

**Community Planning and Economic Development Planning Division Report
Zoning Code Text Amendment**

Date: April 23, 2007

Initiator of Amendment: Council Member Gordon

Date of Introduction at City Council: April 14, 2006

Specific Site: Citywide

Ward: Citywide **Neighborhood Organization:** Citywide

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Intent of the Ordinance: To expand opportunities for installation of wind energy conversion systems.

Appropriate Section(s) of the Zoning Code: Chapter 535, Article X. Wind Energy Conversion Systems (new)

Background: Minnesota Statutes define wind energy conversion systems (WECS) as any device such as a wind charger, windmill, or wind turbine and associated facilities that converts wind energy to electrical energy. State statutes recognize two different types of WECS: large (LWECS) and small (SWECS). The two types are differentiated by the amount of energy produced. LWECS are regulated by the state. An example of an LWECS is Attachment A. The statute allows local government to regulate SWECS, therefore the proposed regulations apply only to SWECS. SWECS available in the market vary in size and capacity. Examples of SWECS can be found on Attachment B.

Site and wind conditions and advances in technology were also considered in drafting these regulations. Since the current zoning code was adopted in 1999, the Planning Division has not received any WECS proposals. General industry consensus is that a consistent wind speed greater than 9 miles per hour (MPH) is necessary for a traditional WECS (a freestanding tower with rotor blades—Attachment B) to begin generating electricity. Over most of Minneapolis, average wind speed at 30 meters (approximately 100 feet) is between 0.0 to 9.5 MPH. Wind in urban areas is more turbulent than rural areas further inhibiting the efficiency of traditional WECS. Most manufacturers of WECS require a wind speed analysis at a site before they install a WECS. If wind speeds are not conducive to wind energy production, they will not proceed with the installation. These circumstances are likely the reason that no WECS proposals have been received. However, interest in wind energy as a renewable energy source has resulted in research to produce models built for the urban environment, such as the building mounted WECS shown in the attached example (Attachment C). With advances in technology, WECS could become more efficient at lower wind speeds in urban environments. This amendment assumes that some areas of the city exist that have wind speeds above nine MPH where freestanding WECS could be located and that technology improvements will occur in the near future to make more installations possible.

Purpose for the Amendment:

What is the reason for the amendment?

What problem is the Amendment designed to solve?

What public purpose will be served by the amendment?

What problems might the amendment create?

The general purpose of the amendment is to expand the allowed use of WECS. The zoning code currently only allows WECS in the industrial districts with a maximum height of 35 feet. The staff recommendation is intended to create regulations to provide for appropriate locations of WECS, to ensure compatibility with surrounding uses, and to promote safe, effective and efficient use of WECS to increase opportunities for generation of renewable energy. Staff proposes that the City regulate WECS in a manner similar to communication towers, antennas and base units. In the following paragraphs, applicable code references of the proposed text amendment are noted in parentheses.

To clarify how the ordinances pertaining to WECS should be applied, several definitions are proposed (section 535.700). The definition of WECS has been expanded from the state statute definition to clearly state that the support structure, such as a tower, is considered part of the system. Definitions are also provided for building mounted WECS, height measurement of freestanding and building mounted WECS, monopole towers, institutional uses, and publicly owned property.

By allowing WECS in more locations, the potential to negatively impact surrounding uses increases. To minimize impacts on surrounding properties, the following issues were addressed in sections 535.710 through 535.760:

- **Permitted and Conditional Uses:** Freestanding WECS would be allowed as a conditional use because they typically are tall structures and require a large site to operate (535.730). Building mounted WECS would be reviewed administratively because they would be smaller in scale (535.710). Both types of WECS would be subject to a substantial, wide-ranging list of requirements and regulations.
- **Location:**
 - *Freestanding:* WECS are most efficient in higher wind speeds and wind is stronger at higher altitudes. Relatively open spaces allow the most access to consistent wind supply. Nearby structures and objects create turbulence reducing the efficiency of freestanding WECS. Further, the tower site and setback must be adequately sized to contain any guyed wires, debris and the tower in the event of a collapse (535.740(3)). Therefore, a larger site is more appropriate. The recommended minimum lot area is one acre (535.730(3) and 535.740(2)(a)). A map showing properties greater than one acre in area is attached (Attachment D). The height and spacing needs of WECS can be incompatible with the character of residential areas, therefore the most restrictions (use, height, setbacks, type, etc) apply in those areas (535.730(1)). Freestanding WECS would not be allowed in the downtown districts because it could inhibit development (535.730(2)). They would also not be allowed in parks or cemeteries to ensure the preservation of trees and green space (535.700).

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- *Building mounted:* Building mounted WECS would be allowed in all districts (535.710(1)). Their smaller size (limited to 15 feet in height) would likely have less of an impact on surrounding properties.

To ensure that impacts, such as visual and noise-related, remain minimal in residential areas, WECS could not be located on residential buildings less than 4 stories and 42 feet in height (535.710(2) and (4)). The 42 foot height requirement would not allow WECS on a 3-floor residential building with a floor(s) that is more than 14 feet in height. Under the zoning code, a story is a portion of a building between a floor and the floor above, or 14 feet, whichever is less. These height requirements would not allow WECS on single- and two-family dwellings and most three- and four-family dwellings. The reason for restricting the installation of building-mounted WECS on residences is that not enough information is available that proves new technology for building-mounted WECS does work in an urban environment and won't create negative impacts for surrounding properties.

Building mounted WECS could be located on nonresidential buildings less than 4 stories in height, as long as they are set back at least 10 feet from the walls of the structure (535.710(3)). Setting the WECS back would reduce visual impacts.

Allowing installations to occur on taller residential buildings and nonresidential buildings in the city where fewer residential uses are likely to be impacted will give staff the opportunity to observe them and then determine if building-mounted WECS should be allowed for all residences in the future.

- *Shoreland and Mississippi River Critical Area Overlay Districts:* Part of the purpose of the Shoreland and Mississippi River Critical Area Overlay Districts is to preserve and enhance the aesthetic value of the City's shoreland areas. The height of all structures in these areas, with the exception of the central riverfront adjacent to downtown, is limited to two and a half stories or 35 feet, whichever is less. To comply with these height restrictions and to limit the visual impacts, WECS would not be allowed in these overlay districts (535.750(2)).

▪ **Height:**

- *Freestanding:* As previously discussed, most freestanding WECS are most efficient in higher wind speeds and wind is stronger at higher altitudes. However, tall towers in residential or commercial areas may not be compatible with surrounding uses. Height would be limited to 60 feet in residence, office residence and commercial districts and to 100 feet in industrial districts (535.740(2)(a)). Because industrial areas are less likely to be negatively impacted, a WECS up to 100 feet in height could be allowed on any industrially zoned parcel over one acre in area (535.740(2)(b)). The city planning commission would be authorized to allow an increase in height if the applicant can show that surrounding topography, structures, vegetation and other factors make a tower that complies with the district height regulation impractical. However, towers in residential, office residential, and commercial districts could not be more than 90 feet on a lot less than 5 acres in area and no more than 150 feet on a lot over 5 acres in area (535.740(2)(d)).

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- *Building mounted*: Models that can be located on a building are generally smaller. The height would be limited to 15 feet (535.710(1)).
- **Noise** (535.750(8)): WECS can create noise that could be irritating to individuals. The noise created by the Macalaster College turbine is a whirring, whiny noise that is audible within 100 feet of the base of the tower (the turbine is 103 feet tall). Noise was also considered when determining location and height regulations.
- **Capacity** (535.750(1)): The regulations would allow building mounted and freestanding WECS with a maximum capacity of 100 kilowatts. The capacity of most SWECS is below this maximum.
- **Setbacks** (535.710(3); 535.740(3)(b)); 535.750(3)): The required setbacks would protect adjacent residences from any possibility of thrown rotor blades or ice, tower collapse, and noise.
- **TV/radio reception interference** (535.750(4); 535.720(b)(4)): In the past, rotors were typically made of metal, which caused interference with TV, radio and other communication reception. Modern rotors are typically made of wood, fiberglass, or other composite materials with little or no interference of electronic devices.
- **Structure stability**: WECS must comply with all code requirements (535.720(1) and (3)). Building mounted units must be securely constructed on a building that can structurally support the WECS (535.710(2)).
- **Safety/security**: Towers must be designed in a manner to prevent unauthorized climbing (535.740(4)) and any moving parts must be at least 15 feet above the ground (535.740(2)(c)). All systems must contain an internal braking system (535.750(5)).
- **Aesthetics**: Other aesthetic concerns, such as wires (535.740(1) and (5)), materials (535.750(4)), and signage (535.750(6)) are also regulated for all WECS. Lighting of the WECS would not be allowed unless required by the FAA (535.750(7)).
- **Maintenance/abandonment** (535.750(10) and 535.760): All WECS must be maintained and kept in operating condition.
- **Heritage Preservation** (535.750(9)): Where HPC review is required, WECS would be subject to all requirements of the city's Heritage Preservation Ordinance.
- **On-site use** (535.720(b)(5) and (6)): Staff is concerned about how the electricity generated would be transferred to other properties if the use of WECS is not limited to on-site consumption. For example, the ordinance as written would prevent wires from being strung across property lines. There are also safety concerns for burying wires underground. The applicant would be allowed to sell excess energy back to an electric utility service provider.

The proposed regulations should minimize any negative impacts WECS may have. The City will likely revisit its ordinance again in the future in order to respond to technological advances related to wind energy.

Timeliness:

Is the amendment timely?

Is the amendment consistent with practices in surrounding areas?

Are there consequences in denying this amendment?

Most of the energy consumed by the United States comes from nonrenewable resources imported from other countries. Energy costs are continually increasing. Use of nonrenewables has negative environmental impacts. These are all major issues that the United States and the world are now dealing with. Renewable energy sources decreases the United States dependency on other countries, provides a way to provide energy without depleting resources and has few negative environmental impacts. The state of Minnesota has passed a law requiring that 25 percent of the state’s electricity come from renewable energy sources by the year 2025. Many cities, such as Chicago, IL and Lincoln, NE, and counties across the country and in Minnesota have adopted ordinances that allow WECS. By not adopting this amendment, it would continue to be virtually impossible to establish an efficient WECS in Minneapolis.

Comprehensive Plan:

How will this amendment implement the Comprehensive Plan?

The Minneapolis Plan states: “Creating a sustainable city, a place where present day decisions about resource use and land development do not impinge on the quality of air, water, land and the economic livelihood of future generations, requires action on a number of fronts.... Taking action now to preserve the choice and quality of life for future generations is a deeply rooted responsibility to the city's future that all members of the community share.” The plan also states: “The city recognizes...the importance of protecting and insulation residential areas from invasions of space, noise...[and] negative aesthetics...” The following policies and implementation steps are also relevant:

7.9 Minneapolis will make buildings more energy efficient.

Applicable Implementation Step

Promote the transition to cleaner alternative fuels (such as natural gas instead of coal and oil) and renewable fuels (hydro, wind, biomass and solar).

9.15 Minneapolis will protect residential areas from the negative impact of non-residential uses by providing appropriate transitions between different land uses.

Applicable Implementation Steps

Provide appropriate physical transition and separation using green space, setbacks or orientation between residential and nonresidential uses.

Staff comment: The proposed amendment could indirectly reduce air and water pollution. WECS located on buildings would not consume additional land. Freestanding WECS can be integrated into the urban environment if appropriate location conditions are present. The proposed regulations are intended to protect residential areas from any negative impacts of WECS.

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Recommendation of the Community Planning and Economic Development--Planning Division:

The Community Planning and Economic Development Planning Division recommends that the City Planning Commission and City Council adopt the above findings and **approve** the zoning code text amendment.