# COUNCIL ACTION FORM

# <u>SUBJECT</u>: ZONING ORDINANCE TEXT AMENDMENTS TO ALLOW SMALL WIND ENERGY SYSTEMS IN COMMERCIAL AND INDUSTRIAL ZONING DISTRICTS

# BACKGROUND:

In response to increased interest in small scale on-site power production, in August 2009 the City Council reviewed possible solar and wind policies and decided to review solar and wind zoning text changes separately. The City Council subsequently passed regulations for on-site solar energy systems in November 2009. Policy option concepts for wind were then 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

Code provisions facilitating wind energy in these zones are reflected in the attached ordinance amendments to Chapter 29, Articles 13 and 5. There are currently no pending requests for wind turbines in residential districts. Because of the lack of active interest in residential areas, 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 follows the same format as the Des Moines Metro Area Council of Governments Model Ordinance for Small Wind Energy Conversion Systems. That model ordinance is generalized to serve as a guide for Des Moines and surrounding suburban communities. Because there are no federal or state laws establishing rights for the wind energy industry, cities are allowed to establish more customized standards based solely upon local policies, such as a city's Land Use Policy Plan. Accordingly, West Des Moines has passed its own wind energy ordinance; while proposed regulations are under review in Ankeny. Story County Zoning has also passed wind energy regulations, but they will not apply to areas within the city limits of Ames.

Staff has reviewed information from across the United States, including manufacturer specifications, municipal ordinances, trade journals, conference sessions and actual site visits. The following documents have been particularly influential in the development of this proposed ordinance:

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

# Highlights of Proposed Amendment:

Many of the concepts within the proposed ordinance have been discussed at previous City Council meetings. Therefore, this report will only summarize new or significantly revised topics.

# Allowed Use:

The foundational issue for the Council involves creation of a code provision for wind energy as an allowable use. This would be 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 previously 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 Planning and Zoning Commission and the City Council discussed this issue many times. In August the Council discussed imposing minimum lot sizes 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 specifies that no noise or vibration above the ambient sound level may be detected from a property within a zone where a system is not allowed.

The proposal further regulates low frequency (inaudible) sound by setting a minimum design standard requiring that all sound waves emitted from the system be above 20 hertz. 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 (large) wind turbines, such as those in rural areas, rather than small wind turbines. Small wind turbines oscillate at higher revolutions per minute and therefore are not typically associated with these low frequency sounds. An example of a low frequency sound would be a bass toned musical instrument. The lowest key on the piano is 32 hertz. The human ear can not detect anything below 20 hertz.

#### 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:

The Model Ordinance includes a mandatory requirement for an Iowa Professional Engineer to certify the structural stability of the system. But, because this is less of a zoning issue, the proposed ordinance allows the Building Official to determine whether or not an engineer certification is required.

# Feasibility Study:

The draft ordinance reviewed by the Planning and Zoning Commission had language recommending a wind resource feasibility study. However, because this would be for recommendation purposes only, the language was removed from this proposed ordinance, and will instead be incorporated into a citizen informational packet.

# 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 do buildings. 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 being proposed for residential zones, the minimum lot size requirement has been removed.

# Front Yard:

The front yard prohibition was removed because wind energy is not being 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 also considered 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 text proposed to the Planning and Zoning Commission mirrored 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.

Based on public feedback at the May 5 Planning and Zoning Commission meeting, the Commission removed the limitation that would prevent more than one system taller than the principal building on the lot. The attached proposal reflects that change. It was determined that proposed setback requirements and electrical capacity limitations would achieve a similar result.

# Land Use Policy Plan:

Within the City's adopted 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.

# Net Metering:

This zoning text amendment does not constitute an approval of a net metering tariff. A net metering tariff proposal will be brought forward later by Ames Electric Services.

# Council Goals:

One of the City 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 allows many possible options for owners. In addition, the proposal would facilitate the handful of active inquiries that have already been brought to staff.

**Recommendation of the Planning & Zoning Commission.** At its meeting of May 5, 2010, by a vote of 7-0, the Planning and Zoning Commission recommended that the City Council adopt proposed text amendments allowing wind energy systems in the PRC, HOC, GI, and PI zoning districts. This would amend Chapter 29, Articles 5 and 13.

# ALTERNATIVES:

- 1. The City Council can 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 City Council can modify the proposed text amendment.
- 3. The City Council can decide not to adopt the proposed text amendments.
- 4. The City Council can seek additional public input or information from staff before making a decision.

# MANAGER'S RECOMMENDED ACTION:

As noted above, language recommending a feasibility study was included in the ordinance reviewed by the Commission, but was eliminated from the draft now before the Council. Also not included in this draft, but reviewed by the Commission, was language pertaining to certification by Underwriters Laboratories and American Wind Energy Association. This was removed because it is already addressed under building permit review.

In February the Commission recommended a conservative approach to the City Council that would begin to open opportunities for wind energy within the City of Ames. The Council 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.

Therefore, it is the recommendation of the City Manager that the City Council accept Alternative #1, thereby adopting the attached text amendments allowing wind energy systems in the PRC, HOC, GI, and PI zoning districts.

#### ORDINANCE NO.

AN ORDINANCE TO AMEND THE MUNICIPAL CODE OF THE CITY OF AMES, IOWA, BY AMENDING SECTION 29.501(4)-7 AND ENACTING NEW SECTIONS 29.201(116) AND 29.201(221) THROUGH 29.201(238) AND 29.1310, WIND ENERGY SYSTEMS THEREOF, FOR THE PURPOSE OF ALLOWING SMALL WIND ENERGY SYSTEMS IN IN PLANNED REGIONAL COMMERCIAL (PRC), HIGHWAY-ORIENTED COMMERCIAL (HOC), GENERAL INDUSTRIAL (GI), AND PLANNED INDUSTRIAL (PI) ZONING DISTRICTS AS AN ACCESSORY USE ; REPEALING ANY AND ALL ORDINANCES OR PARTS OF ORDINANCES IN CONFLICT TO THE EXTENT OF SUCH CONFLICT; PROVIDING A PENALTY; AND ESTABLISHING AN EFFECTIVE DATE.

**BE IT ENACTED**, by the City Council for the City of Ames, Iowa, that:

Section One. The Municipal Code of the City of Ames, Iowa shall be and the same is hereby amended by amending Section 29.501(4)-7 and enacting a new Sections 29.201(116) and 29.201(221) through 29.201(238) and 29.1310 as follows:

#### "Sec. 29.201. DEFINITIONS.

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(116) **Mechanical Unit** means a climate control device and/or a piece of hardware used for the delivery or measurement of utilities, not including solar or wind energy systems as defined in Section 29.1309 and Section 29.1310.

(221) <u>AMBIENT SOUND LEVEL</u>: 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).

(222) <u>HEIGHT, TOTAL SYSTEM</u>: The height above grade of the Small Wind Energy System, including the generating unit and the highest vertical extension of any blades or rotors.

(223) <u>OFF-GRID</u>: An electrical system that cannot be or is not permitted to be connected to the utility's electric system or to any building or structure that is connected.

(224) <u>SHADOW FLICKER</u>: Changing light intensity caused by sunlight through the moving blades of a wind energy conversion system.

(225) <u>SMALL WIND ENERGY SYSTEM (SWES)</u>: 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, However, when a parcel on which the system is installed also receives electrical power supplied by a Utility, excess electrical power generated and not presently needed for on-site use may be used by the Utility in accordance with laws and regulations governing such use meets utility requirements.

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

(227) <u>SMALL WIND ENERGY CONVERSION SYSTEM, HORIZONTAL AXIS</u>: A Small Wind Energy System that has blades which rotate through a horizontal plane.

(228) <u>SMALL WIND ENERGY SYSTEM, BUILDING-MOUNTED</u>: 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.

(229) <u>SMALL WIND ENERGY CONVERSION SYSTEM, VERTICAL AXIS</u>: A Small Wind Energy System that has blades which rotate through a vertical plane.

(230) <u>SMALL WIND ENERGY SYSTEM, COLLOCATED</u>: 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.

(231) <u>SWEPT AREA:</u> 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.

(232) <u>TOWER</u>: The vertical component of a wind energy conversion system that elevates the wind turbine generator and attached blades above the ground.

(233) <u>UTILITY</u>: The electric service provider and owner of the electric distribution system through which electric service is normally provided to the subject property.

(234) <u>WIND ENERGY SYSTEM (WES)</u>: 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.

(235) <u>WIND ENERGY SYSTEM, COMMERCIAL</u>: 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

(236) <u>WIND ENERGY SYSTEM, INTERCONNECTED</u>: A Wind Energy System which produces electric power and is capable of connecting with the utility's electric system or is otherwise capable of distributing surplus electricity to the public or other properties outside the control of the wind energy system's owner, even if the system is temporarily or automatically disconnected by a switch or other mechanical device.

(237) <u>WIND ENERGY SYSTEM, NON-ELECTRIC</u>: 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.

(238) <u>WIND TURBINE GENERATOR</u>: The component of a WES that transforms mechanical energy from the wind into electrical energy.

#### Sec. 29.501. CLASSIFICATION OF USES.

#### Table 29.501(4)-7 MISCELLANEOUS USE CATEGORIES

#### 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.

#### Sec. 29.1310. WIND ENERGY SYSTEMS.

(1) Intent.

(a) 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.

- (2) Definitions. See Sec. 29.201
- (3) General Regulations.
  - (a) 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.

(b) 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*.

(4) Permit Required:

(a) It shall be unlawful to construct, erect, install, alter or locate any SWES within the City of Ames, unless both a SWES Zoning Permit and a Building Permit have 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 Section.

(b) After a Zoning Permit has been issued, the owner/operator of the SWES shall obtain a building permit from the City of Ames Building Official prior to commencing construction of the system. Authorization for interconnection is independent of the approval for the SWES zoning and building permits. If an interconnected system is planned, the utility's interconnection requirements must also be satisfied, and no building permit shall be issued until the Building Official has been provided with the utility's written authorization.

(c) In order to obtain a SWES Zoning Permit, a SWESZP application must be submitted to the Planning and Housing Department, in conformance with 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:

- (i) Manufacturer specifications of the proposed system
- (ii) Photographs or renderings of the proposed system
- (iii) 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

(5) 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.

(6) 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 they are mounted. Surfaces of the SWES and building mounted supporting structures shall be non-reflective

- (7) Lighting: No lights shall be installed on the tower, unless required to meet FAA guidelines.
- (8) Signage: Any signs on the system shall be limited to one square foot.

(9) Climbing Apparatus: The tower must be designed to prevent climbing within the first ten feet (10').

(10) 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.

(11) 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.

(12) Utility Notification: The City of Ames shall notify the utility of receipt of a SWESZP 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 SWESZP application.

(13) Interconnection: The SWES, if not off-grid, shall meet the requirements for interconnection and operation as set forth by the utility. Off-grid systems shall be exempt from this requirement.

(14) 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 in accordance with laws and regulations governing interconnection and utility approval.

(15) 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. A SWES shall utilize only manufacturer designs in which the turbine sound level, when installed according to manufacturer's specifications, shall not exceed 55 decibels, at the base of the turbine tower. Additionally, a SWES shall comply with noise control regulations in Chapter 16 of Municipal Code.

(16) Low Frequency Sound: No SWES or combination of SWESs shall emit low frequency sound at or below20 Hertz.

(17) 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.

(18) 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.

(19) Shut Off: A clearly marked and easily accessible power disconnect will be required as determined by the Building Official.

(20) 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.

(21) 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.

(22) 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.

(23) 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.

(24) Bulk Regulations.

(a) Setbacks:

(i) 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.

(ii) 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.

(25) 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.

(26) Minimum Lot Size: None.

(27) Ground and Swept Area Clearance: No portion of the SWES 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.

(28) 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.

(29) Number of Systems per Lot/parcel:

(a) Additional building mounted SWES may be allowed within the parameters of this section.

(b) In no case shall the generating capacity of aggregated SWES exceed anticipated energy needs for on-site consumption, based upon analysis from the utility.

(c) Vertical axis (Building-Mounted or Freestanding): No limit on number.

(d) Horizontal axis (Building-Mounted): No limit on number.

(e) 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."

<u>Section Two</u>. Violation of the provisions of this ordinance shall constitute a municipal infraction punishable as set forth in Section 29.1603(7).

Section Three. All ordinances, or parts of ordinances, in conflict herewith are hereby repealed to the extent of such conflict, if any.

Section Four. This ordinance shall be in full force and effect from and after its passage and publication as required by law.

Passed this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_,

Diane R. Voss, City Clerk 001221 Ann H. Campbell, Mayor