

SECTION 1036 – ALTERNATIVE ENERGY SYSTEMS

SECTION:

- 1036.01: Purpose
- 1036.02: Geothermal Systems
- 1036.03: Solar Energy Systems
- 1036.04: Wind Energy Conversion Systems (WECS)

1036.01: PURPOSE: It is the goal of the City to provide a sustainable quality of life for the city's residents, making careful and effective use of available natural, human and economic resources and ensuring that resources exist to maintain and enhance the quality of life for future residents. In accordance with that goal, 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. Therefore, the purposes of this section include:

- (a) To promote rather than restrict development of alternative energy sources by removing regulatory barriers and creating a clear regulatory path for approving alternative energy systems.
- (b) To create a livable community where development incorporates sustainable design elements such as resource and energy conservation and use of renewable energy.
- (c) To protect and enhance air quality, limit the effects of climate change and decrease use of fossil fuels.
- (d) To encourage alternative energy development in locations where the technology is viable and environmental, economic and social impacts can be mitigated.

1036.02: GEOTHERMAL SYSTEMS:

Subd. 1. Zoning districts. Geothermal systems in accordance with the standards in this section are allowed as a permitted accessory use in all zoning districts.

Subd. 2. Standards.

- 1. System requirements.
 - a. Only closed loop geothermal systems utilizing heat transfer fluids as defined in Section 1001.02 are permitted. Open loop geothermal systems are not permitted.
 - b. Geothermal systems in public waters may be permitted in business, industrial or R-3 Districts as an interim use in accordance with Section 1010 subject to approval from the Minnesota Department of Natural Resources.
 - c. Geothermal systems in water bodies owned or managed by the City of Big Lake may be permitted in business, industrial or R-3 Districts as an interim

use in accordance with Section 1010 subject to approval from the Minnesota Department of Natural Resources.

2. Setbacks.
 - a. All components of geothermal systems including pumps, borings and loops shall be set back at least 5 feet from interior side lot lines and at least 10 feet from rear lot lines.
 - b. Above-ground equipment associated with geothermal systems shall not be installed in the front yard of any lot and shall meet all required setbacks for the applicable zoning district.
3. Easements. Geothermal systems shall not encroach on public drainage, utility roadway or trail easements.
4. Noise. Geothermal systems shall comply with Minnesota Pollution Control Agency standards outlined in Minnesota Rules Chapter 7030.
5. Screening. Geothermal systems are considered mechanical equipment and subject to the requirements of Section 1027.04.

Subd. 3. Safety. Geothermal systems shall meet the requirements of the State Building Code.

Subd. 4. Abandonment. If the geothermal 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:

1. The heat pump and any external mechanical equipment shall be removed.

Subd. 5. Permits. A building permit shall be obtained for any geothermal system prior to installation.

1036.03 SOLAR ENERGY SYSTEMS:

Subd. 1. Roof Mounted and Ground Mounted Solar Energy Systems.

1. Zoning district allowance. Solar energy systems in accordance with the standards in this chapter 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 chapter and shall be regulated as any other building element.

- b. Height.
 - i. Residential roof mounted solar energy systems are permitted to exceed the maximum height requirements in the applicable zoning district up to 18 inches above the rooftop to which it is attached. Residential rooftop mounted solar energy systems must be installed parallel to the rooftop to which it is attached. Residential ground mounted solar energy systems shall not exceed 10 feet in height.
 - ii. Commercial roof mounted solar energy system are permitted to project a maximum of 4 feet from the roof to which is it attached to. The pitch shall not exceed 40% at maximum tilt. Commercial ground mounted solar energy systems shall not exceed 15 feet in height at maximum tilt.
 - iii. Ground mounted solar energy systems must be engineered to include 3 feet of clearance from grade to bottom of the solar energy system.
- c. Location. In residential zoning districts, ground mounted solar energy systems shall be limited to the rear or side yard. In commercial, industrial and institutional districts, ground mounted solar energy systems may be permitted in front yards, side yards adjacent to public rights-of-way and rear yards.
- d. Setbacks. Ground mounted solar energy systems shall comply with all accessory structure setbacks in the applicable zoning district. Roof mounted 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 may be flush mounted or bracket mounted. Bracket mounted collectors shall be permitted only when a determination is made by the City Building Official that the underlying roof structure will support apparatus, wind, and snow loads and all applicable building standards are satisfied.
- f. Easements. Solar energy systems shall not encroach on public drainage, utility roadway or trail easements.
- g. Screening. Ground mounted systems shall be screened from view and the public right of way to the extent practicable without impacting their function. Solar energy systems are exempt from screening requirements for rooftop mechanical equipment.
- h. Maximum area.
 - i. Residential ground mounted solar energy systems shall be limited to 5% of the lot area.
 - ii. Commercial ground mounted solar energy systems shall be limited in size to the maximum area requirement allowed for accessory structures or no more than 25% of the yard in which the solar energy system is placed, whichever is less.
 - iii. Ground mounted solar energy systems are exempt from maximum impervious surface limitations in each zoning district.
 - iv. Aesthetics. All solar energy systems shall minimize glare toward vehicular traffic and adjacent properties.

- i. 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.
- j. Safety.
 - i. Standards. Solar energy systems shall meet the minimum standards outlined by the International Electrotechnical Commission (IEC), the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), ASTM International, British Standards Institution (BSI), International Organization for Standardization (ISO), Underwriter's Laboratory (UL), the Solar Rating and Certification Corporation (SRCC), the current Minnesota Building Code or other standards as determined by the City Building Official.
 - ii. 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 community development director. The city reserves the right to deny a building permit for proposed solar energy systems deemed to have inadequate certification.
 - iii. 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 shall be provided if required by the utility.
- k. Abandonment. If a solar energy system remains nonfunctional or inoperative for a continuous period of 1 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.
- l. Permit. A building permit shall be obtained for any solar energy system prior to installation. A building permit submittal must include the following: to-scale site plan, manufacturers and installation specifications, a complete structural review worksheet for residential roof mounted solar arrays and any additional information requested by city staff and/or the building official.

Subd. 2. Standards for Community Solar Energy Systems (Solar Garden).

- 1. Community Solar Energy Systems shall be allowed as an Interim Use in the Future Restricted Development (AG) and shall be processed according to the standards of Section 1010 (Interim Use Permits).
- 2. Community Solar Energy Systems shall not have a generating capacity of more than five (5) megawatts.
- 3. Community Solar Energy Systems shall be on properties of at least five (5) acres in size.
- 4. Prohibitions: The City prohibits all Community Solar Energy Systems within:

- a. The Shoreland Overlay District, as designated on the Big Lake zoning map.
 - b. Wetlands to the extent required by the Minnesota Wetland Conservation Act,
 - c. Within Six Hundred (600) feet of areas designated or formally protected from development by Federal, State or County agencies as wildlife habitat, wildlife management areas or designated as National Wild and Scenic land or corridor.
 - d. The Floodway District and the Flood Fringe District
 - e. Residential Districts, Business Districts.
 - f. All drainage and utility easements.
 - g. Two Hundred (200) feet of a principal structure existing at the time the Interim Use Permit is issued.
5. An interconnection agreement must be submitted to the utility company and proof be provided to the City that the utility company has deemed the agreement “complete”.
 6. All structures must meet the setback, height and coverage limitations for the zoning district in which the system is located, except as otherwise stated in this section.
 7. Screening. Solar energy systems shall be screened from view to the extent possible without reducing their efficiency, but are exempt from the strict requirements of Section 1027.04. Screening may include walls, fences or landscaping.
 8. The owner or operator shall be required to submit to the City, as part of the Interim Use Permit application, a detailed site plan showing both existing and proposed conditions. These plans shall show the location of all areas where solar arrays would be placed, the existing and proposed structures, property lines, access points, fencing, landscaping, surface water drainage patterns, floodplains, wetlands, the ordinary high water mark for all water bodies, any other protected resources, topography, electric equipment and all other characteristics requested by the City.
 9. All Community Solar Energy Systems shall meet the standards of the Minnesota Building Code and all applicable local, state and federal regulatory standards. The owner or contractor shall receive a building and/or mechanical permit before installing a Community Solar Energy Systems. Community Solar Energy Systems are subject to the accessory use standards for the district in which it is located, including setback, height and impervious surface coverage limits.
 10. The owner or operator of the Community Solar Energy Systems must submit to the City a detailed emergency shutdown plan as part of the review process.
 11. Signage shall be posted at all entrance points to the property the Community Solar Energy System is located on that includes at a minimum, the owner and operator's name, contact information and emergency phone numbers. All signage shall meet the requirements of Chapter 13 (Signs) of City Code.

12. Foundations. The manufacturer's engineer or another qualified engineer shall certify that the foundation and design of the solar panels meets the accepted professional standards, given local soil and climate conditions.
13. Power and communication lines. Power and communication lines running between banks of solar panels and to electric substations or interconnections with buildings shall be buried underground on premise. The City may grant exemptions to this requirement in instances where shallow bedrock, water courses or other elements of the natural landscape interfere with the ability to bury lines.
14. Decommissioning Plan: The City requires the owner or operator to submit a decommissioning plan for Community Solar Energy Systems to ensure that the owner or operator properly removes the equipment and facilities upon the end of project life or after their useful life. The owner or operator shall decommission the solar panels in the event they are not in use for twelve (12) consecutive months. The plan shall include provisions for the removal of all structures and foundations, the removal of all electrical transmission components, the restoration of soil and vegetation and a soundly-based plan ensuring financial resources will be available to fully decommission the site. The disposal of structures and/or foundations shall meet all federal, state and local requirements. The City may require the owner or operator to provide a current day decommissioning cost estimate and shall post a bond, letter of credit or establish an escrow account, including an inflationary escalator, in an amount determined by the City Council, to ensure proper decommissioning.

Subd. 3. Standards for Solar Farms.

1. Solar Farms shall be permitted as an Interim Use in the Future Restricted Development (AG) district, and shall be processed according to the standards of Section 1010 (Interim Use Permits).
2. Solar Farms shall be on properties of at least five (5) acres in size.
3. Stormwater management and erosion and sediment control shall meet the requirements of the City and best management practices.
4. Prohibitions: The City prohibits Solar Farms within:
 - a. The Shoreland Overlay District, as designated on the Big Lake zoning map.
 - b. Wetlands to the extent required by the Minnesota Wetland Conservation Act,
 - c. Within Six Hundred (600) feet of areas designated or formally protected from development by Federal, State or County agencies as wildlife habitat, wildlife management areas or designated as National Wild and Scenic land or corridor.
 - d. The Floodway and Flood Fringe Districts
 - e. All zoning districts except Future Restricted Development (AG) District.
 - f. All drainage and utility easements.

- g. Two Hundred (200) feet of a principal structure existing at the time the Interim Use Permit is issued.
5. An interconnection agreement must be submitted to the utility company and proof be provided to the City that the utility company has deemed the agreement “complete”.
6. All structures must meet the setback, height and coverage limitations for the zoning district in which the system is located, except as otherwise stated in this section.
7. Screening. Solar energy systems shall be screened from view to the extent possible without reducing their efficiency, but are exempt from the strict requirements of Section 1027.04. Screening may include walls, fences or landscaping.
8. Foundations. The manufacturer's engineer or another qualified engineer shall certify that the foundation and design of the solar panels meets the accepted professional standards, given local soil and climate conditions.
9. Power and communication lines. Power and communication lines running between banks of solar panels and to electric substations or interconnections with buildings shall be buried underground on premise. The City may grant exemptions to this requirement in instances where shallow bedrock, water courses or other elements of the natural landscape interfere with the ability to bury lines.
10. The owner or operator shall be required to submit to the City, as part of the Interim Use Permit application, a detailed site plan showing both existing and proposed conditions. These plans shall show the location of all areas where solar arrays would be placed, the existing and proposed structures, property lines, access points, fencing, landscaping, surface water drainage patterns, floodplains, wetlands, the ordinary high water mark for all water bodies, any other protected resources, topography, electric equipment and all other characteristics requested by the City.
11. All Solar Farms shall meet the standards of the Minnesota Building Code and all applicable local, state and federal regulatory standards. The owner or contractor shall receive a building and/or mechanical permit before installing a Solar Farm. Solar Farms are subject to the accessory use standards for the district in which it is located, including setback, height and impervious surface coverage limits.
12. The owner or operator of the Solar Farm must submit to the City a detailed emergency shutdown plan as part of the review process.
13. The City may allow the installation of small operations, security and equipment buildings on the site of solar farms as permitted accessory uses to the Solar Farm.
14. The owner or operator shall contain all unenclosed electrical conductors located above ground within structures that control access. In addition, solar farms shall be protected from entry by a minimum four (4) foot tall fence.

15. Signage shall be posted at all entrance points to the property the Solar Farm is located on that includes at a minimum, the owner and operator's name, contact information and emergency phone numbers. All signage shall meet the requirements of Chapter 13 (Signs) of the Zoning Code.
16. The Solar Farm owner or operator shall provide access to the Big Lake Fire Department either in the form of a lock or key to all access points to the property the Solar Farm is located on.
17. Solar Farms which have a generating capacity of 50 megawatts or more shall fall under the jurisdiction of the MN Public Utilities Commission (PUC).
18. Decommissioning Plan. The City requires the owner or operator to submit a decommissioning plan for Solar Farms to ensure that the owner or operator properly removes the equipment and facilities upon the end of project life or after their useful life. The owner or operator shall decommission the solar panels in the event they are not in use for twelve (12) consecutive months. The plan shall include provisions for the removal of all structures and foundations, the removal of all electrical transmission components, the restoration of soil and vegetation and a soundly-based plan ensuring financial resources will be available to fully decommission the site. The disposal of structures and/or foundations shall meet all applicant, federal, state and local requirements. The City may require the owner or operator to provide a current-day decommissioning cost estimate and shall post a bond, letter of credit or establish an escrow account, including an inflationary escalator, in an amount determined by the City Council, to ensure proper decommissioning.

Subd. 4. Additional standards. In addition to the standards outlined above, all solar energy systems shall meet the following standards.

1. The owners or operators of solar energy systems that are connected to the electric distribution or transmission system, either directly or through the existing service of the primary use on the site, shall obtain an interconnection agreement with the electric utility in whose service territory the system is located. Off-grid systems are exempt from this requirement.
2. Electric solar energy system components that are connected to a building electric system must have an Underwriters Laboratory (UL) listing.
3. All solar energy systems shall meet the standards of the Minnesota and National Electric Code.
4. All solar energy systems using a reflector to enhance solar production shall minimize glare from the reflector that affects adjacent or nearby properties. Steps to minimize glare nuisance may include selective placement of the system, screening on the north

side of the solar array, reducing use of the reflector system or other remedies that limit glare.

5. Abandonment. Any solar energy system which is inoperable for twelve (12) successive months shall be deemed to be abandoned and shall be deemed a public nuisance. The owner shall remove the abandoned system at their expense after obtaining a demolition permit.
6. Building Permit. A building permit shall be obtained for any solar energy system prior to installation.
7. All solar energy systems shall meet all federal and state requirements including the Public Utilities Commission (PUC) requirement and size requirements.

1036.04: WIND ENERGY CONVERSION SYSTEMS (WECS):

Subd. 1. Residential zoning districts.

1. Wind energy conversion systems shall be permitted as an accessory use, which conditions shall include, but are not limited to the following:
 - a. For lots under two acres in size wind energy conversion systems shall be roof mounted.
 - b. Height shall be limited to that of applicable zoning district regulation.
2. Conditional use permit required for any wind energy conversion systems, which conditions shall include, but are not limited to the following:
 - a. For lots under two acres in size, any roof mounted wind energy conversion system exceeding the allowed zoning district height regulation.
 - b. For lots over two acres and under 20 acres in size wind energy conversion systems shall be roof mounted or attached to a monopole in the rear yard that is under 100 feet in height.
 - c. For lots 20 acres and over, wind energy conversion systems shall be roof mounted or attached to a monopole that may be over 100 feet in height.
 - d. Lot line setbacks shall be equal to maximum turbine blade height. If over 100 feet in height the setback shall be as follows: for each foot over 100, add an additional 0.5 feet to the setback from residentially zoned lot line (example, a 150-foot tall tower would need to be setback 175 feet from the lot line).
 - e. Shoreland District setbacks shall apply.

Subd. 2. Nonresidential zoning districts.

1. Permitted accessory use if under 100 feet in height.
2. Conditional use if over 100 feet in height and/or more than one pole mounted on a lot.

3. Lot line setbacks shall be equal to maximum turbine blade height. If over 100 feet in height the setback shall be as follows: for each foot over 100, add an additional 0.5 feet to the setback from residentially zoned lot line (example, a 150-foot tall tower would need to be setback 175 feet from the lot line).
4. Shoreland District setbacks shall apply.
5. No limit on the number of roof mounted turbines.

Subd. 3. TOD District

1. For lots within the Station Zone, roof mounted wind energy conversion systems shall be permitted as an accessory use and subject to zoning height restrictions. Limit one roof mounted turbine per building.
2. For lots within the Midway and Transition Zone,
 - a. Permitted accessory use if under 100 feet in height.
 - b. Conditional use if over 100 feet in height and/or more than one pole mounted on a lot.
 - c. Lot line setbacks shall be equal to maximum turbine blade height. If over 100 feet in height the setback shall be as follows: for each foot over 100, add an additional 0.5 feet to the setback from residentially zoned lot line (example, a 150-foot tall tower would need to be setback 175 feet from the lot line).
 - d. Shoreland District setbacks shall apply.
 - e. Limit one roof mounted turbine per building allowed in Midway Zone. No limit on the number of roof mounted turbines in the Transition Zone.

Subd. 5. Downtown Design District

1. Roof mounted wind energy conversion systems shall be permitted as an accessory use and subject to zoning height restrictions. Limit one roof mounted turbine per building.

Subd. 6. For all zoning districts.

1. Free standing towers, where permitted, shall be of monopole design.
2. All wind energy conversion systems shall be equipped with an automatic overspeed control device as part of the design.
3. All wind energy conversion systems shall comply with Minnesota Pollution Control Agency noise standards outlined in Minnesota Rules Chapter 7030.
4. Minimum blade clearance to ground of 30 feet for pole mounted horizontal turbines.

5. Setbacks along public land may be waived or reduced at the discretion of public body in ownership of said land, subject to the review and approval of the city council.
6. All applicable provisions of chapter 9 of this Code, including, but not limited to, the applicable provisions of the state building codes therein adopted, shall be complied with, in addition to those requirements set out in this article and chapter 10.
7. Prior to the issuance of a permit, the applicant shall provide, among other things, to the city documentation or other evidence from the dealer or manufacturer that the wind energy conversion system has been successfully operated in atmospheric conditions and is warranted against any systems failures under reasonably expected severe weather operating conditions as established by the director of fire and building inspection services. The applicant shall also provide, among other things, to the city documentation that the tower structure for the system has received a professional engineer's certification.
8. Wind energy conversion system tower foundations shall be designed to resist two times the wind uplift calculated pursuant to the Uniform Building Code as adopted by the city and shall have a professional engineer's certification.
9. No wind energy conversion system tower shall be constructed 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 feet.
10. No wind energy conversion system or support tower of any kind shall be erected anywhere within the city without first making an application for and obtaining from the city a permit therefore which shall not be granted unless all requirements of this article are met and the proposed use will not be harmful to the public health, welfare and safety.
11. Wind energy conversion systems and towers shall be adequately grounded, as determined by the city engineer, for protection against a direct strike by lightning and shall comply, as to electrical wiring and connections, with all applicable federal regulations, state statutes, regulations, and standards, as well as city codes.
12. For all wind energy conversion system towers, effective measures shall be taken to prevent public interference and to place the tower in a substantially non-climbable condition. Effective measures include removal of climbing rungs or ladders from the bottom eight feet of the tower. The intention shall be to prevent climbing of the tower by unauthorized persons.
13. Except for illumination devices required by FAA regulations and residential lighting in compliance with city codes, no wind energy conversion system or tower shall have affixed or attached to it in any way any sign (does not include equipment labels),

- banner, or placard of any kind, except for one sign, not to exceed two square feet, which displays suitable warning of danger to unauthorized persons, the system's manufacturer, and emergency shut-down procedures.
14. All wind energy conversion systems shall comply with all applicable Federal Communications Commission regulations, as amended.
 15. All wind energy conversion systems shall comply with all applicable Federal Aviation Administration regulations, as amended.
 16. The interface of a wind energy conversion system with the consumer's electric service shall be pursuant to all applicable federal and state regulations. The city encourages the owner to notify his local electric utility company in advance and requests that both parties regulate their activities in a cooperative manner.
 17. If the wind energy conversion 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 mechanical equipment.