II. B.

Memorandum
Planning & Development Services Division

To: **Planning and Public Works Committee**

From: Aimee E. Nassif, Planning and Development Services Director

Date: August 8, 2013

RE: **Renewable Energy for Residential Properties**

Background

At the direction of the Planning and Public Works Committee, Staff has been working on draft language for inclusion in the City Code for the regulation of renewable energy systems on residential properties. After consultation with the City Attorney and research from a variety of sources, Staff began presenting draft language to this Committee for discussion in February 2012. At that time, the Committee asked for additional information pertaining to current practices for permit review, inspections by entities such as the fire district, and current homeowner solar rights laws.

In March, at the direction of this Committee, Staff presented the information requested above along with draft language for a new City Code provision for the regulation of renewable energy structures on residential property only. At this meeting, the Committee asked for additional information pertaining to height restrictions for both ground mounted and roof mounted systems as well as additional information for screening of ground mounted systems. Staff has completed this research and presents the following information for your consideration and review.

Height Restrictions for ground mounted and roof mounted systems

Height restrictions for ground mounted solar energy systems vary from municipality to municipality ranging in general from a maximum allowed of 3 feet in height up to 20 feet in height. Current draft language in the ordinance attached to this report restricts the height to a maximum of 10 feet.

The height restriction for roof mounted solar energy systems is fairly consistent in that most other city codes that we researched require that said systems shall not exceed the height of the existing roofline and in some municipalities it is required to be mounted parallel to the roof plane; no more than 8 or 12 inches higher than the roof's surface. Current draft language in the ordinance attached to this report restricts the height of roof mounted systems and includes that said systems shall be mounted to the existing roof and not project more than 12 inches above the surface. It should be noted that this ordinance pertains only to residential properties. As discussed previously, once this ordinance is complete, an ordinance dealing with all nonresidential properties will be addressed.

Height Restrictions for wind energy systems

There are a variety of ways in which existing city codes in nearby and distant municipalities address height of wind energy systems. For the most part, the maximum height permitted is the height permitted for any structure in the district in which the site is located. However, the main area of concern discussed from the last meeting was the height of wind energy systems that may be mounted to the roof of an existing structure. Local and nationally, wind energy systems are treated in a variety of ways on residential properties which range from very little regulations to a complete prohibition. Staff recommends restricting the height of wind energy systems to no taller than the height of the existing residential structure on the site (similar to the City Code in O'Fallon, MO).

Screening of ground mounted solar energy and ground source heat pump systems

Lastly, Staff was asked to propose additional language specifying the screening requirements for these ground mounted systems. The City of Clayton currently has the most specific requirements related to screening which is:

> *Ground-mounted solar energy systems must be substantially screened from public view (including adjacent properties and public rights-of-way) by fencing, walls, plantings or other architectural feature or any combination thereof; provided however, that screening shall not be required to be so dense, so tall or so located as to render the equipment essentially non-functional.*

Staff recommends utilizing this language as shown above and has included said language for your consideration in the attached draft.

Request

The draft ordinance attached to this report includes updated language pertaining to screening and height limitations as described above. Page 2 of the attached draft ordinance also includes language regarding how the height of ground mounted solar energy systems will be calculated. In addition, you will notice that language pertaining to ground source heat pump systems has also been included. As this ordinance now pertains to all types of renewable energy systems and sources, Staff has incorporated language restricting this renewable energy source into the draft language for your consideration.

Staff has completed research directed by the Planning and Public Works Committee and seeks direction on the proposed draft language.

Respectfully submitted,

Aimee E. Nassif, AICP
Planning & Development Services Director

Attachment A

Residential Renewable Energy Ordinance.

1. *Purpose.* The purpose of this Section of the City Code is to promote the use of renewable energy and to provide for the development, installation, and construction of solar and small wind energy systems on residential property subject to criteria and regulations established to protect the public health, safety and welfare of the residents of the City.

2. *Definitions.* For the purposes of this Ordinance, terms used for renewable energy structures shall be defined as follows:

    1) Building Integrated Photovoltaic System (BIPV). 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. PV shingles or tiles, PV laminates, and PV glazing are all examples of BIPV.
    2) Glare. The effect produced by light reflecting from a solar energy system with an intensity sufficient to cause annoyance, discomfort, or loss in visual performance and visibility.
    3) Ground-Mounted Solar Energy System. A solar energy system that is not attached to a structure and is affixed to the ground.
    4) Ground Source Heat Pump System. A system that uses the relatively constant temperature of the earth to provide heating in the winter and cooling in the summer.
    5) Ground Source Heat Pump System, Closed Loop. A system that circulates a heat transfer fluid, typically food-grade anti-freeze, through pipes or coils buried beneath the land surface.
    6) Ground Source Heat Pump System, Horizontal. 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 twenty (20) feet below the surface.
    7) Ground Source Heat Pump System, Open Loop. A system that uses ground water as a heat transfer fluid by drawing ground water from a well to a heat pump and then discharging the water over land, directly in a water body or into an injection well.
    8) Ground Source Heat Pump System, Vertical. A closed loop ground system heat pump where the loops or coils are installed vertically in one (1) or more borings below the land surface.
    9) Photovoltaic (PV) System. A solar energy system that converts sunlight into electrical energy.
    10) Roof-Mounted Solar Energy System. A solar energy system affixed to the roof of either a principal or accessory structure.

11) Small Wind Energy System. A structure designed for the purpose of converting wind energy into electrical energy to reduce on-site consumption of utility power.
12) Solar Energy System. A structure designed for the purpose of collecting and transforming solar energy into thermal or electrical energy. Solar energy systems may include photovoltaic or solar thermal systems.
13) Solar Thermal System. A solar energy system that uses sunlight to produce heat that is used for space heating and cooling, domestic hot water, and heating pool water.

3. *Applicability.*

1) Solar and small wind energy systems are structures which shall be permitted on all residential property zoned residential, estate or non-urban district.
2) The requirements of the City Code shall apply to all solar and small wind energy systems installed or modified after the effective date of this Ordinance on all residential property zoned residential, estate or non-urban district.
3) Any upgrade, modification, or structural change that alters the size or placement of an existing solar or small wind energy system shall comply with the provisions of this Section.

4. *Solar Energy Systems – Minimum Requirements.*

1) The following general requirements apply to all solar energy systems. All solar energy systems shall:

a) Comply with all minimum yard structure setback requirements for the zoning district in which the property is located;
b) Be placed in such a manner that glare will not be directed onto nearby properties or adjacent streets; and
c) Adhere to Chapter 7 of the City Code pertaining to minimum standards for property maintenance.

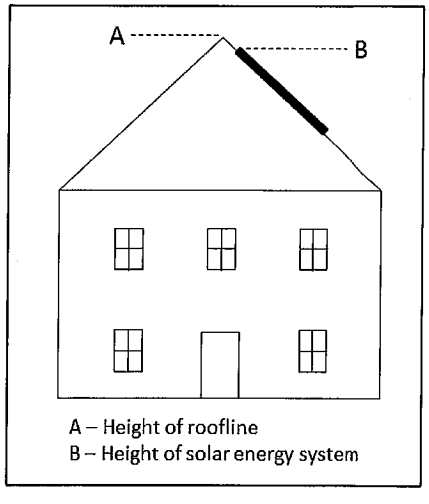
2) Minimum Requirements for Ground-Mounted Solar Energy Systems. All ground-mounted solar energy systems shall:

a) Be located in the rear yard of the residential property;
b) Not exceed ten (10) feet in height as measured from the average grade at the base of the structure to the highest point of the structure;
c) Have all exterior electrical and/or plumbing lines connecting to a principal or accessory structure be located underground; and
d) Be screened by vegetation or fencing to minimize visibility from adjacent properties and the right-of-way.

3) Minimum Requirements for Roof-Mounted Solar Energy Systems.

a) All roof-mounted solar energy systems shall be mounted on a principal or accessory building or structure.
b) Mounting on sloped roofs:

1. System shall not exceed the height of the existing roofline as illustrated below and shall be mounted parallel to the roof (not to exceed twelve [12] inches) so as to not appear to project above the original design surface.
2. System shall be positioned in a symmetrical fashion and centered on the plane of the roof on which it is located.
3. System shall be set back at least two (2) feet from any outside edge, ridge, or valley of the roof.



A – Height of roofline
B – Height of solar energy system

c) Mounting on flat roofs. When located on a flat roof, roof-mounted solar energy systems shall be screened from public view by parapet walls or other architectural screening as approved by the City. The height of the solar energy system shall not exceed the maximum height permitted for residential dwelling units in the district in which the property is located.

4) Building-Integrated Photovoltaic Systems.

a) Building-integrated photovoltaic systems may be located on any roof plane or wall.

5. *Small Wind Energy Systems – Minimum Requirements.* One small wind energy system shall be permitted per residential lot and shall:

1) Comply with all minimum yard structure setback requirements for the zoning district in which the property is located;
2) Only be located in the rear yard of the residential property;
3) Have a maximum tower height that does not exceed the maximum height permitted for a structure in the zoning district in which the tower is located or the maximum height of the existing residential structure, whichever is less;
4) Height shall be measured as the distance from average grade at the base of the structure to the highest point of the structure;
5) Adhere to Chapter 7 of the Chesterfield City Code pertaining to minimum standards for property maintenance;
6) Be placed in such a manner that glare will not be directed onto nearby properties or adjacent street and does not create significant shadow flicker impacts. "Significant shadow flicker" is defined as more than 30 hours per calendar year on abutting occupied buildings;
7) Have a sound level that does not exceed 60 decibels as measured at the site property line, except during short-term events such as severe wind storms and utility outages;
8) Either be stock color from the manufacturer or painted with a non-reflective, unobtrusive color that blends in with the surrounding environment;
9) Have all exterior electrical lines located underground; and
10) Not be illuminated by artificial means, except where the illumination is specifically required by the Federal Aviation Administration or other federal, state, or local regulations.

6. *Ground Source Heat Pump Systems – Minimum Requirements*

1) Only closed loop ground source heat pump systems utilizing heat transfer fluids as defined are permitted. Open loop ground source heat pump systems are prohibited.
2) Setbacks
    a) All components of ground source heat pump systems including pumps, borings and loops shall be set back at least five (5) feet from all property lines.
    b) Above ground equipment associated with ground source heat pumps shall not be installed in a front yard. Equipment shall be located in the side or rear yard, set back at least five (5) feet from the property line.
    c) Ground source heat pumps systems shall not be located or encroach upon any recorded easement.

7. *General Review Process.* Municipal Zoning Approval is required for all solar, small wind energy systems and ground source heat pump systems prior to the issuance of a building permit The following information shall be submitted to the Planning and Development Services Division:

1) An Application for Municipal Zoning Approval.
2) Five (5) copies of a plot plan, drawn to scale and including the following information:

    a) Location and size of the renewable energy structure, including the height of the residential structure, the maximum height of the solar or small wind energy system, and the height of all other structures located on the property;
    b) The location and type of screening for proposed ground-mounted solar energy systems;
    c) All existing and proposed easements/rights-of-way on the site;
    d) Specific structure setbacks in accordance with the structure setbacks established in the governing zoning district;
    e) For small wind energy systems, the Applicant shall have the burden of proving the shadow flicker will not have significant adverse impact on neighboring or adjacent uses. Potential shadow flicker will be addressed either through siting or mitigation measures; and
    f) Any other information as required by the City of Chesterfield.

8. *Appeal.* Decisions of the Planning & Development Services Director regarding the application of this ordinance may be appealed to the Board of Adjustment in accordance with applicable procedures as established by the Board of Adjustment.

9. *"Grandfathered" or Existing Solar, Ground Source Heat Pumps and Small Wind Energy Systems.* Solar, ground source heat pumps and small wind energy systems lawfully installed and operable on residential property, prior to the effective date of this Section of the City Code, are exempt from the requirements herein unless:

    1) The solar, ground source heat pumps or small wind energy system is moved to another location on the property, enlarged, or replaced with a new system; or
    2) Any other work or alteration is done to the existing solar, ground source heat pumps or small wind energy system that requires Municipal Zoning Approval by the City.

10. *Penalty for Violation.* This ordinance and the requirements thereof are exempt from the warning and summons for violation set in Section 1003.410 of the Zoning Ordinance of the City of Chesterfield.