

AN ORDINANCE AMENDING TITLE VII, "ZONING AND PLANNING ORDINANCE" OF THE CITY CODE BY ENACTING A NEW CHAPTER 167, "ALTERNATIVE ENERGY SYSTEMS" AND OTHER AMENDMENTS RELATING TO THE SITING, PLACEMENT AND APPROVALS OF SUCH STRUCTURES IN THE CITY.

Legislative Findings

1. The City has the authority to enact legislation to regulate the construction, placement, and operation of Alternative Energy Systems pursuant to its zoning powers and additionally pursuant to its general and specific police powers established by statute, authorizing the regulations herein to protect the public health, safety and welfare.

2. The City Council finds that it is in the public interest to explore opportunities that encourage the development, where appropriate, of wind and solar energy production in a manner that is consistent with all state and federal environmental standards and that achieves reliable, cost-effective, sustainable energy production.

3. The City Council further finds that renewable energy production is part of the recently passed "Renew Missouri" initiative to establish a renewable alternative energy standard for the state and to increase jobs within the industry.

4. The City Council's signing of the Mayors Climate Protection agreement urges state and local government to explore alternative energy production methods that reduces the emission of carbon dioxide in the atmosphere, while still achieving energy production goals.

5. The newly adopted Gladstone Comprehensive Plan, through public engagement and support, encourages the City to analyze sustainable practices at all levels of City governments and incentives that promote sustainable practices in private development.

6. The City Council hereby finds and declares that the use of wind and solar energy can help reduce the nation's reliance upon irreplaceable domestic and imported fossil fuels; can reduce air and water pollution resulting from the use of conventional energy sources; requires effective legislation and efficient administration of state and local programs to be of greatest value to its citizens; and is of such importance to the public health, safety, and welfare that the City should take appropriate action to encourage its use.

7. A duly noticed and published public hearing was held regarding the proposed new regulations, including in conformance with all requirements of Missouri Revised Statutes Section 89.060, and

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF GLADSTONE, MISSOURI, as follows:

SECTION 1: The Code of Ordinances of the City is hereby amended by adopting a new Chapter 167, "Alternative Energy Systems" to be included within Title VII therein as attached hereto and incorporated herein.

SECTION 2: This Ordinance shall be in full force and effect both from and after its passage and approval by the City Council.

SECTION 3: AMENDMENT OF SECTION 7.100.010. Section 7.100.010 of the Gladstone Code of Ordinances is hereby amended to add the following new definitions:

1. **Blades:** shall mean the aerodynamic surface that catches the wind.
2. **Emergency Generator:** An engine that converts mechanical energy into electrical energy during times of electrical power outages or failure. Emergency generators are not regulated by this ordinance.
3. **Large/Utility Scale Wind Turbine:** shall mean a wind energy conversion system (WECS), consisting of a wind turbine, tower, and the associated control or conversion electronics, which has a rated capacity of more than 100 kW and which is intended to produce electricity for sale to a rate regulated or non-regulated utility or use off site. Turbines in this category are typically grouped together to form wind farms or a wind power plant, these groupings may also be referred to as a wind facility.
4. **Micro Wind Turbine:** shall mean a wind energy conversion system (WECS), consisting of a wind turbine, tower, and the associated control or conversion electronics, which has a rated capacity of 10 kW or less. Examples of items they can be used to power include small appliances in boats and campers, a few lights, or portable communication systems, such as radio equipment.
5. **Nacelle:** shall mean the body of the propeller-type wind turbine.
6. **Overspeed Controls:** shall mean mechanisms that are used to limit the speed of blade rotation to below the design limits of the WECS. The following systems describe different methods for slowing or stopping a wind turbine in the event of malfunction, for repairs, or any other incident as needed.
 - (a) **Braking:** shall mean a method of overspeed control that utilizes a disc brake, which can be applied mechanically, electrically, or hydraulically to stop the rotor in emergencies.
 - (b) **Feathering:** shall mean a method of overspeed control that rotates the blade axis, or rotors, at an angle to maintain the torque at rated wind speeds.
 - (c) **Furling:** shall mean the method of overspeed control by which the blades are turned away from the direction of the wind.
7. **Small Wind Turbine:** A wind energy conversion system consisting of a wind turbine, a tower, and associated control or conversion electronics, which has a rated capacity of more than 10 Kilowatts (kW) but less than 100 kW and which is intended to primarily reduce on-site consumption of utility power.
8. **Tower:** shall mean the monopole, freestanding, or guyed structure that supports a wind generator. Towers are made from tubular steel, concrete, or steel lattice. The vertical component of a wind energy conversion system that elevates and supports the wind turbine generator and attached blades above the ground up out of the turbulent wind.
9. **Tower Height:** The height above grade of the fixed portion of the tower, excluding the wind turbine itself.

10. **Total Extended Height:** The height above grade to a blade tip at its highest point of travel.
11. **Turbine:** shall mean the parts of a wind system including the blades and nacelle.
12. **Wind Energy Conversion System (WECS):** shall mean any machine designed for the purpose of converting wind energy into electrical energy. The WECS includes all parts of the system.

SECTION 4: Allowed Use

The Small Wind Energy Conversion System (SWECS) shall not be considered an accessory use under Title IX, Building and Construction Ordinance (BACO), Chapter 2300, Detached Accessory Structures and shall comply with all requirements under Section 5 of this chapter. Small wind energy conversion systems not meeting the performance standards of Section 5 may be allowed by a Special Use Permit following a duly noticed and published public hearing. The Community Development Director, for a Small Wind Energy Conversion System, may waive the fees for a Special Use Permit application. Publicly owned property, such as city parks, buildings, and school institutions are excluded from the performance standards in Section 5 below.

Administrative Process: The following items shall be submitted in support of an application for building permit for either (a) micro or (b) small wind turbine(s):

1. A plot plan, utilizing a standard engineering scale not to exceed 1:100, indicating the placement of the wind turbine(s) and distances from the proposed turbine location and the nearest built structure, any above ground utilities, the nearest trees, and all property lines. A fall zone shall be indicated on the plan to approximate the area around the base of the turbine that would likely receive the tower and turbine if it were to fall and shall be approved by the City Building Official.
2. Turbine information: specific information on the type, model, size, height, rotor material, rated power output, performance, safety, and noise characteristics of each wind turbine being proposed, tower and electrical transmission equipment.
3. Data in sufficient detail to allow for a determination that the proposed WECS shall meet all the standards of this ordinance.
4. Drawings of the wind turbine structure, including the tower, base, and footings: In addition, an engineering analysis of the tower showing compliance with the International Building Code certified by a licensed professional engineer.
5. Building permit applications for micro or small wind energy systems shall be accompanied by a line drawing of the electrical components in sufficient detail to allow for a determination that the manner of installation conforms to the adopted National Electrical Code (NEC). All building permits require installations to be designed and sealed by an engineer licensed in the State of Missouri, designs shall include structural analysis.
6. For compliant SWECS, permit fees may be waived.

Special Use Permit Process: The following items shall be submitted in support of a Special Use Permit application for (a) large/utility scale wind turbine(s):

1. All plan submission requirements of Title VII, Zoning and Planning Ordinance (ZAPO).
2. The site plan shall include the distance from the proposed turbine location and the nearest built structure, any above ground utilities, the nearest tree(s), and all property lines.
3. The proposed location and design of the wind facility, including all turbines, ground equipment, appurtenant structures, transmission infrastructure, access, fencing, exterior lighting, etc.
4. **Turbine information:** specific information on the type, model, size, height, rotor material, rated power output, performance, safety, and noise characteristics of each wind turbine being proposed, tower, and electrical transmission equipment.
5. A noise study, prepared by a qualified professional, shall demonstrate that except for short-term events such as utility outages and severe windstorms, the large/utility scale wind turbine shall not produce noise in excess of 55 dbA at the property lines. The noise study shall include:
 - (a) A description and map of the project's noise producing features, including the range of noise levels expected, and the basis for such expectations.
 - (b) A description and map of the noise sensitive environment, including any sensitive noise receptors (e.g. residences, hospitals, libraries, schools, places of worship, parks, areas with outdoor workers and other facilities where quiet is important or where noise could be a nuisance) within one-thousand-feet (1,000').
 - (c) A survey and report prepared by a qualified engineer that analyzes the pre-existing ambient noise (including seasonal variation) and the affected sensitive receptors located within one-thousand-feet (1,000').
 - (d) A description and map of the cumulative noise impacts.
 - (e) A description of the project's proposed noise control features and specific measures proposed to mitigate noise impacts for sensitive receptors as identified above to a level of insignificance.
6. **Soil:** A geotechnical report shall be furnished along with the certification which shall, at a minimum, include the following:
 - (a) Soils engineering and engineering geologic characteristics of the site based on on-site sampling and testing.
 - (b) Foundation design criteria for all proposed structures.
 - (c) Slope stability analysis.
 - (d) Grading criteria for ground preparation, cuts and fills, and soil compaction.
7. **Shadow/Flicker:** A shadow/flicker model shall demonstrate that shadow/flicker shall not fall on, or in any existing residential structure. The shadow/flicker model shall:
 - (a) Map and describe within a one-thousand-foot radius of the proposed wind energy system the topography, existing

residences and location of their windows, locations of other structures, wind speeds and directions, existing vegetation and roadways. The model shall represent the most probable scenarios of wind constancy, sunshine constancy, and wind directions and speed;

(b) Calculate the locations of shadow/flicker caused by the proposed project and the expected durations of the shadow/flicker at these locations, calculate the total number of hours per year of shadow/flicker at all locations;

(c) Identify problem areas where shadow/flicker will interfere with existing or future residences and roadways and describe proposed mitigation measures, including, but not limited to, a change in siting of the wind energy conversion system, a change in the operation of the wind energy conversion system, or grading or landscaping mitigation measures.

8. **Use of MET (Meteorological) Towers:** Met Towers may be utilized for large or utility scale wind turbines only as approved by the City Council. The location, height, and length of time such structures are to be erected shall be provided as part of the application for preliminary development plan and Special Use Permit.
9. **Impact on Wildlife:** A study shall be provided by a professional that demonstrates that the development and operation of the wind turbine(s) in question shall not have an adverse impact on endangered or threatened avian or bat species and their critical habitats.
10. **Additional Information:** The Director, Commission, or City Council may require additional technical studies deemed necessary to fully evaluate the application. Should the services of an outside consultant be needed to evaluate any such technical studies, the cost of such services shall be borne by the applicant.

SECTION 5: Small Wind Energy Conversion Systems (SWECS) may be permitted in all zoning districts subject to the following requirements:

1. **Setback:** The base of the tower shall be set back from all property lines, structures, public right-of-ways, and public utility lines a distance equal to the total extended height, not to exceed two times the maximum allowable height restrictions in all zoning districts. Only one wind turbine structure shall be allowed per lot in either a residential or commercially zoned property.
2. **Micro and Small WECS:**
 - (a). **Location:** All micro and small wind turbines shall be located in the rear yard only. Exceptions to this standard for small wind turbines may only be reviewed as part of the Special Use Permit application.
 - (b). **Utility Notification:** No building permit for a micro or small WECS shall be issued until a copy of the utility company's approval for interconnection of a customer-owned (SWECS) generator has been provided. Off-grid systems shall not be permitted, unless by Special Use Permit approval.
 - (c). Due to public health and safety concerns, facilities that use alternative energy systems exclusively for all power needs, and are not connected to a public power source or "grid" for any purpose,

(known as "off-grid" systems), shall not be permitted, unless a Special Use Permit is approved in accordance with this Ordinance.

3. **Roof-Mounted Wind Turbines:** Maximum height shall be equal to half the height of the building being utilized for support. The minimum setback for all roof top turbines shall be equal to the height of the tower from all property lines and any buildings.
4. **Minimum Blade Clearance:** The blade tip clearance for micro wind turbines shall, at its lowest point, have a ground clearance of not less than 15 feet. The minimum blade clearance for any other wind turbine shall be 30 feet.
5. **Color/Finish:** Wind turbines, exclusive of the towers, shall be painted a non-reflective, non-obtrusive color such as the manufacturer's default color option or a color that conforms to the environment and architecture of the community. Towers shall maintain galvanized steel, brushed aluminum or white finish, unless FAA standards require otherwise.
6. **Sound:** Sound produced by the turbine under normal operating conditions, as measured at the property line, shall not exceed the definition of nuisance noise. Sound levels, however, may be exceeded during short-term events such as utility outages, severe wind storms, or other causes outside the control of the property owner.
7. **Wind Turbine Equipment:** Small wind turbines must have been approved under the state public benefits program or any other small wind certification program recognized by the American Wind Energy Association.
8. **Wind Turbine Maintenance:** The owner of a wind turbine shall complete all necessary maintenance and improvements to the structure if it is determined to be inoperable or hazardous to neighboring properties.
9. **Requirement for Engineered Drawings:** Building permit applications for small wind energy systems shall be accompanied by standard drawings of the wind turbine structure and stamped engineered drawings of the tower, base, footings, and/or foundation as provided by the manufacturer. Wet stamps shall not be required.
10. **Soil Studies:** For standard soil conditions (not including gravel, sand, or muck), foundations developed by the wind turbine manufacturer shall be acceptable for turbine installations of 20kW or less and will not require project-specific soils studies or an engineer's wet stamp.
11. **Compliance with FAA Regulations:** No SWECS 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.
12. **Compliance with National Electric Code:** Building permit applications for SWECS shall be accompanied by a line drawing of the electrical components, as supplied by the manufacturer, in sufficient detail to allow for a determination that the manner of installation conforms to the National Electrical Code.
13. **Utility Notification:** No SWECS shall be installed until evidence has been given that the utility company has been informed of the customer's intent to install an interconnected (SWECS) customer-owned generator.
14. **Electrical Wires:** All electrical wires associated with a wind energy system shall be located underground.

15. **Self-Supporting Structures:** All tower structures shall be of monopole construction unless attached to a structurally reinforced roof where such support is not warranted. No lattice structures or towers requiring a guy wire supports shall be permitted.
16. **Safety Shutdown:** Each wind turbine shall be equipped with both manual and automatic overspeed controls to limit the rotational speed of the blade within the design limits of the rotor. Manual electrical and/or overspeed shutdown disconnect switches shall be provided and clearly labeled on the wind turbine structure. No wind turbine shall be permitted that lacks an automatic braking, furling, or feathering system to prevent uncontrolled rotation, overspeeding and excessive pressure on the tower structure, rotor blades, and turbine components.
17. **Abandonment:** If a wind turbine is determined to be inoperable the current property owner shall be notified that they must, within six months of receiving the notice, restore their system to operating condition or the property owner shall, at his/her expense, remove the wind turbine and tower for safety reasons. If the owner(s) fails to restore their system to operating condition within the six-month period, the tower then would be subject to the Public Nuisance provisions of the zoning code.
18. **Signage:** All signs, other than the manufacturer's or installer's identification, appropriate warning signs, or owner identification on a wind generator, tower, building, or other structure associated with a small wind energy system visible from any public road shall be prohibited.
19. **Lighting:** No illumination of the turbine or tower shall be allowed unless required by the FAA.
20. **Access:** Any climbing foot pegs or rungs below 12 feet of a freestanding tower shall be removed to prevent unauthorized climbing.

SECTION 6: AMENDMENT OF SECTION 7.100.010. Section 7.100.010 of the Gladstone Code of Ordinances is hereby amended to add the following new definitions:

1. **Active Solar System** - A solar energy system that transforms solar energy into another form of energy or transfers heat from a collector to another medium using mechanical, electrical, or chemical means.
2. **Building-integrated Solar Systems** - An active solar 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. Building-integrated systems include but are not limited to photovoltaic or hot water solar systems that are contained within roofing materials, windows, skylights, and awnings.
3. **Grid-intertie Solar System** - A photovoltaic solar system that is connected to an electric circuit served by an electric utility company.
4. **Off-grid Solar System** - A photovoltaic solar system in which the circuits energized by the solar system are not electrically connected in any way to electric circuits that are served by an electric utility company.
5. **Passive Solar System** - A solar energy system that captures solar light or heat without transforming it to another form of energy or transferring the energy via a heat exchanger.

6. **Photovoltaic System** - An active solar energy system that converts solar energy directly into electricity.
7. **Renewable Energy Easement, Solar Energy Easement** - An easement that limits the height or location, or both, of permissible development on the burdened land of structures or vegetation, or both, for the purpose of providing access for the benefited land to wind or sunlight passing over the burdened land.
8. **Renewable Energy System** - A solar energy or wind energy system. Renewable energy systems do not include passive systems that serve a dual function, such as a greenhouse or window.
9. **Roof Pitch** - The final exterior slope of a building roof calculated by the rise over the run, typically but not exclusively expressed in twelfths such as 3/12, 9/12, 12/12.
10. **Solar Access** - A view of the sun, from any point on the collector surface, that is not obscured by any vegetation, building, or object located on parcels of land other than the parcel upon which the solar collector is located, between the hours of 9:00 AM and 3:00 PM Standard time on any day of the year.
11. **Solar Collector** - A device, structure or a part of a device or structure for which the primary purpose is to transform solar radiant energy into thermal, mechanical, chemical, or electrical energy.
12. **Solar Collector Surface** - Any part of a solar collector that absorbs solar energy for use in the collector's energy transformation process. Collector surface does not include frames, supports and mounting hardware.
13. **Solar Daylighting** - A device specifically designed to capture and redirect the visible portion of the solar spectrum, while controlling the infrared portion, for use in illuminating interior building spaces in lieu of artificial lighting.
14. **Solar Energy** - Radiant energy received from the sun that can be collected in the form of heat or light by a solar collector.
15. **Solar Energy Device** - A system or series of mechanisms designed primarily to provide heating, to provide cooling, to produce electrical power, to produce mechanical power, to provide solar daylighting or to provide any combination of the foregoing by means of collecting and transferring solar generated energy into such uses either by active or passive means. Such systems may also have the capability of storing such energy for future utilization. Passive solar systems shall clearly be designed as a solar energy device such as a trombe wall and not merely a part of a normal structure such as a window.
16. **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 generating, or water heating.

17. **Solar Heat Exchanger** - A component of a solar energy device that is used to transfer heat from one substance to another, either liquid or gas.
18. **Solar Hot Water System** - A system that includes a solar collector and a heat exchanger that heats or preheats water for building heating systems or other hot water needs, including residential domestic hot water and hot water for commercial processes.
19. **Solar Mounting Devices** - Devices that allow the mounting of a solar collector onto a roof surface or the ground.
20. **Solar Storage Unit** - A component of a solar energy device that is used to store solar generated electricity or heat for later use.

Section 7: Active solar energy systems shall not be considered an accessory use under Title IX, Building and Construction Ordinance (BACO), Chapter 2300, Detached Accessory Structures, and shall comply with all requirements as set forth below.

1. **Height** - Solar systems shall not exceed the maximum allowed height in any zoning district. For purposes for height measurement, solar systems other than building-integrated systems shall be considered to be mechanical devices and are restricted consistent with other building-mounted mechanical devices.
2. **Set-back:** Active solar systems must meet the accessory structure setback for the zoning district and primary land use associated with the lot on which the system is located.
 - (a). **Roof-mounted Solar Systems:** In addition to the building setback, the collector surface and mounting devices for roof-mounted solar systems shall not extend beyond the exterior perimeter of the building on which the system is mounted or built. Exterior piping for solar hot water systems shall be allowed to extend beyond the perimeter of the building on a side yard exposure.
 - (b). **Ground-mounted Solar Systems:** Ground-mounted solar energy systems may extend into the side-yard or rear setback provided that no exposed electrical components, wires, or devices other than the solar collector are at any time within nine feet of the property line. No ground-mounted solar system shall be allowed in an approved easement. In all cases the entire system must maintain a one-foot setback from the property line.
3. **Visibility:** Active solar systems shall be designed to blend into the architecture of the building or be screened from routine view from public right-of-ways other than alleys. The color of the solar collector is not required to be consistent with other roofing materials except in those instances when a Special Use Permit is required consistent with the provisions of this ordinance. All active solar systems shall be consistent with any approved deed restrictions and covenants.
 - (a). **Building Integrated Photovoltaic Systems:** Building integrated photovoltaic solar systems shall be allowed regardless of visibility, provided the building component in which the system is integrated meets all required setback, land use or performance standards for the district in which the building is located.

(b). **Solar Systems with Mounting Devices:** Solar systems using roof mounting devices or ground-mount solar systems shall not be restricted if the system is not visible from the closest edge of any public right-of-way other than an alley. Roof-mount systems that are visible from the nearest edge of the street frontage right-of-way shall not have a highest finished pitch more than twenty (20) percent steeper than the roof pitch on which the system is mounted. Systems with a pitch more than twenty percent greater than the finished roof pitch must acquire a Special Use Permit.

4. **Approved Solar Components:** Electric solar system components must have a UL listing.
5. **Plan Approval Required:** All solar systems shall require administrative plan approval by the Community Development Department.
6. **Plan Applications:** At the discretion of the Building Official, plan applications for solar systems may be accompanied by to-scale horizontal and vertical (elevation) drawings. The drawings must show the location of the system on the building or on the property for a ground-mount system, including the property lines.
 - (a). **Pitched Roof Mounted Solar Systems:** For all roof-mounted systems other than a flat roof the elevation must show the highest finished slope of the solar collector and the slope of the finished roof surface on which it is mounted.
 - (b). **Flat Roof Mounted Solar Systems:** For flat roof applications a drawing shall be submitted showing the distance to the roof edge and any parapets on the building and shall identify the height of the building on the street frontage side, the shortest distance of the system from the street frontage edge of the building, and the highest finished height of the solar collector above the finished surface of the roof.
7. **Plan Approvals:** Applications that meet the design requirements of this ordinance, and do not require a Special Use Permit, shall be granted administrative approval by the Community Development Department. Plan approval does not indicate compliance with Building Code and Electric Code or approval by the Building Official.
8. **Compliance with Building Code:** All active solar systems shall meet approval of local construction codes.
9. **Utility Notification:** No grid-intertie photovoltaic system shall be installed until evidence has been presented to the Community Development Department that the owner has submitted notification to the utility company of the customer's intent to install an interconnected customer-owned generator. Off-grid systems shall not be permitted, unless by Special Use Permit approval.

(a). Due to public health and safety concerns, facilities that use alternative energy systems exclusively for all power needs, and are not connected to a public power source or "grid" for any purpose, (known as "off-grid" systems), shall not be permitted, unless a Special Use Permit is approved in accordance with this Ordinance.

10. **Special Use Permit:** Where the standards in Section 7 are not met, active solar energy systems shall be considered by a Special Use Permit request. The following conditions shall govern approval of a Special Use Permit application for an active solar energy system. The Community Development Director, for Active Solar Energy Systems, may waive the fees for a Special Use Permit application.


11. **Standards for Solar System Special Use Permits:** When a Special Use Permit is required, the permit may be granted if the applicant demonstrates that the following safety and aesthetic conditions are met:

(a). **Aesthetic Conditions:** The solar system must blend into the building on which the system is mounted by being sufficiently set back from public right-of-ways or screened from view from the right-of-way, or by using a surface collector color that blends into the roof or wall of the building as seen from the public right-of-way.

(b). **Safety Conditions:** The solar system must be anchored in such a manner as to withstand windspeeds up to 90 mph, and must be set back from adjoining properties far enough to not present a threat to accidental contact with electrical components, but in any case no farther than the building setback.

13. **Pole-mounted Systems Restricted:** Pole-mounted or ground-mounted active solar systems shall not be allowed in residential districts between the front of the building and the front public right-of-way.

PASSED, SIGNED, AND MADE EFFECTIVE BY THE COUNCIL OF THE CITY OF GLADSTONE, MISSOURI, this 26th day of October, 2009.



Carol A. Rudi, Mayor

ATTEST:



Cathy Swenson, City Clerk

1st Reading: October 12, 2009 2nd Reading: October 26, 2009