wind turbines, by realtors, and by a town official, is protecting the quality of life for people living near wind energy developments who have not chosen to participate in those developments. We believe it is the responsibility of a governmental body to provide an opportunity for citizens to consent on some on the most contentious issues relating to wind energy development.

We believe that our views are not adequately addressed in the straw proposal and the report presented by the Council to the Commission. We worked hard to listen to ideas that differ from our own, and we appreciate the opportunity to hear differing views over the many hours of meetings. However, our concerns with the product of the Wind Siting Council is not with the loss of votes on particular issues, it is with the failure of the process to address the realities of the effects of large wind turbines on nearby populations, to bring quality information into critical areas, and to explore the economic implications of locating an industrial facility next to a residential area.

We would ask the reader to be tolerant of the varying writing styles that result from multiple authors and to excuse indications of frustration that were not removed from the text. Council members supporting this minority opinion include a member representing towns, both realtor members, and a landowner living in the vicinity of a wind energy system. Our opinions are also supported by another landowner living in the vicinity of a wind energy system, Gerry Meyer, who served as one of our alternates to the Council.

Our issues of concern include:

- The Composition of the Wind Siting Council
- Health
- Noise
- Shadow Flicker
- Property Values

APPENDIX E: MINORITY REPORT

Wind Siting Council Membership

Wind turbine siting has been a contentious issue in this state—separating families, communities and abandoning Wisconsin residents to their fate. Recognizing this state of affairs, the legislature in Act 40 designated appointments to a Wind Siting Council that were intended to produce an evenly-balanced composition. Unfortunately, the appointments made were heavily weighted on the side of members having a direct or indirect financial interest in promoting wind development in the state.

It may have been more appropriate to have had all three Commissioners discuss these appointments at one of their open meetings. In future, there may be need for some legislative committee oversight in future Wind Siting Council member selection, since these decisions ultimately promote outcomes that could unnecessarily burden Wisconsin citizens in the name of "the greater good."

The following is the language in the statute that prescribed the composition of the Wind Siting Council:

2009 WISCONSIN ACT 40

The people of the state of Wisconsin, represented in senate and assembly, do enact as follows:

SECTION 1. 15.797 of the statutes is created to read:
15.797 Same; council. (1) WIND SITING COUNCIL.
(a) In this subsection, "wind energy system" has the meaning given in s. 66.0403 (1) (m).
(b) There is created in the public service commission a wind siting council that consists of the following members appointed by the public service commission for 3−year terms:

1. Two members representing wind energy system developers (Developer Members)
2. One member representing towns (Towns Member) and one member representing counties (Counties Member)
3. Two members representing the energy industry (Energy Members)
4. Two members representing environmental groups (Environmental Members)
5. Two members representing realtors (Realtor Members)
6. Two members who are landowners living adjacent to or in the vicinity of a wind energy system and who have not received compensation by or on behalf of owners, operators, or developers of wind energy systems (Landowners)
7. Two public members (Public Members)
8. One member who is a University of Wisconsin System faculty member with expertise regarding the health impacts of wind energy systems (UW Faculty Member)

The Table following indicates the degree of compliance with the legislation and identifies those with direct or indirect financial or organizational interests in the promotion of wind energy systems in the state. Commentary is found on the pages following the table:

APPENDIX E: MINORITY REPORT

Membership on the Wind Siting Council called for in 2009 Wisconsin Act 40
As appointed by the Public Service Commission
a check with the legislative language and
identification of financial or organizational interests in the promotion of wind energy systems

SECTION 1. (b) There is created in the Public Service Commission a wind siting council that consists of the following members appointed by the Public Service Commission for 3-year terms:

NAME	AFFILIATION	APPOINTMENT MATCHES LEGISLATIVE LANGUAGE?	INDEPENDENT OF FINANCIAL OR ORGANIZATIONAL INTEREST IN THE PROMOTION OF WIND ENERGY SYSTEMS?
1. Two members representing wind energy systems developers.			
Tom Green	Wind Capitol Group	YES	NO
Bill Rakocy	Emerging Energies of Wisconsin, LLC; CREWE Member	YES	NO
2. One member representing towns and one member representing counties.			
Doug Zweizig	Town of Union (Rock Co.) (Town wrote an ordinance)	YES	YES
Lloyd Lueschow	Green County (no industrial wind activity)	YES	YES
3. Two members representing the energy industry.			
Andy Hesselbach,	WE Energies; CREWE Member	YES	NO
Dan Ebert,	WPPI Energy; CREWE Chair	YES	NO
4. Two members representing environmental groups.			
Michael Vickerman	RENEW Wisconsin	YES	NO
Ryan Schryver	Clean Wisconsin	YES	NO
5. Two members representing realtors.			
George Krause Jr.	Choice Residential LLC	YES	YES
Tom Meyer	Restaino & Associates	YES	YES
6. Two members who are landowners living adjacent to or in the vicinity of a wind energy system and who have not received compensation by or on behalf of owners, operators, or developers of wind energy systems.			
Dwight Sattler	Landowner 3,700 feet from a turbine	YES	YES
Larry Wunsch	Landowner 1,100 feet from a turbine	YES	YES
7. Two public members.			
David Gilles	Godfrey & Kahn former WPSC General Council	NO	?
Jennifer Heinzen	Lakeshore Technical College, Pres. RENEW WI	NO	NO
8. One member who is a University of Wisconsin System faculty member with expertise regarding the health impacts of wind energy systems.			
Jevon McFadden	Assigned to the Wisconsin Department of Health Services. Employed by the Federal CDC. Admitted non-expert on this subject.	NO	?
Number of members not matching the legislative language		**3**	
Number of members independent of financial or organizational interest			**6**

APPENDIX E: MINORITY REPORT

Commentary on the composition of the Wind Siting Council:

- Three of the members of the Wind Siting Council were also members of the Coalition for Clean, Responsible Energy for Wisconsin's Economy (CREWE), having a history of working in concert on the wind siting issue. "CREWE is a coalition group that formed to advocate meaningful energy policy change consistent with the Governor's Global Warming Task Force final report, which will have a positive impact on Wisconsin's economic development and security and foster job creation. CREWE's membership consists of Alliant Energy, EcoEnergy, Johnson Controls, Xcel Energy, C5•6 Technologies, Madison Gas and Electric, Orion Energy Systems, Forest County Potawatomi Community, Wisconsin Energy Corp., Emerging Energies of Wisconsin, MillerCoors, American Transmission Co. and WPPI Energy." http://wicrewe.com/

- The legislation called for two "public members," presumably, in the simplest term, persons who represent the best interests of the public.
  The definition of "general public" found at allwords.com (http://www.allwords.com/word-general+public.html) would be:
  1. *Those members of the public who have no special role in a specific public area, such as an airport, hospital or railway station; there will typically be restrictions on their access.*
  2. *Members of the public not in the attentive public of any given issue; laypersons.*

  The two people appointed were far from laypersons on the issue of wind energy systems in Wisconsin:

  "**David J. Gilles** is a shareholder and a member of the environmental and energy law practice group in the Madison office and has expertise in energy regulatory law matters. He also works with the antitrust, consumer protection and government practice team. Prior to joining the [Godfrey & Kahn] firm, Dave served as General Counsel to the Public Service Commission of Wisconsin (2003-2007). The Commission is an independent regulatory agency, responsible for overseeing public utilities providing electric, gas, water and telecommunications services to the public.
  As General Counsel, Dave was responsible for all legal matters affecting the agency. Dave supervised and directed legal representation in state and federal courts and before the Federal Energy Regulatory Commission and Federal Communications Commission. While at the agency, legislation streamlining procedures for approval of energy facilities was enacted (2003 Wisconsin Act 89). In addition, legislation setting renewable resource portfolio standards for energy providers became law (2005 Wisconsin Act 141)." (http://www.gklaw.com/attorney.cfm?attorney_id=300)

  Jennifer Heinzen is the President of RENEW Wisconsin. For an example of her advocacy for increased use of wind energy systems in Wisconsin, see her response to perceived anti-wind comments of State Representative Bob Ziegelbauer. http://renewmediacenter.blogspot.com/2009/01/response-to-comments-of-state-rep-bob.html

APPENDIX E: MINORITY REPORT

- Probably the most problematic appointment to the Wind Siting Council was the person appointed to serve as the "University of Wisconsin System faculty member with expertise regarding the health impacts of wind energy systems." The person appointed is an employee of the Wisconsin Department of Health Services, an agency that has taken a position on the issue of wind turbines and health: "the information currently available to the Division of Public Health does not support the conclusion that existing setback criteria would result in adverse health impacts to the public." (Letter from Seth Foldy, State Health Officer and Administrator, Division of Public Health to Kendall Schneider, Chair, Town of Union (Rock County) Town Board, September 4, 2009) This carefully worded conclusion is strikingly similar to McFadden's conclusion in his presentation to the Wind Siting Council on May 17, 2010: "Evidence does not support the conclusion that wind turbines *cause* or are *associated with* adverse health outcomes." As an employee of the Bureau of Environmental and Occupational Health, McFadden is presumably subordinate to Foldy and therefore constrained in his conclusions to those of his agency.

  Act 40 called for an <u>independent</u> researcher, a faculty member in the University of Wisconsin system. The person appointed is not a faculty member, but an adjunct assistant professor:

  > Definitions are found in the **Wisconsin Administrative Code: UWS 1.04 Faculty.** "*Faculty" means persons who hold the rank of professor, associate professor, assistant professor, or instructor in an academic department or its functional equivalent in an institution.*
  >
  > and the **Faculty Policies and Procedures University of Wisconsin—Madison** (As approved by the Faculty Senate on 15 May 1978, with subsequent amendments as of 4 May 2009)
  > *1.02. UNIVERSITY FACULTY. A. The university faculty consists of all persons who hold the rank of professor, associate professor, assistant professor, or instructor with at least a one-half time appointment in UW-Madison, or with a full-time appointment jointly between UW-Madison and UW-Extension.*)
  >
  > Directory search at the University of Wisconsin—Madison:
  > 1 match
  > Name JEVON MCFADDEN
  > E-mail
  > Phone
  > Title ADJUNCT ASST PROF
  > Division SCHOOL OF MEDICINE AND PUBLIC HEALTH
  > Department POPULATION HEALTH SCIENCES

Adjunct professors, as can be learned from Wikipedia, are "Typically part-time non-salaried, non-tenure track faculty members who are paid for each class they teach. This position does not always require a completed PhD." (http://en.wikipedia.org/wiki/Professor#United_States_and_Canada) Therefore the Wind Siting Council did not have the quality of instruction in the peer-reviewed literature on the health impacts of wind energy systems envisioned by the legislators. Instead of a researcher who is accountable to the University and the community of scholars for the quality of assessment on this question, the Council had a member who only looked like a faculty member, who has not published any investigation into such questions, and acknowledged that he had only informed himself in the relevant literature for a few years.

We want to be clear that our concerns about the composition of the Wind Siting Council are not criticisms of the individuals appointed. In each case, these individuals were appropriate

representatives of their roles and organizations. They were hard-working and conscientious members of the Council. Our critique is with the effect that these appointments had on the process of the Council's deliberations and with the pre-determination of the recommendations contained in the Council report.

The legislatively-desired diversity of the Council was clearly distorted in the appointment process, and the consequences of that act can be seen in the conduct and product of the Council. At the first meeting, Council members are described in the Council report as sharing "his or her background, experience and thoughts on wind development." However, none of the three members of CREWE mentioned that part of their experience, even though they had been working together to advance that organization's agenda at that time. It is clear that those expecting regulation from the Commission's rules and those Council members associated with them would have a strong voice in the recommendations for those regulations.

The Council Chair repeatedly urged the Council to work toward a consensus and even suggested specific ways in which opposing positions might be accommodated, but the majority operated to deflect information or proposals that might interfere with the agenda of ensuring that local jurisdictions would not be able to restrict wind farm development. The imbalance in favor of increased ability to site wind farms resulted in

- an inadequate and biased review of the scientific literature,
- little review of state and national regulations,
- no examination of the ordinances passed in Wisconsin by local jurisdictions (even though these ordinances were frequently cited as the rationale for the Council), and
- a series of majority votes in favor of relaxed regulation of wind energy systems.

The pattern of voting by this block of members can be seen in the *Wind Siting Council Straw Proposal Amendment Ballot: Data Tabulation* distributed on July 9, 2010.

Had the Commissioners vetted the Wind Siting Council applicants as a group in an open meeting, perhaps the council would have been a more diverse group applying equal consideration for the promotion of wind development and minimizing burdens for the residents of Wisconsin.

Health

The Wind Siting Council failed to address health issues adequately in their recommendations for the wind siting rules.

The following pages are a personal account from a resident in the Forward Energy project. They illustrate how some Wisconsin residents' health is being impacted while living in a wind facility, his increasing awareness of how his neighbors are affected, and his experience in interacting with health professionals.

> World wide, wherever large industrial wind turbines are erected, there are numerous complaints of health effects. Most common, and immediately after turbines begin to turn, are headaches and loss of sleep.

APPENDIX E: MINORITY REPORT

On May 17th wind siting council member Jevon McFadden gave a presentation titled "Wind Turbines: A Brief Health Overview." His research did not include any visit or interview with current wind farm residents, nor did it include overnight stays in homes within a wind farm. It mostly included information obtained from reports obtained on the internet. I feel there are serious flaws in that presentation. I will only cite two of those slides. On slide 68 the second bullet point reads, "Persons with sleep problems should be medically evaluated". That seems to be a needless visit to the doctor as wind farm residents did not have this sleep problem before the turbines began turning. It is not because some of those residents are getting older as one council member suggested; it is the frequent jet-flying-over sound or thumping sounds that often last for days at a time that are the catalyst of the problem. The third bullet point of slide 68 states, "Symptoms of sleep disturbance, vertigo, tinnitus, anxiety, etc. may represent serious underlying medical conditions." Again, these symptoms were not present before the turbines were installed.

In correlation to the symptoms beginning just after or shortly after the wind turbines began turning, the symptoms (depending on their severity) go away immediately after leaving the wind farm for vacation or in some cases abandoning homes out of desperation. Sleep returns immediately, and headaches cease right away. Some residents report that they no longer dream, however dreams return when they sleep away from their home. Ringing in the ears takes several days to clear up, while more serious internal problems may take months to improve.

One young woman in the Forward project had intestinal ulcers that began after the turbines began turning that went away in the following months after her family abandoned their home and moved to a peaceful cul-de-sac in a nearby village. The mother of the same family and a woman in a home less than a mile away both had compromised immune systems. Of course, this was diagnosed by doctors. After moving from their homes,, their health and weight improved observably. These, of course, are only a few of an unknown number of persons in the state who have been affected by the placement of wind turbines adjacent to their properties. We urge the Public Service Commission to determine the extent of the problems before permitting the siting of additional turbines.

Before continuing, we will list some, however probably not all, of the health effects experienced by residents living where wind turbines are not responsibly sited: headaches, sleep deprivation, anxiety, dizziness, chest palpitation, stress, depression, anger, nausea, exhaustion, irritability, lack of motivation, loss of short term memory, tinnitus, intestinal ulcers, and reduced immunity system.

The Wind Siting Council heard numerous times from member Larry Wunsch (an uncompensated landowner living adjacent to or in the vicinity of a wind energy system member) about what it is like to live 1,100 feet from a large industrial wind turbine regarding sound, health, and shadow flicker. Council member Dwight Sattler has stated he only hears the turbine to the south east of his home sometimes and does not experience shadow flicker. Mr. Sattler estimated to the council that the single turbine is at least ½ a mile from his home (Other estimates are 3000+ feet away.). This difference between these two members demonstrates irresponsible vs. responsible siting. Those of us in the minority were expecting <u>responsible</u> siting rules from this council.

APPENDIX E: MINORITY REPORT

Slide 72 of Dr. McFadden's presentation states, "Encourage concerned individuals to report symptoms or illness to a healthcare provider" and "Encourage health officials to continue to assess new evidence as it becomes available." The actual words stated were, "Health officials both at the state and local levels are advised to continue to assess new evidence as it becomes available. This is standard practice with regards to all issues of potential public health impact."

The following is one personal account (An interested Department of Health Services could easily learn of many others.): *On May 18, 2010, I called my clinic. Both my wife and I have been to the doctor concerning our symptoms. My wife especially had a doctor patient conversation of the diseases caused by sleep deprivation. Those diseases include high blood pressure, diabetes, heart disease and fibromyalgia. I called the clinic to find out if they report our visits concerning the negative health affects of living too close to large industrial wind turbines to the county or state health departments. The answer, "No, we do not," "We only report communicable diseases and specific requests from the health department." I again called our doctor on July 27, 2010 to see if they had been requested to submit information to the county and state health departments concerning patients with illnesses due to wind turbines too close to their homes. "No, no such request had been made". Based on the information received from my doctor and clinic, I do not believe health issues caused by wind turbines will "filter" to the state health department from visits to our "local health care provider."*

How many people go to their doctor and then report to their county or state health departments that they made a medical appointment and the results of that visit? How many residents living in a wind farm would even think about calling their county or state health department to let them know of their symptoms? I think the health departments would admit that not many would. Yet, locally we hear many complaints of residents with sleep deprivation, headaches (caused by sound and shadow flicker), and many other health concerns.

In a public meeting of the Brown County health department, Dr. McFadden stated that cortisol levels are inconclusive. If a patient has a cortisol level of 254 (A person's cortisol level should be less than 100.) during a period of high sleep deprivation caused by five wind turbines with ¾ of a mile of his home and the day after a 21-day shut down of the Forward Project the patient's cortisol level is 35, it should raise high red flags to the state Department of Public Health and the public health representative on the wind siting council that there could be a health concern related to the wind turbines.

Residents that self-report health issues seem to be in question of their reliability by Dr. McFadden. If we go to our doctor for any symptom not necessarily wind energy-related, our doctor will ask us what brings us today. Our doctor will ask questions related to the issue at hand, often very detailed, to help him/her assess the situation and determine the next steps in tests or treatment. Those answers would be self reported. I believe many patients would anticipate those questions and may even have details mentally prepared or written down

On June 9th, Wind Siting Council Chair Dan Ebert introduced his straw proposal. In his statements explaining his proposal, he concluded: "Having read through a number of the studies and having heard Jevon's presentation, I don't believe there is sufficient analysis

and evidence to suggest that we need to weigh in on the health issues at this point." That was taken as a slap in the face to council member Larry Wunsch and his alternate Gerry Meyer and many other wind farm residents in the Wisconsin wind farms and wind farms around the world that are suffering from the effects of industrial wind turbines being irresponsibly placed too close to their homes. The "majority" has downplayed the health issues during the Council's work time.

We agree that, like many other sounds and daily happenings, some people are more sensitive to surroundings than others. In the case of wind energy there seem to be many residents that are sensitive to not just the loud, very obvious sounds, but also the low frequency sound that often is not heard, but felt by the body. Low frequency sound was barely addressed or was downplayed by the Council. The peer-reviewed literature of Nina Pierpont, and studies done by Dr. Christopher Hanning, Dr. Carl, Phillips, Dr. Robert McMurtry, Dr. Amanda Harry, Dr. Michael Nissenbaum and others, including sound engineer Rick James, were ignored or dismissed.

Numerous times during the wind siting council meetings it was brought up that any decisions on health had to be based on science. If government agencies are not willing to do epidemiological studies, how will science ever determine the health issues related to wind energy? At the Brown County Health Department meeting on May 25th, concerned residents challenged Dr. McFadden and the state health department representatives at the meeting to come up with a questionnaire for current wind farm residents. Part of that request was based on the observation that there were already enough "lab rats" to study rather than create more victims of wind energy. The **fact** is: That wherever large industrial wind turbines are erected there are health issues.

This conclusion is supported by a physician who has surveyed studies conducted on those affected by wind turbines: "*Large industrial wind turbine developments do not belong in close proximity to locations where people live and work.*"[his italics] (Herbert S. Coussons, MD, "Re: Health Impacts and Setback Guidelines for Wind Siting Council," PSC REF#: 130689) Dr. Coussons cites authoritative sources to document the levels of sound that disturb sleep, and summarizes: "At 30—40dB measurable objective sleep disturbances are seen. At 40—55dB adverse health effects are seen. Above 55dB is dangerous to public health. Experience has shown industrial wind turbines cause noise that exceeds 40 dB when in close proximity." This summary suggests that the Wind Siting Council report is recommending a sound level—45 dBA at night and 50dBA during the day—that will disturb sleep and flirts with producing adverse health effects. The problems that result from disturbed sleep are "deficits of concentration, attention and cognitive performance, reduced vigilance, malaise, depressed mood, and irritability," problems that have distinct implications for health.

While those seeking to minimize the health effects of wind turbines argue for clear causality in order to permit any attention to health concerns, there is recent work that points to the mechanisms through which disturbance from infrasound wind turbine noise takes place. Where Dr. McFadden's presentation dismisses the possibility of lower levels of infrasound being a problem, since it cannot be "heard," Alec N. Salt and Timothy E. Hullar have identified the mechanism in the inner ear that could account for the complaints resulting from proximity to working wind turbines: "In most studies of wind turbine noise, this high level, low frequency noise is dismissed on the basis that the sound is not perceptible. This fails to take into account the fact that the OHC [outer hair cells] are stimulated at levels that are not heard." (Alec N. Salt

and Timothy E. Hullar, Department of Otolaryngology, Washington University School of Medicine, "Responses of the ear to low frequency sounds, infrasound and wind turbines," June 2010) This work is now part of the peer-reviewed scientific literature and is likely to be followed by more conclusive evidence of a causal path from wind turbine noise to health effects.

Dr. Carl Phillips, an epidemiologist familiar with the science of epidemiology and with the state of research on questions of wind turbines and health effects, concludes that there is reason for investigation to ensure that siting decisions would not cause harm:

> In summary, there is substantial evidence to support the hypothesis that wind turbines have important health effects on local residents. If forced to draw a conclusion based on existing evidence alone, it would seem defensible to conclude that there is a problem. It would certainly make little sense to conclude that there is definitely no problem, and those who make this claim offer arguments that are fundamentally unscientific. But there is simply no reason to draw a conclusion based on existing evidence alone; it is quite possible to quickly gather much more useful information than we have.

(Carl V. Phillips, MPP PhD, "An Analysis of the Epidemiology and Related Evidence on the Health Effects of Wind Turbines on Local Residents," PSC REF#: 134274)

On pages 25-26 of his report, Dr. Phillips sketches out a research design that could be used to examine Wisconsin residents' experience with wind farms already permitted and operating. It is irresponsible to neglect to evaluate the effects of decisions already made before making further decisions. Chairman Callisto has attempted to reassure those concerned with the upcoming rules by saying, "I think they're going to be flexible to accommodate new studies," he said. "Rules get modified all the time. Nothing's written in stone." (quoted in "Wind turbine debate spins toward Sept. 1 deadline," The Daily Reporter, June 29, 2010.) Unfortunately, wind turbines are installed in concrete foundations weighing hundreds of tons that will not be modified for decades. In the case of Council-member Larry Wunsch, the turbine permitted under PSC rules to be placed 1,100 from his home has been operating for over five years and will likely continue to operate, though the Council Chair has acknowledged that it should not have been permitted given what we know now. We believe that it would be better to aggressively pursue knowledge of the potential for effects on human health now than to make decisions again that will be regretted later.

Health issues are not limited to humans. One Forward resident, before abandoning their home, also had problems with their alpacas birthing at not normal times of the day and in three cases had still-born or aborted births, where before the turbines were erected there were no reproductive problems. In a neighboring wind project, a man who has raised chickens all his life now has a variety of health issues in his chickens. When the chickens were moved to a relative's property outside the area of the wind farm, the chickens' health returned. In the smaller Wisconsin Public Service project near Algoma, a beef farmer who had not had health concerns with his animals prior to the wind farm had some animals get ill and others die after the turbines were erected. In the Forward project, few if any deer are seen; however residents two miles outside the project are seeing more deer than ever. The same results are reported for turkeys. The concern for wildlife was not addressed in the Wind Siting Council proceedings (such concerns were stated to be the responsibility of the Department of Natural Resources) even though "environmental" groups were part of the make up of the Council.

APPENDIX E: MINORITY REPORT

Noise

Given that noise from large wind turbines is the source of most complaints from Wisconsin residents, the approach taken by the Wind Siting Council to understanding this issue and to proposing reasonably protective noise standards was seriously flawed.

- Where Act 40 stipulated that a member of the Wind Siting Council be "a University of Wisconsin system faculty member with expertise regarding the health impacts of wind energy systems," the person appointed was not a member of the UW—System faculty but was an adjunct assistant professor whose primary work location was a state agency with an established position on the question of health impacts of wind energy systems. Further, he publicly stated that he was not an expert.
- The Wind Siting Council report is in error in stating that the Council surveyed peer-reviewed scientific research regarding the health impacts of wind energy systems. The Council was given a PowerPoint-assisted talk on the subject. The PowerPoint slides have been made available, but the presenter has publicly refused to provide the text of the report, even though this text has been used by others to make presentations elsewhere in the state.
- The summary regarding "Noise" in the Council report relies on sources that have not been provided to Council members, either in copies or links. In addition, a significant number of the sources in the Council report were not included in the presentation given to the Council. It is impossible to claim that the Council surveyed literature to which they were not given access or of which they had no knowledge.
- The oral report provided to the Council and the presentation included in the Council report shows the selection and use of sources to justify a pre-determined conclusion and does not reflect either an expert or objective survey of the relevant literature. In contrast, the report provided on the docket by Carl V Phillips, "An Analysis of the Epidemiology and Related Evidence on the Health Effects of Wind Turbines on Local Residents," (PSC REF#: 134274) provides a discussion of the issues by an expert and experienced analyst. Phillips details the flaws and limitations of industry-sponsored reports that minimize the effects of noise and proposes timely and efficient approaches to studying the effects of wind turbine noise on the Wisconsin residents already exposed. Neither the Phillips report nor any other assessment of the effects of noise from wind turbines on proximate populations has been considered in Council meetings. After the PowerPoint presentation, the issue was declared closed.
- Selection and use of sources to support a pre-determined point is illustrated by the casual setting aside of recommendations from such organizations as the World Health Organization, Vestas, the New Zealand Wind Energy Association, The National Research Council of the National Academies, and the Minnesota Department of Health (Environmental Health Division) while basing the recommendation for sound levels on studies done in Europe with smaller turbines and greater setbacks than are presently permitted in Wisconsin.
- The majority on the Council that voted for the recommended standard cannot explain the meaning of the noise standard they have voted for. This can be seen in the following two-minute video from a Council meeting: http://www.youtube.com/watch?v=29RmKZ8raT0 This discussion took place July 15, 2010 after the decisive vote was taken on the noise standard. In an earlier written “straw” ballot, five members of the Council had voted for a

standard to allow 25 dBA over the ambient or background sound. (This was not one of the choices on the ballot, "25 dBA" had to be written in under "Other.") In the July 15 meeting, Council members were asked how much louder a 25 dBA difference was. Initially, no one on the Council could say. Finally, Dr. McFadden volunteered 500 times louder, probably meaning 500 percent or five times louder. Because of the logarithmic nature of the decibel scale, the difference is closer to six times louder. What is remarkable is that none of those who had just voted for a standard they did not understand sought to clarify or reconsider what they had just decided. This is an unfortunate demonstration of the quality of decision making on which recommendations in the Council report have been based.

- Since the Council approach to the examination of this central issue fails to meet the literal requirements of Act 40, the recommendations of the Council regarding a noise standard should be set aside, and a process that matches what was required in the Act (a survey of the literature by the Council guided by an independent and qualified researcher) should be initiated.

James P. Cowan, INCE BD. Cert. presented "Wind Turbine Generator Noise Issues" to the Council on June 2, 2010. (http://psc.wi.gov/apps 35/ERF_search/content/SearchResult.aspx Noise Presentation Cowan 06-02-10) Mr. Cowan said that in his experience a 2 megawatt 100-meter wind turbine generator would produce 45 dBA at a 2,000 foot setback and that in central New York state, 2,000 feet was a typical setback. He added that at a 1,000 foot setback the sound would be approximately 6 dBA louder, or about 51 dBA.

Setbacks, other than for safety, were not recommended in the Council report because Council members were agreed that setbacks are a crude device for addressing the problems of noise and shadow flicker. Nevertheless, distance is the only sure mitigation for these problems. In lieu of better information or the kind of study recommended below, we would recommend a 2,640-foot setback from homes with a sound level standard set to 5 decibels above ambient sound pressure to wind farm residents. This is a modest set back compared to the call of doctors, scientists, physicists and sound engineers from around the world for setbacks of 1.2 miles and more.

Shadow Flicker

We do not believe the Council has sufficiently addressed the issue of shadow flicker. We believe that a non-participating property owner should not have to deal with the annoyance of *any* amount of shadow flicker. Non-participating property owners should have the right to freely enjoy their property without shadow flicker annoyance.

A property owner has an interest in the private use and enjoyment of his or her land. What a neighboring property owner does on his or her own property needs to stay there, and should not have spillover effects on other properties. Shadow flicker is an annoyance that can affect the use and enjoyment of a non-participating landowner's property. This annoyance should not be taken lightly. Council member Larry Wunsch who lives in a wind farm is affected by shadow flicker on his property at various times of the year. He has stated that this effect in his home is like someone turning the lights on and off inside the house at a rate of 80 times a minute and lasting for an average of 50 minutes daily on non-cloudy days for six weeks in the spring and six weeks in the fall. Shadow flicker affects the total property for considerably longer periods.

APPENDIX E: MINORITY REPORT

Shadow flicker can be predicted at the time a wind turbine's placement is being considered, and shadow flicker can be prevented from falling on a neighbor's land or buildings through proper siting and setbacks. Therefore, such interference should be avoided unless a waiver is granted by a landowner. Further, we believe that property owners have a right to enjoy the entire property surrounding their residence; we recommend at a minimum that site planning should identify locations for turbines that do not result in shadow flicker at or around gardens, barns, and other areas of a property used on a regular basis.

Council-member Larry Wunsch is the only Council member that lives with shadow flicker. Mr. Wunsch has testified with and provided other members of the Council a DVD of how shadow flicker can take away the enjoyment of a person's land. Our recommendation is to eliminate the hours of exposure that is recommended in the Council report and instead have zero tolerance for shadow flicker on a non-participating property owner's land.

Property Value

The Council was clearly divided on the question of whether locating wind turbines next to a residential property would decrease that property's value. The Council heard testimony and reviewed studies that made the case for loss of property values. It was very apparent to the minority of the Council (The minority included a landowner living adjacent to a wind turbine who is trying to sell his property and two realtors.) that the majority's opinion varies greatly from the minority's opinion and seeks a much different outcome. In the minority's opinion, the evidence showing close proximity to wind turbines to be undesirable to buyers and negative with respect to one's property value is clear and convincing.

The main argument that was used to claim there is no effect of proximity of wind turbines to property values is that any loss of property values is directly and mainly related to the loss of value because of current economic conditions. The Council majority, most of whom have a vested interest in the development of wind energy, has relied heavily on what is known as the "Berkeley Study" as their main source of support that no value loss occurs due to wind turbines. (The "Berkeley Study" citation is: B. Hoen Wiser, R., Cappers, P., Thayer, M., and Sethi, G. (2009) "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. It was funded by the Office of Energy Efficiency and Renewable Energy Wind & Hydropower Technologies Program of the U.S. Department of Energy under Contract No. DE-AC02-05CH1123.)

However, the Berkeley Study has not held up to the scrutiny of other investigators. Michael McCann of McCann Appraisal LLC in Illinois conducted a very thorough review and provided a written analysis in response to the Berkeley Study: "The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis" dated Dec 14, 2009 thoroughly details the flaws within the Berkeley Study.

Albert R. Wilson, a specialist in environmental financial risk management and impaired value analysis, concluded that the Berkeley Study does not meet professional standards ("Wind Farms, Residential Property Values, and Rubber Rulers," can be found at http://www.masterresource.org/2010/02/is-doelawrence-berkeley-labs-wind-power-impacts-study-junk-science/#more-7526):

APPENDIX E: MINORITY REPORT

> *While I have other issues with the Report (and again reiterate that I have no opinion on the influence of wind farms on residential sales prices), the concerns I have addressed here lead to the conclusion that the Report should not be given serious consideration for any policy purpose. The underlying analytical methods cannot be shown to be reliable or accurate.*

Kevin F. Forbes, Ph.D (Associate Professor, Catholic University of America, "Reflections on the Integration of Wind Energy into the Power Grid") also demonstrated why we cannot rely on the study's conclusions (document provided to the Commission, pages 6 & 7). The sample used in the study was incapable of finding any effects of wind turbine proximity to property values, and therefore concluding that there are no effects is the scientific equivalent of a fisherman coming up empty and claiming there were no fish in the lake.

The Council minority would recommend that the proper method for arriving at a reasonable "value factor" would use credentialed professionals within the appraisal industry, rather than rely on speculations on the effects of the economy or dependence on such a deeply flawed study.

The Council minority found credible the direct testimony presented by Mr. Kurt Kielisch, ASA, IFAS, SR/WA, R/W-AC President and Senior Appraiser of the Appraisal One Group. His testimony was directly relevant to our local area and State. Appraisal One Group is an appraisal firm specializing in forensic appraisal, eminent domain, stigmatized properties, and valuation research. His presentation (based on "Wind Turbine Impact Study," Appraisal Group One, 9/9/2009) provided insightful and well-documented information on the impact on property values that wind farms and wind turbines have had locally.

His organization's study and report consisted of a literature review, a survey of real estate professionals, and comparable property appraisals in the area of three of Wisconsin's currently operating wind farms consisting of 88, 86, and 41 wind turbines. He informed the Council that value of any property was based on perceptions of a buyer. His findings have demonstrated that local buyer's perceptions of proximity to wind turbines have been found to be negative, resulting in an average of 30% decrease in the areas studied.

Mr. McCann produced an 82-page report, "Wind Turbine Setbacks," dated June 8, 2010, where he gives his professional opinion regarding wind turbine setbacks and how they affect property values. He provides opinions and recommendations on how to minimize these concerns correspond very closely with those in the report provided to the Council by The Appraisal One Group, dated 9/9/2009.

Some on the Council stated, if there were a negative effect on property values, the shared revenue provided to local jurisdictions would result in a reduction of property taxes and make up for any effects on property values. Andrew Reschovsky's analysis of how this has worked in Wisconsin is summarized as ("An Analysis of Shared Revenue Utility Aid," PSC REF#:134042):

> In Wisconsin, utilities are generally exempt from local property taxation. However, county and municipal governments are compensated for their loss of property tax revenue through a state-financed grant program known as shared revenue utility aid. This paper describes the utility aid program and explains why revenue from utility aid will most likely be used to increase spending on municipal or countywide public

> services or to reduce municipal or county property tax mill rates. The paper concludes that these benefits of utility aid accrue to all property owners within the recipient jurisdictions and that they would not provide disproportionally larger benefits to landowners who are within close proximity of a wind turbine farm.

So we can't rely on shared revenue to address the property value problem

Strong evidence from areas that have had wind farms sited and operating much longer than we have experienced here in Wisconsin allows us to predict what will happen in this state. The evidence is far too convincing to allow us to dismiss the reality that wind farms do greatly negatively impact property values and that this effect can no longer be ignored or minimized.

Council member Andy Hesselbach of WE Energies commented that it is the preference of wind energy developers to site wind turbines closest to property lines, as it provides the developer the largest area to maximize the number of wind turbines and minimize development costs. This preference was confirmed by Council-member Michael Vickerman, of RENEW Wisconsin. Encroaching on a non-participating neighboring property without a negotiated easement is a common cause of conflict, results in a loss of property value, and has been argued to be a "taking" of personal property rights. ("Takings: Balancing Public Interest and Private Property Rights, *Wisconsin Briefs* from the Legislative Reference Bureau, Brief 98-2 April 1998)

Given that locating a wind farm adjacent to existing developed properties has been shown to negatively affect property values, providing an equitable Property Value Protection plan in the rules recommendations will help protect the interests of all parties involved.

Summary

Wind siting rules to adhere to the intentions of Act 40 need to be more restrictive than the ones proposed in the majority report in order to protect the health and safety of non-participating neighbors. The value of their property needs to have protection, and the quality of life rural residents intended to enjoy needs to be protected rather than taken from them.

The minority recommends three areas for study that could greatly increase understanding and reduce the contention that is likely to follow from following the recommendations of the Council report:

Health

Those seeking to minimize or deny the health impacts of wind energy systems do not deny that the operation of wind turbines has disturbed and will disturb the sleep of those living nearby. They also cannot deny the well-understood consequences of inadequate sleep. What they attempt is to have us ignore is the possibility that proximity to wind turbines is known to *directly* cause the symptoms that wind-farm neighbors experience. This narrow space on which they have based their argument is diminishing. In addition to the widespread reports of health effects and the phenomenon of neighbors abandoning their homes, there is an increasing amount of the kind of peer-reviewed scientific literature that wind farm proponents have been calling for that is documenting the symptoms and identifying the mechanisms by which wind farm noise can be found to cause them.

APPENDIX E: MINORITY REPORT

Wisconsin has a large number of residents living close enough to wind turbines already operating in the state. Carl Phillips ("An Analysis of the Epidemiology and Related Evidence on the Health Effects of Wind Turbines on Local Residents," PSC REF#: 134274) has provided a protocol by which a timely and affordable investigation could be conducted to learn about the health impacts that are occurring in this state. It would seem to be responsible to conduct such a study before permitting additional turbines. We would recommend a delay in the permitting of further wind development in Wisconsin until epidemiological studies can be conducted and evaluated.

Safety Setbacks

The Wind Siting Council's considerations of safety setbacks from a wind turbine were inadequate given the potential for harm. The only distances discussed were 1.1 the height of the turbine and 1 time the height of the turbine. The Council was not clear on the source for the 1.1 standard, though it seemed to be a standard used for cell towers. Wind turbines differ from cell towers in that there is a large weight at the top (the nacelle and blades) and in that there are large moving parts. A council member whose utility operates a wind farm reported that there have been cases of wind turbines falling over. Even though there was a request for staff to provide information from authoritative sources for the consideration of setback distance, the Chair said that it would not be necessary. The discussion became more bizarre when a Council member proposed landowners being able to ignore a safety setback, claimed that a safety setback was unnecessary, and said that it should be renamed as a "courtesy setback." In short, the recommendation from the Wind Siting Council cannot be relied upon, and an engineering study to establish safety setbacks from wind turbines is required.

Property Values

Since there is much contention about the effects of wind turbines and property values, and since the Appraisal One study might be dismissed because of its sponsorship, it might be productive for the Public Service Commission to obtain its own study of the issue. The two realtors on the Council would strongly recommend that the issue of property rights and property value effects need to be addressed in order to ensure that wind farm developers and operators are not benefitting from imposing economic hardship on their neighbors.

Wind industry advocates urge the use of science in developing policy for the regulation of wind energy systems. We agree that the discipline of science in the making of observations and reaching conclusions is indispensible to reaching sensible and long-lasting decisions. We also would promote direct observation of realities. When people are abandoning their homes, when they find it difficult or impossible to sell their homes, when symptoms experienced in the vicinity of wind turbines do not occur in other environments, it is not useful to dismiss such reports as inaccurate or hysterical. We would recommend that a body that permits wind turbine installations, whether local jurisdictions or the Wisconsin Public Service Commission, has a responsibility to inform themselves of the consequences of their permitting decisions.

By the same token, we have attempted to be as accurate as possible in our description of the working of the Wind Siting Council, of the literature we have cited, and of the experiences Wisconsin citizens are having living among wind turbines. If we have been in error, we would

desire to have the record corrected, so that we can proceed with a more accurate grasp of the situation.

Finally, we believe that all members of the Wind Siting Council have an interest in increased use of renewable sources of energy in Wisconsin. We in this minority are concerned that the recommendations in the Council report will not address the problems that led to the Council's creation. The standards recommended will, we believe, lead to continuing and increased dissention between proponents of wind development and local governments, and among citizens. We would prefer rules for the siting of wind energy systems that will reduce such conflict because we think that siting turbines in ways that people can live with will provide a sustainable source of energy for Wisconsin.

Respectfully submitted,

George Krause, realtor (Council member)

Tom Meyer, realtor (Council member)

Larry Wunsch, landowner living in the vicinity of a wind energy system (Council member)

Doug Zweizig, towns representative (Council member)