

- **Sec. 78-1379. - Alternative energy systems.**

(a)

Scope. [Section 78-1379](#) applies to alternative energy systems in all zoning districts.

(b)

Purpose and intent. The purpose and intent of this section is to establish standards and procedures by which the installation and operation of alternative energy systems shall be regulated within the city. The city finds that it is in the public interest to encourage alternative energy systems that have a positive impact on energy production and conservation while not having an adverse impact on the community.

(c)

Definitions. For the purpose of [section 78-1379](#), the following definitions shall apply unless the context clearly indicates or requires a different meaning.

(1)

General definitions.

Accessory. A system designed as a secondary use to existing buildings or facilities, wherein the power generated is used primarily for on-site consumption.

Alternative energy system. A ground source heat pump, wind energy conversion system, hydronic furnace or solar energy system.

(2)

Ground source heat pump system definitions.

Closed loop ground source heat pump system. A system that circulated a heat transfer fluid, typically food-grade antifreeze, through pipes or coils buried beneath the land surface or anchored to the bottom of a body of water.

Ground source heat pump system. A system that uses the relatively constant temperature of the earth or a body of water to provide heating in the winter and cooling in the summer. System components include open or closed loops of pipe, coils or plates; fluid that absorbs and transfers heat; and a heat pump unit that processes heat for use or disperses heat for cooling; and an air distribution system. Also sometimes referred to as a geothermal system.

Heat transfer fluid. A non-toxic and food grade fluid such as potable water, aqueous solutions of propylene glycol not to exceed 20 percent by weight or aqueous solutions of potassium acetate not to exceed 20 percent by weight.

Horizontal ground source heat pump system. A closed loop ground source heat pump system where the loops or coils are installed horizontally in a trench or series of trenches no more than 20 feet below the land surface.

Open loop ground source heat pump system. A system that uses groundwater as a heat transfer fluid by drawing groundwater from a well to a heat pump and then discharging the water over land, directly in a water body or into an injection well.

Vertical ground source heat pump system. A closed loop ground source heat pump system where the loops or coils are installed vertically in one or more borings below the land surface.

(3)

Solar energy systems definitions.

Building-integrated solar energy system. A solar energy system that is an integral part of a principal or accessory building, rather than a separate mechanical device, replacing or substituting for an architectural or structural component of the building including, but not limited to,

photovoltaic or hot water solar systems contained within roofing materials, windows, skylights and awnings.

Flush-mounted solar energy system. A roof-mounted system mounted directly abutting the roof. The pitch of the solar collector may exceed the pitch of the roof up to five percent but shall not be higher than ten inches above the roof.

Passive solar energy system. A system that captures solar light or heat without transforming it to another form of energy or transferring the energy via a heat exchanger.

Photovoltaic system. A solar energy system that converts solar energy directly into electricity.

Solar energy system. A device or structural design feature, a substantial purpose of which is to provide daylight for interior lighting or provide for the collection, storage and distribution of solar energy for space heating or cooling, electricity generation or water heating.

(4)

Wind energy conversion systems definitions.

Horizontal axis wind turbine. A wind turbine design in which the rotor shaft is parallel to the ground and the blades are perpendicular to the ground.

Hub. The center of a wind generator rotor, which holds the blades in place and attaches to the shaft.

Hub height. The distance measured from natural grade to the center of the turbine hub.

Monopole tower. A tower constructed of tapered tubes that fit together symmetrically and are stacked one section on top of another and bolted to a concrete foundation without support cables.

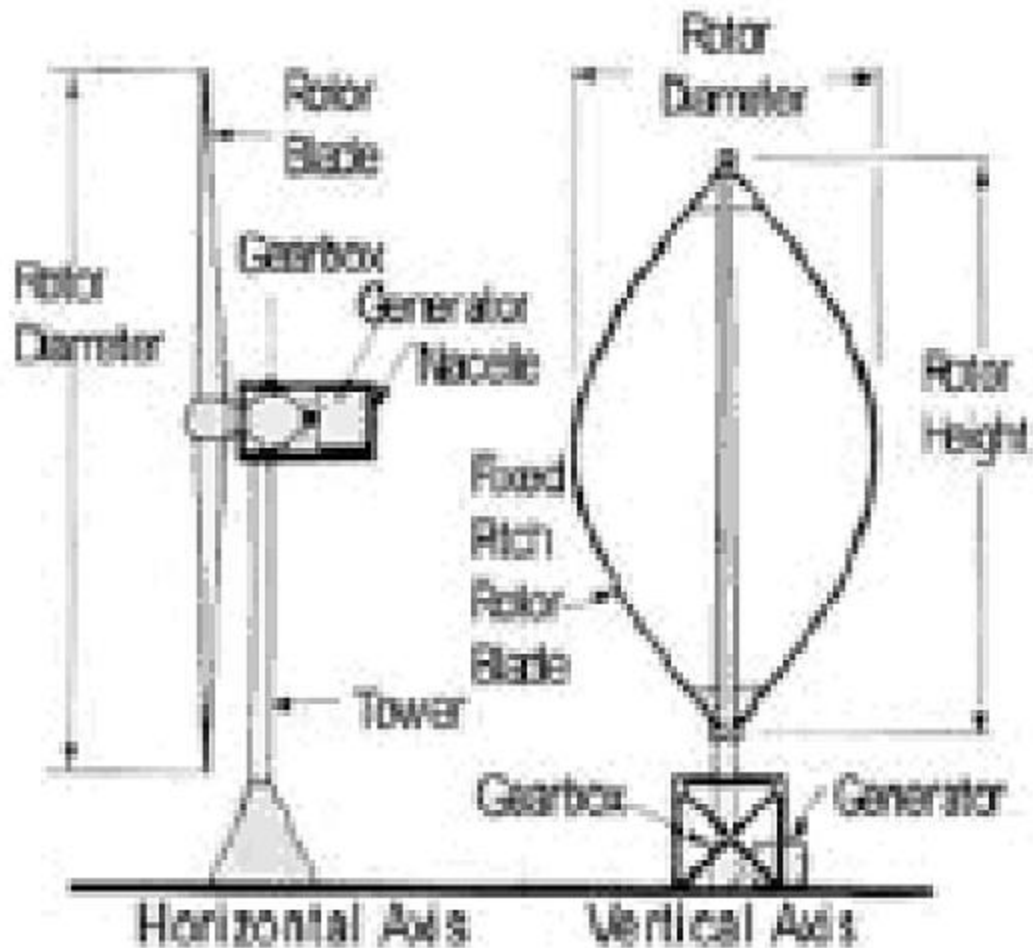
Small wind energy conversion system (SWECS). A WECS of 5,000 kW nameplate generating capacity or less.

Total height. The highest point above natural grade reached by a rotor tip or any other part of a wind turbine.

Vertical axis wind turbine. A type of wind turbine where the main rotor shaft runs vertically.

Wind energy conversion system (WECS). An electrical generating facility that consists of a wind turbine, feeder line(s), associated controls and may include a tower.

Wind turbine. Any piece of electrical generating equipment that converts the kinetic energy of blowing wind into electrical energy through the use of airfoils or similar devices to capture the wind.



Wind Turbine Configurations

(5)

Hydronic furnace definitions.

Hydronic furnace. An outdoor wood boiler that provides heating or hot water using a firebox surrounded by a water jacket enclosed within an insulated shed. A fire is started inside the firebox, and the water temperature is controlled by a thermostatically actuated damper.

(d)

Ground source heat pump systems.

(1)

Zoning districts. Ground source heat pump systems in accordance with the standards in this section are allowed as a permitted accessory use in all zoning districts.

(2)

Standards.

a.

System requirements.

1.

Only closed loop ground source heat pump systems utilizing heat transfer fluids as defined in [section 78-1379\(3\)](#) are permitted. Open loop ground source heat pump systems are not permitted.

2.

Ground source heat pump systems in water bodies owned or managed by the City of Orono are not permitted.

3.

Ground source heat pump systems in private ponds constructed within uplands and that are not protected wetlands are permitted.

b.

Setbacks.

1.

All components of ground source heat pump systems including pumps, borings and loops shall be set back at least five feet from interior side and rear lot lines, at least ten feet from front lot lines, and maintain all State-mandated isolation distances.

2.

Above-ground equipment associated with ground source heat pumps shall not be installed in the front yard of any lot or the side yard of a corner lot adjacent to a public right-of-way and shall meet all required accessory structure setbacks for the applicable zoning district.

c.

Construction.

1.

All access shall be over the owner's land and due care shall be taken to avoid hazard, inconvenience or damage to public streets and nearby public or private property.

2.

Necessary precautions shall be taken in stockpiling excavated materials to avoid erosion, dust or other infringements upon adjacent property.

3.

All wiring, installation of pipes, grading and all other installations and construction shall be subject to inspection.

4.

Disturbed land shall be restored to its prior condition after completion of construction.

d.

Easements. Ground source heat pump systems shall not encroach on public drainage, utility, roadway or trail easements.

e.

Noise. Ground source heat pump systems shall comply with Minnesota Pollution Control Agency standards outlined in Minnesota Rules Chapter 7030 as amended.

f.

Screening. Ground source heat pumps are considered mechanical equipment and are subject to the screening requirements of the applicable zoning district.

(3)

Safety. Ground source heat pumps shall be certified by Underwriters Laboratories, Inc. and meet the requirements of the State Building Code.

(4)

Abandonment. If the ground source heat pump system remains nonfunctional or inoperative for a continuous period of one year, the system shall be deemed to be abandoned and shall constitute a public nuisance. The owner shall remove the abandoned system at their expense after a demolition permit has been obtained in accordance with the following:

- a. The heat pump and any external mechanical equipment shall be removed.
- b. Pipes or coils below the land surface shall be filled with grout to displace the heat transfer fluid. The heat transfer fluid shall be captured and disposed of in accordance with applicable regulations. The top of the pipe, coil or boring shall be uncovered and grouted.
- c. Private pond ground source heat pump systems shall be completely removed from the bottom of the body of water.

(5)

Permits. A city building permit and any other required agency permits shall be obtained for any ground source heat pump system prior to installation. Borings for vertical systems are subject to approval from the Minnesota Department of Public Health.

(e)

Solar energy systems.

(1)

Zoning districts. Solar energy systems in accordance with the standards in this section are allowed as a permitted accessory use in all zoning districts.

(2)

Standards.

- a. *Exemption.* Passive or building-integrated solar energy systems are exempt from the requirements of this section and shall be regulated as any other building element.
- b. *Roof-mounted systems allowed.* The only solar energy systems allowed in the city are those that are roof-mounted,
- c. *Height.* Roof-mounted solar energy systems shall comply with the maximum height requirements in the applicable zoning district.
- d. *Setbacks.* Roof-mounted solar energy systems shall comply with all building setbacks in the applicable zoning district and shall not extend beyond the exterior perimeter of the building on which the system is mounted.
- e. *Roof mounting.* Roof-mounted solar collectors shall be mounted parallel to the surface of the roof and within three feet of the roof surface, unless manufacturer's documentation is provided indicating that collectors must be angled to provide optimum performance. No portion of the collectors or their mounting system shall extend above the peak or ridge height of a pitched roof. On a flat roof, collectors and their mounting systems shall not extend more than 5 feet above the roof surface.
- f. *Easements.* Solar energy systems shall not encroach on public drainage, utility, roadway or trail easements.
- g.

Screening. Solar energy systems shall be screened from view to the extent possible without impacting their function.

h.

Maximum area. In all residential zoning districts, the collector and mounting system of a roof-mounted solar energy system shall cover no more than 70 percent of the roof to which it is affixed.

i.

Aesthetics. All solar panels shall be designed, installed, positioned and constructed of materials so as not to cause any glare or reflective sunlight onto neighboring properties or structures, nor toward vehicular traffic on land or on a lake, and so as to not obstruct views. Reflection angles from collector surfaces shall be oriented away from neighboring windows. Where necessary, screening may be required to address glare.

j.

Feeder lines. The electrical collection system shall be placed underground within the interior of each parcel. The collection system may be placed overhead near substations or points of interconnection to the electric grid.

(3)

Safety.

a.

Standards and certification.

1.

Certification. Solar energy systems shall be certified by Underwriters Laboratories, Inc. and the National Renewable Energy Laboratory, the Solar Rating and Certification Corporation or other body as determined by the building official. The city reserves the right to deny a building permit for proposed solar energy systems deemed to have inadequate certification.

2.

The equipment or device must be designed and constructed in compliance with all applicable building and electrical codes, and (if for co-generation) must be in compliance with all state and federal regulations regarding co-generation of energy.

b.

Utility connection. All grid connected systems shall have an agreement with the local utility prior to the issuance of a building permit. A visible external disconnect must be provided if required by the utility.

(4)

Abandonment. If the solar energy system remains nonfunctional or inoperative for a continuous period of one year, the system shall be deemed to be abandoned and shall constitute a public nuisance. The owner shall remove the abandoned system at their expense after a demolition permit has been obtained. Removal includes the entire structure including transmission equipment.

(5)

Permits. A building permit shall be obtained for any solar energy system prior to installation.

(f)

Wind energy conversion systems.

(1)

Zoning districts. Small wind energy conversion systems (SWECS) in accordance with the standards in this section are permitted accessory uses on lots at least ten acres in gross area within the RR-1A and RR-1B Rural Residential zoning districts. SWECS in accordance with the standards in this section are allowed as a conditional use on lots at least five acres in gross area and subject to

conditional use permit approval in the following commercial or industrial districts: B-1 Retail Sales; B-4 Office and Professional; B-6 Highway Commercial; B-6 PUD; and I Industrial.

(2)

Standards for SWECS in residential zoning districts.

a.

Number. No more than one SWECS is permitted per parcel.

b.

Height. In the RR-1A and RR-1B zoning districts, a maximum hub height of 30 feet is allowed as a permitted accessory use.

c.

Blade length. A maximum blade length of 15 feet is permitted.

d.

Clearance. The minimum distance from the ground for the lowest point of a blade or any other moving part shall be 12 feet.

e.

Roof mounting. Roof or wall mounted SWECS are not permitted.

f.

Setbacks. The base of the SWECS tower shall be set back at least 100 feet from all property lines. SWECS shall not be installed in the front yard of any lot or in the side yard of a corner lot adjacent to a public right-of-way. SWECS shall not be located more than 100 feet from the principal structure on the property.

g.

Easements. SWECS shall not encroach on public drainage, utility, roadway or trail easements.

h.

Noise. SWECS shall comply with Minnesota Pollution Control Agency standards outlined in Minnesota Rules Chapter 7030 at all property lines.

i.

Screening. SWECS are exempt from the screening requirements for the district in which they are located.

j.

Aesthetics. All portions of the SWECS shall be a nonreflective surface, subject to the approval of the city administrator or his/her designee. Only monopole towers are permitted. The appearance of the turbine, tower and any other related components shall be maintained throughout the life of the SWECS pursuant to industry standards. Systems shall not be used for displaying any advertising, nor for other uses including but not limited to cell phone antennas, flags, ham radio antennas, etc. No components unnecessary to the operation of the SWECS shall be allowed. Systems shall not be illuminated.

k.

Feeder lines. The electrical collection system shall be placed underground within the interior of each parcel.

l.

Vibration. No wind energy conversion system shall produce vibrations through the ground that are perceptible beyond the property on which it is located.

m.

Location. No SWECS shall be allowed within the Shoreland Overlay District. SWECS shall be setback a distance at least equal to the height of the SWECS from a floodplain, pond or wetland.

(3)

Standards for SWECS in commercial and industrial zoning districts.

a.

Number. No more than one SWECS is permitted per parcel.

b.

Height. In commercial and industrial zoning districts, a maximum hub height of 30 feet is allowed.

c.

Blade length. A maximum blade length of 15 feet is permitted.

d.

Clearance. The minimum distance from the ground for the lowest point of a blade or any other moving part shall be 12 feet.

e.

Roof mounting. Roof or wall mounted SWECS are not permitted.

f.

Setbacks. The base of the SWECS tower shall be set back at least 100 feet from all property lines. SWECS shall not be installed in the front yard of any lot or in the side yard of a corner lot adjacent to a public right-of-way. SWECS shall not be located more than 100 feet from the principal structure on the property.

g.

Easements. SWECS shall not encroach on public drainage, utility, roadway or trail easements.

h.

Noise. SWECS shall comply with Minnesota Pollution Control Agency standards outlined in Minnesota Rules Chapter 7030 at all property lines.

i.

Screening. SWECS are exempt from the screening requirements for the district in which they are located.

j.

Aesthetics. All portions of the SWECS shall be a nonreflective surface, subject to the approval of the city administrator or his/her designee. Only monopole towers are permitted. The appearance of the turbine, tower and any other related components shall be maintained throughout the life of the SWECS pursuant to industry standards. Systems shall not be used for displaying any advertising, nor for other uses including but not limited to cell phone antennas, flags, ham radio antennas, etc. No components unnecessary to the operation of the SWECS shall be allowed. Systems shall not be illuminated.

k.

Feeder lines. The electrical collection system shall be placed underground within the interior of each parcel.

l.

Vibration. No SWECS shall produce vibrations through the ground that are humanly perceptible beyond the property on which it is located.

m.

Location. No SWECS shall be allowed within the Shoreland Overlay District. WECS shall be setback a distance equal to the height of the WECS from a floodplain, pond or wetland.

(4)

Safety.

a.

Standards and certification.

1.

Standards. SWECS shall meet minimum standards such as International Electrotechnical Commission (IEC) 61400-2 or the American Wind Energy Association's (AWEA) Small Wind Turbine Performance and Safety Standard or other standards as determined by the city administrator or his/her designee.

2.

Certification. SWECS shall be certified by Underwriters Laboratories, Inc. and the National Renewable Energy Laboratory, the Small Wind Certification Council or other body as determined by the city administrator or his/her designee. The city reserves the right to deny a building permit for proposed SWECS deemed to have inadequate certification or testing for operation in a severe winter climate.

3.

Maintenance. SWECS shall be maintained under an agreement or contract by the manufacturer or other qualified entity. The owner of the SWECS shall once every two years have the SWECS inspected by a licensed qualified professional and submit to the city a report on the status and condition of the SWECS.

b.

Utility connection. All grid connected systems shall have an agreement with the local utility prior to the issuance of a building permit. A visible external disconnect must be provided if required by the utility.

(5)

Abandonment. If the SWECS remains nonfunctional or inoperative for a continuous period of one year, the system shall be deemed to be abandoned and shall constitute a public nuisance. The owner shall remove the abandoned system at their expense after a demolition permit has been obtained. Removal includes the entire structure including foundations to below natural grade and transmission equipment.

(6)

Permits. A building permit shall be obtained for any SWECS prior to installation.

(7)

Power distribution. The power produced from a SWECS shall only be used for on-site consumption except if connected to the local utility power grid per the provisions of this section.

(g)

Hydronic furnaces. Hydronic furnaces are not an allowed use or structure within any zoning districts in the city.

(Ord. No. 119 3rd series, § 1, 12-9-2013; Ord. No. 142 3rd series, §§ 1, 2, 4-13-2015)

- **Secs. 78-1380—78-1400. - Reserved.**