
MODEL ORDINANCE

UTILITY-SCALE WIND ENERGY PROJECTS IN

VIRGINIA

April 4, 2012

BACKGROUND:

This Model Wind Ordinance provides suggested language for consideration by localities in framing their own local wind ordinance for utility-scale wind energy projects. It was developed by the Local Government Outreach Group (LOG), an informal group of stakeholders with representation from local governments, developers, academia, and environmental organizations, whose work was facilitated by the Department of Environmental Quality.

Primary sources considered by the LOG for this Model Wind Ordinance included the Virginia Association of Counties (VACO) Model Wind Ordinance, adopted ordinances from Pulaski and Rockingham Counties in Virginia, and model ordinances from New York, Pennsylvania, Michigan, and Oregon. Other ordinances and models were also reviewed by LOG subgroups as they drafted suggested provisions on particular issues.

Based on these resources and their own experiences in Virginia and other states, subgroups of the LOG recommended provisions for this Model Wind Ordinance. Dr. Maria Papadakis of James Madison University compiled the recommended provisions, providing editorial comments and context. Group members and members of the public provided further comments on the draft compilation, by email and at LOG meetings. The version presented here reflects the compilation of provisions suggested by LOG members for consideration by local governments when they determine whether and how utility-scale wind energy projects should be located in their jurisdictions. To the extent practicable, explanatory comments and issues of concern are noted in footnotes. The use of **[brackets]** around certain provisions (1) indicates points at which a local government should supply locality-specific information or (2) signals a decision point at which a local government may adopt the suggested provision and/or may wish to give special consideration to local circumstances and preferences in framing the provision.

When utilizing this Model Ordinance, please also refer to the document, "Introduction: DEQ's Local Government Outreach for Renewable Energy," which can be found at www.deq.virginia.gov.

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1. TITLE

This ordinance shall be known as the Utility-Scale Wind Energy Project Ordinance for [locality].¹

2. PURPOSE²

The purpose of this ordinance is to provide for the siting, development, and decommissioning of utility-scale wind energy projects in [locality], subject to reasonable conditions that promote and protect the public health, safety and welfare of the community while promoting development of renewable energy resources.³

3. APPLICABILITY

This ordinance applies to all utility-scale wind energy projects proposed to be constructed after the effective date of this ordinance. Utility-scale wind energy projects constructed prior to the effective date of this ordinance shall not be required to meet the requirements of this ordinance.

¹ **Title.** Ordinances similar to this model are sometimes titled “Large Wind Energy Project Ordinance.” The Virginia statute that addresses state permitting of wind projects up to a rated capacity of 100 megawatts is titled the “Small Renewable Energy Projects Act.” In part to minimize confusion between the reach of state law and the reach of this model ordinance, the LOG chose the term “utility scale.” The LOG also intends to address model wind ordinances for smaller wind projects, which are likely to be titled “community scale” and “residential scale.” Local governments are urged to utilize terminology that best communicates the scope of their particular wind ordinances. (Note: This model ordinance generally attempts to be consistent with both the substance, terminology, and even the grammatical style of the Small Renewable Energy Projects Act.)

² **Purpose.** The statement of purpose is based on similar provisions found in existing ordinances and models and was acceptable to most LOG members. The phrase “promoting development of renewable energy sources” conforms with Virginia’s Energy Policy (specifically, §67-103 of the Code of Virginia). The legal requirements of this Energy Policy are discussed in the companion document, “Introduction: DEQ’s Local Government Outreach for Renewable Energy,” which appears on DEQ’s website along with this model ordinance. One LOG member believed that including the promotion of renewable energy as part of the Purpose was going further than necessary. However a local government chooses to articulate the Purpose of its wind ordinance, it should keep in mind the statutory mandate, incumbent on both local and state government entities, to promote the development of renewable energy.

³ **Public Health, Safety, and Welfare.** This model ordinance addresses local governments’ traditional areas of responsibility – public health, safety, and welfare – as they relate to wind energy projects. The model ordinance does not address protection of natural resources. In Virginia, the Department of Environmental Quality (DEQ) regulates impacts of wind projects on wildlife and historic resources pursuant to 9VAC15-40. The Virginia legislature delegated this authority to DEQ pursuant to the Small Renewable Energy Projects Act of 2009 (§10.1-1197.5 et seq. of the Code of Virginia). Other natural resources are regulated via permits administered by DEQ and other agencies or levels of government (e.g., air, water, waste, erosion and sediment control) pursuant to other state or federal laws.

4. DEFINITIONS

“Applicant” means the owner or operator who submits an application to the locality for a permit to install a wind energy project under this ordinance.

“Landowner” means the person who owns all or a portion of the real property on which a wind energy project is constructed.

“Meteorological (MET) tower or wind-monitoring tower” means a free-standing tower equipped with instrumentation, such as anemometers, designed to provide real-time data pertaining to wind speed and direction, and used to assess the wind resource at a particular site.

“Non-participating landowner” means a person who owns real property that may be affected by a wind energy project and is not under lease or other property agreement with the owner or operator of the wind energy project.

“Operator” means the person responsible for the overall operation and management of a wind energy project.

“Owner” means the person who owns all or a portion of a wind energy project.

“Participating landowner” means a person who owns real property under lease or other property agreement with the owner or operator of a wind energy project.

“Rated capacity” means the maximum capacity of a wind energy project based on the sum total of each turbine’s nameplate capacity. The nameplate capacity is typically specified by the manufacturer with a label on the turbine equipment.

“Shadow flicker” means the visible effect that occurs when rotating turbine blades cast shadows on the ground and nearby structures causing a repeating pattern of light and shadow.

“Tower” means the structure on which a wind turbine is mounted, or on which anemometers and other instrumentation are mounted in the case of MET towers.

“Wind energy project, utility-scale”⁴ means a facility that generates electricity from wind, and consists of (1) one or more wind turbines and other accessory structures and buildings, including substations, post-construction meteorological towers, electrical infrastructure, and other appurtenant structures and fa-

⁴ **Definition of “Project.”** In land use zoning and ordinances, one of the first issues is how to name and define wind energy installations. Commonly used terms include windmills, turbines, wind energy facilities, wind energy systems, and wind energy conversion systems. Although several planning experts recommended using the term *facility*, LOG members recommended using *project* wherever the term would fit, in order to be consistent with Virginia’s Small Renewable Energy Projects Act of 2009 (hereinafter “2009 statute”).

ilities within the boundaries of the site, and (2) is designed for, or capable of, operation at a rated capacity greater than [5MW].⁵ Two or more wind turbines otherwise spatially separated but under common ownership or operational control, which are connected to the electrical grid under a single interconnection agreement, shall be considered a single utility-scale wind energy project.

“Wind turbine” means a wind energy conversion system that converts wind energy into electricity through the use of a wind turbine generator that typically consists of a tower, nacelle, rotor, blades, controller and associated mechanical and electrical conversion components.

“Wind turbine height” means the vertical height of a wind turbine as measured from the existing grade to the highest vertical point of the turbine rotor or tip of the turbine blade when it reaches its highest elevation.

5. TYPE OF PERMITTING⁶

⁵ **Rated Capacity of Utility-Scale Wind Project.** This model ordinance utilizes “greater than 5MW” to define the size project addressed by utility-scale wind projects in order to coordinate with the 2009 statute; however, local governments may wish to alter this number. One alternative mentioned was “>5MW or 2 or more turbines.” In determining how to define the project sizes addressed by a utility-scale ordinance, local governments may want to keep in mind the tiers or levels of rated capacity that could be addressed in community-scale ordinances. The LOG is also framing a model wind ordinance for community-scale projects.

⁶ **Types of Permitting.** Localities have several options for allowing the use of wind energy projects, with and without zoning designations. In general, these options may be described as follows:

- **By right or permitted use** – Land uses that are permitted “by right” are those that can be approved administratively by the staff because the zoning ordinance allows it. By right development is regulated by the zoning ordinance and by the subdivision ordinance. Approval is a ministerial act typically carried out by the Zoning Administrator who implements the law or policy by applying the facts in a particular case. When the requirements of the law or policy are satisfied, approval is required. The zoning administrator has no discretion to deny an application. **This model ordinance recommends using by right zoning for MET towers, and as explained below, special use permits for utility scale projects..**
- **Accessory uses** – Many zoning ordinances will include uses that are subordinate or incidental to the primary use and located upon land zoned to allow the primary or principal use within zoning districts. For example, detached garages are typically considered to be accessory uses in residential districts. Typically, accessory uses will be directly related to the principal uses permitted within the district and do not require any additional scrutiny.
- **Special Exception/Conditional Use/ Special Use Permitting** – The three terms are synonymous and refer to land uses that are allowed in certain zoning districts with special permission or conditions. Uses allowed by special use permit are those considered to be generally consistent with the by right uses, but ones that may have a potentially greater impact on neighboring properties or the public. Approvals are conditioned upon the applicant’s complying with specific requirements intended to address or mitigate anticipated impacts. These cases generally require case-by-case review by the planning commission, with recommendation for final action by the governing body. The governing body may revoke a special use permit for willful noncompliance with the zoning ordinance or the adopted conditions of the permit, or for failure to commence the use, structure, or activity within the prescribed period of time. Acting on a request for a special exception or a special use permit is a legislative act made only by the governing body, after public hearing.

A. SPECIAL USE PERMIT APPROVAL FOR UTILITY-SCALE WIND PROJECTS.

1. Utility-scale wind energy projects may be installed if approved by a special use permit.
2. The general procedures for applying for a special use permit as set forth in [locality's] zoning ordinance shall apply in addition to the applicable provisions of this ordinance.

B. BY RIGHT APPROVAL FOR METEOROLOGICAL (MET) TOWERS.⁷

1. MET tower(s) may be installed with the issuance of a [zoning or building] permit for the purpose of monitoring wind and other environmental conditions relevant to siting wind energy projects. The [zoning or building] permit is valid for a period of 24 months and is renewable for an additional 24 months.⁸

This model ordinance recommends using **special use permits for utility-scale projects**; however, at least one LOG member suggested permitting by right in certain zoning districts.

Many localities will already have language in place regarding special use permitting processes. Localities may, however, want to include additional provisions for a special use permit for utility-scale wind energy projects specifically. Because utility-scale wind energy projects are complex, jurisdictions may want to ensure that the planning review process allows enough time to thoroughly review the application. It is generally recommended that procedural timelines be consistent with those already in place for facilities of similar size and scope.

In one comment from a member of the public, it was noted that some Virginia localities utilize permitting vehicles other than special use permits, such as overlay districts or industrial zoning districts. After extended discussion at one of its meetings, the majority of the LOG did not choose to include options other than special use permitting, in part because some members had reportedly witnessed such measures (especially overlay districts) being utilized to effectively prohibit wind development. The LOG attempted to suggest provisions in this model ordinance that would, on their face, be compliant with the state's Energy Policy to promote renewable energy. Although a locality may be able to utilize approaches like industrial zoning districts and overlay districts in a manner that comports with the Energy Policy, the locality may need to evaluate carefully whether the approach, as implemented, is vulnerable to arguments that wind development is being prohibited, that wind development is being subjected to stricter standards than other types of development, and similar. On the other side of the coin, however, one LOG member commented that localities may want to consider where within their jurisdiction they wish to encourage or discourage utility-scale wind projects. She expressed her disappointment that the model ordinance does not provide suggestions or resources to help localities do so. The LOG may be able to consider this issue further at a later date.

⁷ **Meteorological Towers.** Utility-scale wind energy projects will generally require the use of one or more pre-construction MET towers to assess the wind resource and to properly design the project. (Exception: Some proposed projects in Virginia are now relying on Light Detection and Ranging or LIDAR technology to gather needed wind resource data.) Pre-construction MET towers are intended to be temporary and are usually left on-site for a period of 1-3 years, although 2 years often appears sufficient to gather necessary data. Some localities do not separately address MET towers as part of their wind ordinances, while others do. Localities should consider whether they would like to allow such towers as a by-right use and for how long. A number of LOG members felt that by-right approval for MET towers makes sense due their temporary nature.

⁸ **MET Towers Over 199 Feet:** Some localities may require a special use permit for MET towers over 199' in height; however, many LOG members felt that the choice of a by right or special use permit determination should be an issue of time (i.e., duration of use) only, not height.

2. An extension of time beyond [48]⁹ months requires the issuance of a special use permit.
3. MET tower(s) shall be decommissioned within one month following the end of the study period, unless otherwise approved.

6. APPLICATIONS AND PROCEDURES¹⁰

In addition to the requirements of [local site plan citation] and [local special use permit citation¹¹], applications for a utility-scale wind energy project shall include the following information:

Some noted that local governments may want to request an annual status report regarding MET towers and the project as a whole to assist local governments in evaluating compliance with the time requirements concerning MET towers, potential triggering of the “inoperable” provision suggested regarding decommissioning, and similar. The LOG did not suggest including a requirement for annual reporting as part of the model ordinance, since they did not want to make it more difficult to approve a wind project than other types of projects (which typically have no such reporting requirement).

⁹ **Duration of MET Tower Approval:** Localities may wish to consider the time frames suggested for MET towers as minimums. Although LOG members generally agreed that 48 months was an apt time frame for local governments to consider, they also noted that, given the need for additional project approvals at federal and state levels, this time limit may not be practicable. Local governments may wish to alter the provision to state that permits are valid for a period of 36 months, or even for five years (to be consistent with typical duration of site plan approval validity), unless the tower falls into disrepair or its use is discontinued (at which time decommissioning requirements would set in). A variation on this suggestion was validity for five years with a status report due to the local government after 24 months and annually thereafter to enable the locality more easily to track applicant progress.

¹⁰ **Applications & Procedures.** This section of the model ordinance attempts to spell out specific, enforceable requirements for protection of the public health, safety and welfare. Some general principles were also considered but not included, in large part because the language might be challenging to interpret and enforce. These general principles included the following:

- a. The use will not pose a significant adverse impact to health or public safety.
- b. There will be no serious hazard to pedestrians or vehicles from the use.
- c. Adequate and appropriate facilities will be provided for the proper operation of the project.
- d. Adverse impacts to the natural and built environment should be avoided or minimized to the extent practicable and in a manner that protects adjacent property owners and the public interest.

¹¹ **Special Use Permits: Public Notification.** LOG members and public attendees noted in LOG meeting discussions that special use permits for wind projects would entail the same general requirements as other SUP’s, including public notification in accordance with § 15.2-2204 of the Code of Virginia. In addition, a representative from the US Department of Defense (DoD) suggested that localities may want to consider notifying DoD of a proposed utility-scale wind energy project even if there are no military establishments within the locality. He stated that a large wind system could affect military operations and readiness some distance away, and the DoD has requested that Virginia localities provide a courtesy notification to allow time for DoD to evaluate the defense implications. In the spirit of cooperation with federal agencies, the following information provided by the DoD representative is included: To notify the Energy Siting Clearinghouse, send correspondence to: Executive Director, USDoD Siting Clearinghouse, Office of the Deputy Under Secretary of Defense (Installations and Environment), Room 5C646, 3400 Defense Pentagon, Washington, DC 20301-3400. To notify the USDoD REC, send correspondence to: Commander Navy Region Mid-Atlantic (N45), 1510 Gilbert Street, Norfolk, VA 23511-2737.

A. PROJECT DESCRIPTION

A narrative identifying the applicant and describing the proposed wind project, including an overview of the project and its location; approximate rated capacity of the wind energy project; the approximate number, representative types and height or range of heights of wind turbines to be constructed; and a description of ancillary facilities, if applicable.

B. SITE PLAN

The site plan shall conform to the preparation and submittal requirements of **[local site plan citation]**, including supplemental plans and submissions, and shall include the following information:

1. Property lines and setback lines
2. Existing and proposed buildings and structures, including preliminary location(s)¹² and elevation(s) of the proposed wind turbine(s).
3. Existing and proposed access roads, drives, turnout locations, and parking.
4. Location of substations, electrical cabling from the wind turbine(s) to the substations, ancillary equipment, buildings, and structures (including those within any applicable setbacks).
5. Additional information may be required, as determined by the **[local official]**, such as a scaled elevation view and other supporting drawings, photographs of the proposed site, photo or other realistic simulations or modeling of the proposed wind project from potentially sensitive locations as deemed necessary by the **[local official]** to assess the visual impact of the project,¹³ landscaping and screening plan, coverage map, and additional information that may be necessary for a technical review of the proposal.

C. DOCUMENTATION OF RIGHT TO USE PROPERTY FOR THE PROPOSED PROJECT

¹² **Location of Wind Turbines.** Local governments should be aware that the final location of turbines in a utility-scale wind energy project may be different than that originally proposed. Shifts in turbine placement may be needed to accommodate a variety of geographic, environmental, regulatory, cost, and technical considerations. Flexibility in the siting of turbines and associated structures is very important to developers, since they must comply with requirements at many levels of authority (local, state and federal). Even though the project's original site plan may change over time, it is recommended that special use permits remain in force so long as the developer continues to meet local ordinance setback and other requirements. As long as the ordinance provisions are met, the revised locations should not restart the approval process. Some local governments ask developers to provide an annual status report so that they can remain apprised of changes in the site plan.

¹³ Google Earth model simulations were mentioned as an alternative to photo simulations.

Documentation shall include proof of control over the land or possession of the right to use the land in the manner requested. The applicant may redact sensitive financial or confidential information.¹⁴

D. DECOMMISSIONING PLAN

The application shall include a decommissioning plan and other documents required by Section 9 of this ordinance.

E. LIABILITY INSURANCE¹⁵

The applicant shall provide proof of adequate liability insurance for utility-scale wind energy project prior to issuance of a zoning or building permit **[or prior to beginning construction]**.

7. LOCATION, APPEARANCE, AND OPERATION OF A PROJECT SITE¹⁶

A. VISUAL APPEARANCE

Wind energy towers shall maintain a galvanized steel finish, unless Federal Aviation Administration (FAA) standards require otherwise, or if the owner is attempting to conform the tower to the surrounding en-

¹⁴ **Documentation.** One option that localities may want to consider is a recorded Memorandum of Agreement (with the financial information redacted) as an acceptable form of documentation.

¹⁵ **Liability Insurance.** Localities will need to decide what “adequate liability insurance” means in the context of local land use requirements. Typically, insurance requirements will be subject to the amount of investment, including installation costs, in the facility. Rather than providing a specific dollar amount, localities might want to develop a sliding scale based upon investment amount or some other indicator used by the locality in other contexts.

¹⁶ **General Siting Requirements.** There are a variety of zoning considerations related to nuisance, appearance, and public safety. Suggested language for various factors typically considered in a wind ordinance is presented in Subsection 7, with the exception of language concerning minimum lot size. There is no minimum recommended lot size because this model ordinance is applicable only to those facilities over 5MW of installed capacity. The ordinance provisions for setbacks that ensure a safe operating environment also define the minimum lot size. For example, using a setback requirement of 110% of the turbine height and the minimum installed capacity of 5MW, the following minimum lot size(s) would be required, based upon 1.5MW and 2.5MW wind turbines:

| Turbine Height | Setback (110%) | 6 MW Facility | | 5 MW facility | |
|----------------|----------------|----------------------|------------------|----------------------|------------------|
| | | # of 1.5 MW Turbines | Minimum Lot Size | # of 2.5 MW turbines | Minimum Lot Size |
| 300 ft | 330 ft | 4 | 31.4 acres | 2 | 15.7 acres |
| 400 ft | 440 ft | 4 | 55.8 acres | 2 | 27.9 acres |
| 500 ft | 550 ft | 4 | 87.3 acres | 2 | 43.6 acres |

vironment and architecture, in which case it may be painted to reduce visual obtrusiveness. The color of the wind energy project shall be a non-reflective, unobtrusive color that blends with the surrounding environment and prevents glint. A photo or other simulation may be required.

B. VISUAL IMPACTS¹⁷

The applicant shall demonstrate through project siting and proposed mitigation, if necessary, that the wind project minimizes impacts on the visual character of a scenic landscape, vista, or scenic corridor as identified in the comprehensive plan¹⁸.

C. LIGHTING

Wind turbines shall not be artificially lighted unless required by the Federal Aviation Administration (FAA) or other applicable authority. If lighting is required, the applicant shall provide a copy of the FAA determination to establish the required markings and/or lights for the wind turbines. Lighting of other parts of the wind energy project, such as appurtenant structures, shall be limited to that required for safety and operational purposes, and be full cut-off luminaries.

D. SIGNAGE

Appropriate warning signage shall be placed on wind turbines, electrical equipment, and wind energy project entrances. Wind turbines shall not be used for displaying any advertising except for reasonable identification of the manufacturer or operator of the wind energy project. All signs, flags, streamers or similar items, both temporary and permanent, are prohibited on turbines except as follows: (a) manufacturer's or installer's identification on the wind turbine; (b) appropriate warning signs and placards; (c) signs that may be required by a federal agency; and (d) signs that provide a 24-hour emergency contact phone number and warn of any danger. Educational signs providing information about the project and benefits of renewable energy may be allowed as provided in the sign ordinance.

E. NOISE¹⁹

¹⁷**Visual Impacts.** Utility-scale wind energy projects have a visual presence in the landscape. Some communities may be concerned about the visual impact of these facilities; the language provided is designed to enable localities to explicitly address visual impacts without restricting access to wind resources. Localities can employ many techniques to assess visual impacts, such as charrettes, geographic information systems (GIS) mapping like Google Earth, and other tools with three dimensional rendering and line-of-sight options and photo-simulations.

¹⁸**Scenic Resources.** This provision assumes designation of scenic resources in a local comprehensive plan. If no such designation has occurred, then this provision is not applicable and not recommended. Some LOG members, however, disagreed with the idea that scenic resources would need to be identified in a local comprehensive plan in order for a locality to insist that visual impacts be mitigated. The underlying goal was that the scenic resources being protected by this provision should rise to some level of importance; that is, the provision is not intended to accommodate anyone's and everyone's expressed desire not to be able to see the turbines. If the comprehensive plan is not a useful tool for identifying which scenic resources should be protected, then a locality is encouraged to utilize another approach that it deems more appropriate.

Audible sound from a utility-scale wind energy project shall not exceed [60 dBA] (A-weighted decibels), as measured at any adjacent non-participating landowner's property line, or the locality's existing noise standard, whichever is greater. The level, however, may be exceeded during short-term exceptional circumstances, such as severe weather. [The applicant is responsible for providing information from a qualified professional assessing background noise levels and ascertaining on a long-term periodic basis that noise levels are in compliance with this standard.]

F. SHADOW FLICKER²⁰

1. The applicant shall certify, by a professional engineer, that any wind turbine that is sited within one half mile of any occupied building on a non-participating landowner's property either avoids shadow flicker on any occupied building or that reasonable efforts to minimize shadow flicker to any occupied building on a non-participating landowner's property shall be made. Any occupied building situated to the south of the line of latitude that crosses the southern-most wind turbine associated with a wind facility is excluded from any flicker study requirement.

¹⁹ **Noise.** Virginia law requires that wind ordinances contain a noise provision (see §67-103 of the Code of Virginia), and the RAP was advised 60dBA is a standard employed in a number of Virginia ordinances, and some localities have night-time noise standards that exceed 60 dBA. Since the Virginia Code also requires local governments to encourage renewable energy when enacting wind ordinances, it is recommended that any established noise limit(s) for wind energy projects not be more restrictive than what is already in place for other land uses. Noise, however, is a complex technical issue on which research is ongoing. Local government leaders may want to consult reliable noise research studies – some of which are referenced on DEQ's website – where relevant issues are analyzed and published in peer-reviewed media. These issues typically include whether to measure noise at the property line or at non-participating residences, the necessity of subtracting out (controlling for) background noise when setting/measuring the standard, whether a qualified professional should be required to conduct the measurements, at what intervals the measurements should be taken, and the appropriate dBA over background noise. The subject of (inaudible) low frequency noise is also addressed in some studies. Based on their understanding of current research on the issue, most members of the LOG did not recommend inclusion of a provision regarding low frequency noise. One public commenter noted that noise standards are difficult to codify effectively, and that setback distance may be the most effective mitigation tool.

²⁰ **Shadow Flicker.** A number of LOG members noted that a shadow flicker provision is not necessary for utility-scale projects because setback provisions will prevent habitation within a distance where shadow flicker can occur. If, however, a locality wishes to address shadow flicker in its utility-scale ordinance, then it may want to consider the language suggested herein. The second sentence in the suggested provision was added because an engineering professor on the LOG explained that the arc of the sun across the southern sky precludes the possibility of blades casting shadows to the south under any circumstances. Regarding shadow flicker studies, this LOG member stated that modeling that is available is reliable and fairly easy to conduct. Most experienced developers, in his opinion, should have the capability of determining what, if any, flicker will occur between any particular turbine and a particular dwelling. He also noted that the orientation of a building is important, since even if a turbine casts a shadow, it may or may not cause a nuisance inside the structure, depending upon building orientation, placement of fenestration, and use.

LOG members indicated that shadow flicker is a more relevant issue for smaller projects/turbines which may be located within or near residential areas. Accordingly, they recommended that the shadow flicker issue be addressed more fully in the model community-scale wind ordinance.

2. The applicant does not have to meet these requirements if adjoining property owners sign a waiver of their rights regarding shadow flicker impacts, as follows:

a. The written waiver shall notify the property owner(s) of shadow flicker limits in this ordinance, describe the impact on the property owner(s), and state that the consent is granted for the wind energy project to not comply with the flicker limit in this ordinance.

b. Any such waiver shall be recorded in the office of the clerk of courts of the locality where the property is located. In addition to the above, the waiver shall describe the properties benefited and burdened, and advise subsequent purchasers of the burdened property that the waiver of shadow flicker limits runs with the land and may forever burden the subject property.

G. HEIGHT²¹

There is no height restriction for turbines in utility-scale wind energy projects pursuant to this ordinance.

H. SETBACKS²²

1. Occupied Buildings:

²¹ Discussion of turbine height at LOG meetings indicated that turbine technology is changing rapidly, and includes the prospect that taller turbines may produce more electricity than a larger number of shorter turbines. If a locality agrees with the conclusion reached at the 11/3/11 LOG meeting that there should be no height restriction on utility-scale projects, then the ordinance may so state, or remain silent on the subject of height. If the locality prefers to include a height limit, the LOG members present on 11/3/11 agreed that 500 feet, with the option for considering an increase in the limit as part of the SUP process, could be appropriate. LOG commenters wanted to ensure that the ordinance language was not restrictive in ways that would prevent a developer from “keeping up” with technology and industry advances but would also empower the community to address issues that affect impacts. Suggested alternative language is as follows:

The individual turbines shall not exceed [500 feet] in height, as measured from the ground to the highest vertical portion of the blade when fully extended, provided that the [local governing body] may allow for greater height through the special use permit review process. The applicant shall provide evidence that the proposed height of wind turbines results in additional benefits in terms of energy production and efficiency, does not exceed industry standards and the height recommended by the manufacturer or distributor, and that the wind turbine height is in compliance with the requirements of this ordinance.

It is recommended that established height limit(s) for wind energy projects not be any more restrictive than what is already in place for other land uses.

²² **Setbacks.** Virginia law requires that wind ordinances contain a setbacks provision (see §67-103 of the Code of Virginia). The LOG subcommittee that addressed the setbacks issue identified the numbers included in this section (110% and 150%) ***as minimum numbers***. Local governments may choose to increase these numbers if and as they see fit. Another suggestion was that setback requirements may also vary by zoning district, rather than establishing a single setback distance. The ratios of 1.1 and 1.5 turbine height are commonly used, although zoning ordinances around the country also use 3 times the turbine height as well as fixed distances. For a review of common practice regarding setbacks, see Commonwealth of Rhode Island, Department of Environmental Management, “Terrestrial Wind Turbine Siting Report,” January 2009, accessed at <http://www.dem.ri.gov/cleanrg/pdf/terrwind.pdf>.

a. MET towers and wind turbines shall be set back from the nearest occupied building a distance not less than **[110%]** of the MET tower or wind turbine height, respectively.

b. MET towers and wind turbines shall be set back from the nearest occupied building on a non-participating landowner's property a distance of not less than **[150%]** of the MET tower or wind turbine height, respectively.

2. Property Lines:

MET towers shall be set back from the nearest property line a distance not less than **[110%]** of the MET tower height. Wind turbines shall be set back from the nearest property line a distance not less than **[110%]** of the wind turbine height. Additionally, no portion of the MET tower or wind turbine, including guy wire anchors, may extend closer than **[ten (10) feet]** from the property line.

3. Waivers of Setback Requirements:²³

Any participating or adjoining landowner may waive applicable setback requirements of paragraph 1.b. (Occupied Buildings on non-participating landowner's property) and paragraph 2. (Property Lines) by **[following the designated procedures and signing and filing the appropriate documentation with the locality in which the wind energy project is located]**; however, the setback requirements of paragraph 1.a. may not be waived.

I. USE OF PUBLIC ROADS

1. The applicant shall identify all state and local public roads to be used within the **[locality]** to transport equipment and parts for construction, operation or maintenance of the wind energy project.

2. The **[locality's]** engineer or a qualified third party engineer hired by the **[locality]** and paid for by the applicant, shall document road conditions prior to construction. The engineer shall document road conditions again thirty (30) days after construction is complete or as soon thereafter as weather permits.

3. The **[locality]** may bond the road in compliance with state regulations.

4. Any road damage caused by the applicant or its contractors shall be repaired at the applicant's expense.²⁴

5. The applicant shall demonstrate that it has appropriate financial assurance to ensure the prompt repair of damaged roads.

²³ **Waiver of Setbacks.** Several LOG members asserted that waiver of setback provisions should be addressed with great caution when the standards are designed to address safety concerns. In response to these concerns, the model ordinance does not allow waiver of the 110% setback requirement for occupied buildings. This approach is also found in Pennsylvania's model wind ordinance.

²⁴ **Road Use.** It was pointed out that there is generally a road use agreement between the developer and the Virginia Department of Transportation (VDOT) for these projects. It is recommended that ordinance language not contradict applicable terms in such agreements.

6. The applicant shall submit written documentation that the applicant or his assignee has accepted full financial responsibility for repairs to damage to private roads used during the construction or operation of the proposed project. Private roads used to access the proposed project, including roads that serve non-participating landowners, shall be restored and maintained to pre-construction conditions during operation of the project, unless otherwise agreed by the parties.

8. SAFETY AND CONSTRUCTION²⁵

A. DESIGN

The applicant shall submit documentation that the design of any buildings and structures associated with or part of the wind energy project complies with applicable sections of the Virginia Uniform Statewide Building Code (USBC) (13VAC5-63).²⁶ This requirement includes all electrical components of the wind energy project.

B. CLIMB PREVENTION/LOCKS

1. The exterior of wind turbines shall not be climbable up to 15 feet above ground surface.
2. All access doors to wind turbines and electrical equipment shall be locked or fenced, as appropriate, to prevent entry by unauthorized persons.
3. The **[locality]** may waive these requirements, if and as it deems appropriate.

C. WARNINGS

1. A clearly visible warning sign concerning voltage must be placed at the base of all pad-mounted transformers and substations.
2. Visible, reflective, colored objects, such as flags, reflectors, or tape shall be placed on the anchor points of guy wires and along the guy wires up to a height of ten feet from the ground.

D. GROUND CLEARANCE

The minimum distance between the ground and any protruding blades utilized on a utility-scale wind energy project shall be 15 feet on a horizontal axis system and ten feet on a vertical axis system, as

²⁵ **Design and operational safety:** There are a variety of ordinance provisions that relate to the technical aspects or installation requirements for a utility-scale wind energy project. Draft language for the range of ordinance topics related to these matters is presented in Subsection 7.

²⁶ **Design:** According to the Virginia Department of Housing & Community Development (VDHCD), the design and construction of any buildings or structures associated with or part of utility-scale wind energy projects are required by state law to comply with the Virginia Uniform Statewide Building Code (the "USBC") (13 VAC 5-63), which is enforced by the local building department of every city, county and town. This section of the model ordinance reflects edits suggested by VDHCD.

measured at the lowest point of the arc of the blades. The lowest point of the arc of the blade shall also be ten feet above the height of any structure within 150 feet of the base of the tower.

E. SPEED CONTROLS AND BRAKES

All wind turbines shall be equipped with a redundant braking system. This system includes aerodynamic over-speed controls (including variable pitch, tip, and other similar systems) and mechanical brakes. Mechanical brakes shall be operated in a fail-safe mode. Stall regulation shall not be considered a sufficient braking system for over-speed protection.

F. EMERGENCY RESPONSE PLAN²⁷

1. Upon request, the applicant shall cooperate with emergency services to develop and coordinate implementation of an emergency response plan for the wind energy project.
2. Any wind energy project found to be unsafe by the local enforcement officer shall be repaired by the project's owner or operator to meet applicable federal, state, and local safety standards or removed within six months.

G. SIGNAL INTERFERENCE²⁸

The applicant shall make reasonable efforts to avoid disruption or loss of radio, telephone, television, or similar signals, and shall mitigate for significant interference caused by the project. The project shall comply with the provisions of Title 47 of the Code of Federal Regulations, Section 15 and subsequent revisions governing said emissions. The owner or operator of a wind energy project may be required to discontinue use until the specified interference has been corrected.

H. CONSTRUCTION AND INSTALLATION

In the construction and installation of a utility-scale wind energy project, the owner or operator shall, to the greatest extent practicable, adhere to the following requirements:

1. Use existing roads to provide access to the site, or if new roads are needed, minimize the amount of land used for new roads and locate them so as to minimize adverse environmental impacts.

²⁷ **Emergency Response Plan.** One LOG member commented that there must be an emergency response plan for utility-scale wind projects, and the owner/operator of the project needs to be involved in its development because he and his staff are the ones most intimately familiar with the facility.

²⁸ **Signal Interference.** LOG subcommittees and the plenary LOG examined several options from existing and model ordinances relating to signal interference. Participants at the 11/3/11 LOG meeting preferred this wording, since it helps create an enforceable standard.

2. Install all electrical wires associated with a utility-scale wind energy project underground, other than wires necessary to connect an individual wind turbine to its base and to overhead collection lines.

9. DECOMMISSIONING²⁹

A. DECOMMISSIONING PLAN

As part of the project application, the applicant shall submit a decommissioning plan, which shall include the following: (1) the anticipated life of the project; (2) the estimated decommissioning cost in current dollars; (3) how said estimate was determined; (4) the method of ensuring that funds will be available for decommissioning and restoration; (5) the method that the decommissioning cost will be kept current; and (6) the manner in which the project will be decommissioned and the site restored.

B. DISCONTINUATION OR ABANDONMENT OF PROJECT

1. At such time that a wind energy project is scheduled to be abandoned or discontinued, the owner or operator shall notify the **[locality's chief administrative officer or his/her designee]** by certified U.S. mail of the proposed date of abandonment or discontinuation of operations. Any wind project that has been inoperable or unutilized for a period of 12 consecutive months shall be deemed abandoned and subject to the requirements of this section.³⁰
2. Within 365 days of the date of abandonment or discontinuation, the owner or operator shall complete the physical removal of the wind energy project and site restoration. This period may be extended at the request of the owner or operator, upon approval of the **[local governing body]**.
3. Decommissioning of discontinued or abandoned wind projects shall include the following:
 - a. Physical removal of all wind turbine(s) and above-ground appurtenant structures from the subject property including, but not limited to, buildings, machinery, equipment, cabling and connections to transmission lines, equipment shelters, security barriers, electrical components, roads (unless such roads need to remain to access buildings retrofitted for another purpose, or the landowner submits a request to the **[locality]** that such roads remain).

²⁹ **Decommissioning:** Under Virginia law, a wind ordinance must contain a decommissioning provision (see §67-103 of the Code of Virginia). It is suggested that the ordinance include language that (1) requires removal of wind turbines and site restoration to pre-project levels when project ceases to operate, unless otherwise agreed; (2) requires the applicant to submit a decommissioning study as part of the project application so that total costs for decommissioning and site restoration can be determined; and (3) requires the applicant to satisfy surety obligations before any local permit is issued.

³⁰ **Discontinuation or Abandonment:** Local governments may want to request annual status reports, either pre- or post- construction, or both. Such reports may assist in evaluating whether a project has been abandoned.

- b. Below-grade structures, such as foundations and underground collection cabling, shall be removed to a depth of **[three]**³¹ feet below ground level or covered to an equivalent depth with fill material; however, these structures may be allowed to remain if a written request is submitted by the landowner to the **[locality]**. Compacted soils shall be decompacted to a depth of three feet.
- c. Restoration of the topography of the project site to its pre-existing condition, except that any landscaping or grading may remain in the after-condition if a written request is submitted by the landowner to the **[locality]**.
- d. Proper disposal of all solid or hazardous materials and wastes from the site in accordance with local and state solid waste disposal regulations.

C. SURETY³²

³¹ **Depth of decompaction.** The LOG also considered a depth of four feet, but three feet was recommended by attendees at the 11/3/11 LOG meeting.

³² **Surety.** Local governments around the country typically seek assurances that all obligations of the utility-scale wind energy project development pursuant to a local government approval will be performed, even in the event of bankruptcy of the project developer. Utility-scale wind energy projects may be owned and operated through a single-asset limited liability corporation, with the only available assets being the wind turbines themselves (the value of which, at the end of their useful lives, may be scrap metal reclamation value). Abandonment of obsolete or inoperative wind turbines, while not likely, would result in neglected maintenance and upkeep and would be a liability for both the community and the property owner. As a condition of issuing any local government approval (e.g., Special Use Permit or building permit), local governments should require a guaranteed funding source for the removal of abandoned or inoperative wind turbines.

SECURED FUNDING SOURCES

Local governments should seek reliable methods of secured funding sources to ensure that performance obligations under the local government approvals are satisfied, up to and including the costs for decommissioning and site restoration for utility-scale wind energy projects. The following methods of secured funding could be considered:

1. *Cash Escrow Account:* An escrow account is established by an escrow agreement between the obligor and obligee, and is held by a third party for distribution to satisfy any obligations as set forth in the escrow agreement. The amount of funds in the escrow account would be determined by the present-day costs to satisfy any and all contractual obligations. If an escrow account were established to guarantee the removal of a wind energy project in the event of abandonment by a bankrupt owner, the total costs of removal and restoration of the project site would be determined and deposited in the account.
2. *Surety Bond:* A surety bond is a legal instrument that guarantees that any legal and/or contractual obligations are paid to the party to be benefited under the terms of a legal instrument. The amount of the surety bond would be determined by the present-day costs to satisfy any and all contractual obligations and would be effective for the life of the project. The surety bond guarantees performance of contractual obligations by a third party in the event of a bankrupt owner.
3. *Letter of Credit:* A letter of credit may be defined as a written instrument by which the writer requests or authorizes the person to whom it is addressed to pay money or deliver goods to a third person. Letters of credit evidence an agreement whereby the writer assumes responsibility for payment to the addressee of the amount of the debt.

Note: Localities wanting to utilize a Letter of Credit may want to consider the following language: Furnish to the [Director of Community Development] a letter of credit issued by a bank or savings and loan institution having an office located in the state and being regulated by the state or the United States government satisfactory to the [Director] as to form and in an amount sufficient for the removal of such facility.

A performance surety, in a form approved by the **[appropriate local government official]** or his designee, shall be submitted by the applicant prior to beginning construction in order to ensure the removal and decommissioning of the utility-scale wind energy project when it is no longer used for the generation of electricity. Such surety shall be an amount that is no less than the total estimated costs for decommissioning, removing and restoring the site for the wind project. Such surety shall be binding on subsequent owners of the property or wind energy project. If the applicant/responsible party fails to decommission the wind project or to decommission a discontinued or derelict wind turbine in accordance with this section, the **[locality]** may access such surety for the completion of decommissioning and site restoration. Any excess funds that accrue after consideration of salvage value may be returned to the applicant/responsible party.

Each locality probably has its own rules and procedures for letters of credit. If your locality uses these and specifies time limits, it may be prudent to review the sufficiency of the letter of credit at least once every five years; however, no stricter or more burdensome requirements are suggested for wind projects than the locality utilizes for other projects or businesses.

Several commenters noted that, for any kind of long-term project, it is a difficult process to obtain estimates and the surety, and then to keep the surety effectively in place over time, as well as keep up with inflation. One LOG member (based on his experience with attempting to do establish sureties for telecommunications towers) suggested requiring cash escrows at 125% of the cost that are placed in a T-bill or CD or similar safe interest-bearing instrument.