

COMMISSION ACTION FORM

SUBJECT: ZONING ORDINANCE TEXT AMENDMENTS TO ALLOW SMALL WIND ENERGY SYSTEMS IN PLANNED REGIONAL COMMERCIAL (PRC), HIGHWAY-ORIENTED COMMERCIAL (HOC), GENERAL INDUSTRIAL (GI), AND PLANNED INDUSTRIAL (PI) ZONING DISTRICTS AS AN ACCESSORY USE

BACKGROUND:

Interest in small scale on-site power production has increased over the past few years. In 2008 and 2009, the city received inquiries from a few property owners who desired to install small wind turbines to supplement their electric power consumption. During that same time period, inquiries were also made about the possibility of installing solar photovoltaic panels and solar water heating systems. In August 2009, City Council reviewed possible solar and wind policies and decided to review solar and wind zoning text changes separately. As a result, the City Council passed regulations for on-site solar energy systems in November 2009. Policy option concepts for wind were brought forward to Council in February 2010. The Council directed staff to prepare text amendments to allow wind energy systems in the following four zoning districts:

1. Planned Regional Commercial
2. Highway-Oriented Commercial
3. General Industrial
4. Planned Industrial

The proposed amendments to Chapter 29, Articles 13 and 5, are attached. The proposal reflects many outcomes of the Planning & Zoning Commission's initial direction to engage the public through informal workshops and various methods of input. Although there was significant interest expressed verbally at those meetings, there are currently no pending requests for wind turbines in residential districts. Because of the lack of active interest, as well as some compatibility concerns, the Council directed staff to not incorporate residential zones. Currently, there is active interest on a few properties within commercial and industrial zones.

The proposed ordinance has similar concepts from the recent Solar Energy Systems ordinance. The proposed ordinance also follows the order of the Des Moines Metro Area Council of Governments Model Ordinance for Small Wind Energy Conversion Systems. The model is attached for comparison purposes. There are several differences between the two ordinances. The model is more generalized because it is a guide for Des Moines and the many surrounding suburban communities, very few of which have passed ordinances as of this date. Because there are no federal or state laws establishing certain rights for wind energy system owners, cities are allowed through zoning powers to establish their own customized standards based upon existing polices in place, such as the Ames Land Use Policy Plan. West Des Moines has passed

a wind energy ordinance. Proposed regulations are under review in Ankeny. Story County Zoning has passed wind energy regulations; however, they do not apply to areas within the city limits of Ames.

The staff has reviewed information from across the United States: manufacturer specifications, municipal ordinances, trade journals, conference sessions and actual site visits. However, the following documents have had direct influence on this draft ordinance:

1. Des Moines Metro Area Council of Governments Model Wind Energy Conversion Systems Ordinance (attached)
2. City of Carson City, Nevada
3. City of Flagstaff, Arizona (home of skystream wind turbine company)
4. Cascade/Swift rooftop wind turbine model ordinance (a manufacturer)
5. American Wind Energy Association model ordinance

AMENDMENT HIGHLIGHTS

Many of the concepts within the proposed ordinance have been discussed at a Planning and Zoning Commission meeting. Therefore, this report will only summarize new or significantly revised topics.

Allowed Use:

The initial amendment for the Commission to consider is to create a code provision for wind energy as an allowable use. This is accomplished by adding “wind energy conversion” to the miscellaneous uses in Table 29.501(4)-7, and establishing that it is an accessory use and is to be implemented with the new Section 29.1310. A similar text amendment was made to this section for ‘solar energy conversion.’

Tower style:

Monopole style towers are required except for General Industrial Zones. The monopole design has typically been found more desirable for urban areas because of its more slender, less noticeable profile on the skyline. This is also a requirement of the zoning code for cell towers. Lattice (webbed) style towers are more indicative of an industrial area and would give more flexibility to industrial owners. Monopole towers exponentially increase in cost with added height, unlike lattice towers. Guyed towers are not allowed under the proposal.

Noise/Vibration:

Whether perceived or real, noise and vibration impacts are by far the most discussed issue for wind energy systems. The Commission and the Council discussed this issue many times. In discussing noise issues with the Council in August, imposing minimum lot sizes was discussed as a means of addressing the complexities of sound attenuation. The proposed standards however are less complex because the proposed zones are not residential zones. The proposed standard requires a manufacturer design of less than 55 decibels and that no noise or vibration above the ambient sound level is detected from a property

within a zone where a system is not allowed. The proposal goes further to regulate low frequency sound (inaudible). Medical research shows that low frequency sound can trigger adverse responses such as migraine headaches, in sensitive individuals. This is, however, more likely a concern of utility scale wind farms in rural areas but not small scale turbines typical of urban environments. Additionally, there is a greater setback requirement from residential zones.

Shadow Flicker:

The proposed standards would also prohibit shadow flicker on or in any residential structure. This would only be applicable where a proposed system is on a lot that is adjacent to a residential zone.

Engineer Certification:

Some early discussion was to include a mandatory requirement for an Iowa Professional Engineer to certify the structural stability of the system. This was changed to be consistent with the existing practice of the Building Official to make a determination on a case-by-case basis.

Feasibility Study:

Although a wind resource feasibility study is not required, there is language in the proposed ordinance which highly recommends it. This additional step can educate a potential buyer before a purchase is made.

Industry Standard:

The Commission discussed the likelihood of home-built or custom-engineered solar and wind energy systems in Ames, because of the presence of the University. Early proposals recommended a requirement for the applicant to show that the system had been approved by an industry standard such as Underwriter's Laboratories or American Wind Energy Association. Manufacturers of wind turbines of course recommend this method. The current proposal is to make evidence of certification optional and rely on the Building Official to determine what information is necessary in order to issue a construction permit.

Setbacks:

There is little evidence that freestanding systems collapse any more often than buildings. Typically, wind turbine towers meet a much higher wind resistance engineering standard than buildings do. Much discussion was held about a process where two neighboring property owners could agree on a reduced setback through a Special Use Permit. However, with the larger lots more typical of commercial and industrial zones, this option was removed. The current proposal is to require a setback distance of 110% of the total height.

Minimum Lot Size:

In August 2009, the City Council discussed the benefits of using minimum lot size as a way to account for many of the complex issues surrounding wind energy systems. However, the discussion was centered on residential areas. Because wind energy is not proposed for residential zones, the minimum lot size has been removed.

Front Yard:

The front yard prohibition was removed because wind energy is not proposed for residential zones. The front yard is the area between the building and the street, regardless of the minimum setback line. Extensive parking and landscaping areas are typical of commercial and industrial areas. Therefore, a prohibition in the front yard would pose a challenge for the majority of lots in these areas.

Number of Systems per Lot:

The quickly evolving small wind industry has led staff to propose more flexibility in the number of systems per lot. Some early discussions indicated a desire to control the density of wind turbines to prevent a dominance of wind towers in the skyline. Some discussions at Council in August were also about the aesthetic importance of the entrance corridors to Ames. The proposal leans heavily on the Des Moines Metro model ordinance with a sliding scale depending on lot size. The proposal mirrors the Des Moines model by limiting the number of towers taller than the tallest building on the lot. The base limit for horizontal axis turbines can be exceeded under collocation provisions included in the proposed standards. For example, a wind turbine mounted on a parking lot light would not be included in the maximum number allowed per lot.

LAND USE POLICY PLAN

Goal 3 of “Goals for a New Vision,” regarding “Environmental-Friendliness” is supportive of this text amendment, because it opens small wind energy as a possibility for property owners to use for conserving traditional energy sources by generating supplemental power on-site.

Goal 4 of “Goals for a New Vision,” focuses on a “greater sense of place and connectivity” and “assuring a more healthy, safe and attractive environment.” The proposed ordinance is consistent with this goal because it seeks to allow small wind energy equipment in a way that is sensitive to the character of the surrounding built environment.

COUNCIL GOALS AND COMMISSION PRIORITIES

One of the Council’s goals is to “Go Green and Promote Environmental Sustainability.” One way to quantify sustainability for the city is to reduce demand for electricity. An additional element of the Council’s goal is sustainability awareness. The proposed text amendment is a flexible set of standards for wind energy systems, which allow many possible options for owners. In addition, the proposal would facilitate the handful of active inquiries that staff is aware of.

In 2009, the Planning & Zoning Commission discussed ways of giving more detail to the “Goals for a New Vision” in the LUPP. One of the details the Commission considered recommending to the Council was to expand on Goal 3 by adding the following text:

"Ames seeks to enhance renewable energy production by encouraging installation of renewable electrical energy systems, such as but not limited to wind, solar, and micro-hydro, at industrial, commercial and residential properties while maintaining control over placement and aesthetics of such systems."

ALTERNATIVES

1. The Planning and Zoning Commission can recommend that the City Council adopt the attached text amendments allowing wind energy systems in the PRC, HOC, GI, and PI zoning districts, which would amend Chapter 29, Articles 5 and 13.
2. The Planning and Zoning Commission can modify the proposed text amendment.
3. The Planning and Zoning Commission can recommend that the City Council not adopt the proposed text amendments.
4. The Planning and Zoning Commission can seek additional public input or information from staff before forming a recommendation.

DEPARTMENT RECOMMENDATION

The Commission recommended a conservative approach to the City Council in February that would begin to open opportunities for wind energy within the city of Ames. The Council therefore directed staff to develop standards for zoning districts actively requesting wind energy systems. Staff believes that the attached draft ordinance is consistent with direction from the City Council and should be forwarded to the Council for consideration. Therefore, it is the recommendation of the Planning & Housing Department that the Planning and Zoning Commission act in accordance with Alternative #1, which is to recommend that the City Council adopt the attached text amendments allowing wind energy systems in the PRC, HOC, GI, and PI zoning districts, which would amend Chapter 29, Articles 5 and 13.

**SMALL WIND ENERGY SYSTEMS DRAFT ORDINANCE
CITY OF AMES, IOWA**

**PLANNING & ZONING COMMISSION
May 5, 2010**

Zoning Text Amendments Proposed:

Use amendment added as an accessory use to revise Section 29.501(4)-7:

Wind Energy Conversion

Definition. The use of Wind Energy Systems for the conversion of the power of wind into electrical energy primarily for on-site as an accessory use to the principal use pursuant to Section 29.1310.

A new Section 29.1310, Wind Energy Systems:

SECTION I - INTENT

Purpose. Wind energy is a clean, readily available and renewable energy source. This section establishes regulations to facilitate the installation and construction of Wind Energy Systems so that systems are safe, effective, and efficient and have minimal impact on surrounding development. The provisions of this Section apply to the placement, construction and use of “wind energy systems” as defined in this section.

SECTION II - DEFINITIONS

AMBIENT SOUND LEVEL: The amount of background noise at a given location prior to the installation of Small Wind Energy System, which may include, but is not limited to, traffic, machinery, lawnmowers, general human activity, and the interaction of the wind with the landscape. Ambient Sound Level is measured on the Decibel – dB(A) – weighted scale as defined by the American National Standards Institute (ANSI).

HEIGHT, TOTAL SYSTEM: The height above grade of the system, including the generating unit and the highest vertical extension of any blades or rotors.

OFF-GRID: An electrical system that is not connected to utility distribution and transmission facilities or to any building or structure that is connected.

SHADOW FLICKER: Changing light intensity caused by sunlight through the moving blades of a wind energy conversion system.

SMALL WIND ENERGY SYSTEM (SWES): A Wind Energy System which has a rated capacity of up to one hundred (100) kW and which is incidental and subordinate to a permitted use on the same parcel or lot. A system is considered a small wind energy system only if it supplies electrical power solely for on-site use, except that when a parcel on which the system is installed also receives electrical power supplied by a utility company, excess electrical power generated and not presently needed for on-site use may be used by the utility company in accordance with section 199, chapter 15.11(5) of the *Iowa Administrative Code*.

SMALL WIND ENERGY SYSTEM, FREESTANDING: A Small Wind Energy System which is elevated by means of a tower and is not located on another supporting structure.

SMALL WIND ENERGY CONVERSION SYSTEM, HORIZONTAL AXIS: A Small Wind Energy System that has blades which rotate through a horizontal plane.

SMALL WIND ENERGY SYSTEM, BUILDING-MOUNTED: A Small Wind Energy System which requires support by a building, and does not connect directly to the ground. A building mounted system is not a minor projection, as defined in Section 29.402.

SMALL WIND ENERGY CONVERSION SYSTEM, VERTICAL AXIS: A Small Wind Energy System that has blades which rotate through a vertical plane.

SMALL WIND ENERGY SYSTEM, COLLOCATED: A Small Wind Energy System that is mounted on a tower or pole structure which serves another primary purpose, such as a parking lot light or flagpole.

SWEPT AREA: Any and all portions of overhanging blades, turbines, or attachments that oscillate, rotate or otherwise move, which are not part of the fixed structural elements of the Small Wind Energy System.

TOWER: The vertical component of a wind energy conversion system that elevates the wind turbine generator and attached blades above the ground.

WIND ENERGY SYSTEM (WES): An aggregation of parts including the foundation, base, tower, generator, rotor, blades and supports in such configuration as necessary to convert the power of wind into electrical energy primarily for on-site use (e.g., wind charger, windmill or wind turbine).

WIND ENERGY SYSTEM, COMMERCIAL: A Wind Energy System which is intended to produce electricity for sale to a rate regulated or non-regulated utility or for use off site.

WIND ENERGY SYSTEM, INTERCONNECTED: A Wind Energy System which produces electricity and is capable of distributing surplus electricity to the public or other properties outside the control of the system's owner, even if the system is temporarily or automatically disconnected by a switch or other mechanical device.

WIND ENERGY SYSTEM, NON-ELECTRIC: A Wind Energy System which converts the power of the wind into a mechanical energy, which is not electrical, and may be otherwise be of a decorative, ornamental or historical nature.

WIND TURBINE GENERATOR: The component of a WES that transforms mechanical energy from the wind into electrical energy.

SECTION III - GENERAL REGULATIONS

1. A Small Wind Energy System (SWES) shall be allowed only as an accessory use to a permitted principal use on the same legalized lot. Commercial systems are not allowed. Non-electric systems are not regulated by this chapter.
2. Zoning: SWES are allowed only in PRC (Planned Regional Commercial), HOC (Highway-Oriented Commercial), GI (General Industrial) and PI (Planned Industrial) zoning districts subject to the provisions contained herein and elsewhere within the *Municipal Code*.
3. Permit Required:
 - a. It shall be unlawful to construct, erect, install, alter or locate any SWES within the City of Ames, unless a SWES Zoning Permit and a Building Permit has been obtained. The Zoning Permit may be revoked by the City of Ames any time the approved system does not comply with the rules set forth in this chapter. After a Zoning Permit has been issued, the owner/operator of the SWES must also obtain a building permit from the City of Ames Building Official prior to commencing construction of the system.
 - b. In order to obtain a SWES Zoning Permit, a SWESZP application must be submitted to the Planning and Housing Department, which follows the Minor Site Development process and submittal requirements. The Planning and Housing Director, upon request of the applicant, may waive any of the submittal requirements that he or she deems not applicable. The Director may also require additional information as minimally needed to determine compliance with the *Municipal Code*. In addition to the requirements of Section 29.1502, the following information shall be submitted:
 1. Manufacturer specifications of the proposed system
 2. Photographs or renderings of the proposed system
 3. Elevation drawings of the proposed system, including as applicable:
 - a. Elevation of building to which attached

b. Distance to other objects on the property, such as trees, power lines and buildings

4. Tower: Only monopole towers are permitted for freestanding Small Wind Energy Systems in the HOC, PRC, and PI zones. Either monopole or lattice towers are permitted in GI zones. Guyed towers or any other types of towers are not permitted.
5. Color and Surface: Freestanding SWES shall be a neutral color such as white, sky blue, or light gray. Supporting structures for building mounted SWES shall match the color of the building on which it is mounted. Surfaces of the SWES and building mounted supporting structures shall be non-reflective.
6. Lighting: No lights shall be installed on the tower, unless required to meet FAA guidelines.
7. Signage: Any signs on the system shall be limited to one square foot.
8. Climbing Apparatus: The tower must be designed to prevent climbing within the first ten feet (10').
9. Maintenance: Facilities shall be well maintained in accordance with manufacturer's specifications. The property owner of any SWES shall maintain such system in a safe and attractive manner, including replacement of defective parts, painting, cleaning, and other acts that may be required for the maintenance and upkeep of the function and appearance of such a system. The owner shall also maintain the ground upon which the system is located in an orderly manner, such that is free of debris, tall grass and weeds, and any associated structures remain quality in appearance.
10. Displacement of Parking Prohibited: The location of the SWES shall not result in the net loss of required parking or landscaping as specified elsewhere in the zoning code.
11. Utility Notification: The City of Ames shall notify the utility of receipt of a WESZP application to install an interconnected customer-owned generator. Off-grid systems shall be exempt from this notification requirement. This is only to inform the utility. A response from the utility is not required to approve or deny the WESZP application.
12. Interconnection: The SWES, if not off-grid, shall meet the requirements for interconnection and operation as set forth by the utility and the Iowa utilities board. No building permit shall be issued until the Building Official has been provided with a copy of an executed interconnection agreement. Off-grid systems shall be exempt from this requirement.

13. Restriction On Use Of Electricity Generated: A SWES shall be used exclusively to supply electrical power to the owner for on-site consumption, except that excess electrical power generated by the SWES and not presently needed for use by the owner may be used by the utility company in accordance with Section 199, Chapter 15.11(5) of the *Iowa Administrative Code*, as may be subsequently amended.
14. Noise and Vibration: A SWES shall be designed, installed and operated so that any noise or vibration has minimal impacts on adjacent properties. No noise or vibration above the ambient sound level shall be detected from a property within a zoning district where an SWES is not allowed. Additionally, the manufacturer design shall specify that the turbine, when installed according to manufacturer's specifications, shall not exceed 55 decibels, at the base of the turbine tower.
15. Low Frequency Sound: No SWES or combination of SWESs shall emit low frequency sound at or below 20 Hertz.
16. Shadow Flicker: No SWES shall be installed and operated so to cause a shadow flicker to fall on or in any residentially zoned dwelling unit existing at such time that the application to install a SWES is received by the city.
17. Safety Controls: Each SWES shall be equipped with both an automatic and manual braking, governing, or feathering system to prevent uncontrolled rotation, over-speeding, and excessive pressure on the tower structure, rotor blades, or turbine components. Said system shall also be capable of stopping power generation in the event of a power outage so as to prevent back feeding of the grid.
18. Shut Off: A clearly marked and easily accessible power disconnect will be required as determined by the Building Official.
19. Wind Access Easements: The enactment of this chapter or granting of an SWES Zoning Permit does not constitute the granting of an easement by the City of Ames. The SWES owner/operator shall have the sole responsibility to acquire any easements, or similar documentation to assure and/or protect access to sufficient wind as may or may not be necessary to operate the SWES.
20. Engineer Certification: Submittal requirements for SWES building permits shall be determined by the Building Official. The Building Official, upon review of the proposed SWES, may require certification by an Iowa Professional Engineer, prior to completing review or issuing building permits.
21. Installation: Installation must be done according to manufacturer's recommendations. All wiring, electrical, and construction work must be completed according to applicable codes. All electrical components must meet industry standards as determined by the Building Official and the utility.

22. Abandonment: System use shall be determined abandoned under the provisions of Section 29.307, which requires notice by the Zoning Enforcement Officer to the property owner. The system shall be removed within 90 days of the termination date, at the cost of the property owner.
23. Feasibility Study: It is highly recommended that a feasibility study be made of any site prior to installing a wind turbine. The feasibility study should include measuring actual wind speeds at the proposed turbine site for at least 3 months.
24. Industry Standard: The Building Official may require evidence that small wind turbines have been approved under a small wind certification program recognized by an industry standard such as the American Wind Energy Association. The Building Official may also require evidence that the components of the system have been approved by the Underwriters Laboratories (UL), or another standard applicable to the technology and materials of the system.

SECTION IV - BULK REGULATIONS

1. Setbacks:
 - a. The minimum distance between any Freestanding SWES and any property line shall be a distance that is equivalent to 1.1 times the total system height. The setback shall be measured from the property line to the closest point of the swept area.
 - b. The required setback for any Building-Mounted SWES shall be equal to the required setback of the principal building to which the SWES is to be attached at such time that the application to install a building mounted SWES is received by the city. Section 29.402(2) regarding allowable minor projections into required setbacks is not applicable.
2. Maximum Height: Height shall be measured from the ground to the top of the tower, including the wind turbine generator and blades. Known as the "total system height," as defined in this section.
 - a. For lots up to three (3) acres, the maximum height shall be 80 feet.
 - b. For lots of three (3) to seven (7) acres, the maximum height shall be 100 feet.
 - c. For lots of more than seven (7) acres the maximum height shall be 120 feet.
 - d. Building-Mounted SWES may project a maximum of 10 feet higher than the point of attachment to the building on which they are attached, based upon the definition of total system height in this section. However, the combined heights of the building and the system may not exceed the

maximum principal building height by more than five (5) feet. Section 29.401(5) regarding maximum heights for allowable roof projections is not applicable.

3. Minimum Lot Size: None.
4. Ground and Swept Area Clearance: No portion of the SWECS Swept Area shall be closer than 10 feet to the ground. Clearance of 15 feet is required over parking areas, driveways, sidewalks, decks, and balconies. No portion of the Swept Area shall extend closer than 20 feet horizontally to the nearest tree, structure, or above ground utility facility.
5. Location:
 - a. No part of a SWES shall be located within or over drainage, utility, or other established easements.
 - b. No SWES shall be constructed, altered, or maintained so as to project above any of the imaginary airspace surfaces described in FAR Part 77 of the FAA guidance on airspace protection.
 - c. No SWES shall be constructed so that any part thereof can extend within 20 feet laterally of an overhead electrical power line (excluding secondary electrical service lines or service drops). The setback from underground electric distribution lines shall be at least five (5) feet.
 - d. No part of the SWES, including the swept area, shall be within or overhang any portion of the property that is within a required building setback.
6. Number of Systems per Lot/Parcel:
 - a. No more than one (1) freestanding SWES may be placed on any parcel or lot that is taller than the tallest existing principal building located on said parcel or lot.
 - b. Additional freestanding SWES which conform to setback requirements contained herein and which are no taller than the tallest existing principal building located on said parcel or lot may be allowed.
 - c. Additional building mounted SWES may be allowed within the parameters of this section.
 - d. In no case shall the generating capacity of aggregated SWES exceed anticipated energy needs for on-site consumption, based upon analysis from the utility.

- e. Vertical axis (Building-Mounted or Freestanding): No limit on number.
- f. Horizontal axis (Building-Mounted): No limit on number.
- g. Horizontal axis (Freestanding): Limited to a maximum of two (2) per acre. At least one is allowed per lot/parcel, but not more than two (2) per acre. Systems collocated on existing poles or towers that serve another primary purpose are exempt from the two (2) per acre limit.

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