# Chapter 53: Solar Energy

## Sec. 53-1 Purpose

An ordinance to update the Code of the City of Eatonton, adding a chapter to permit solar energy systems as permitted, conditional, and special exception uses in any zoning district, and to add requisite definitions therein.

This ordinance aims to promote the accommodation of distributed, on-site residential and non-residential solar energy systems installed to reduce on-site energy consumption and associated equipment, as well as adequate access to sunlight necessary for such systems.

This ordinance permits, depending on zoning district, solar energy systems, while protecting the safety and welfare of adjacent and surrounding land uses through appropriate zoning and land-use controls.

A solar energy system shall be permitted in any zoning district as an accessory use, subject to specific criteria as set forth below. Where general standards and specific criteria overlap, specific criteria shall supersede general standards.

## Sec. 53-2 Definitions

*Accessory Use*: A subordinate building or use which is customarily incidental to the principal use or building, and which is located on the same lot with the principal use or building, as defined in Section 75-4(c) of this code.

*Battery Back-Up*: A battery system that stores electrical energy from a solar PV system, making the electricity available for future use. Battery Back-Up systems are common in Off-Grid Systems and Hybrid Systems.

*Combiner or Junction Box*: Combines the inputs (electrical flows) from multiple strings of solar panels (or micro-inverters) into one output circuit.

*Crystalline Silicon Cells*: Solar photovoltaic cells fashioned from either mono-crystalline, multi-crystalline, or ribbon silicon capable of converting sunlight into electricity. Crystalline silicon solar PV panels are the most commonly used and are generally the most efficient.

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*Distributed Solar*: For the purposes of this Ordinance, distributed solar refers to solar energy systems located on-site and designed to provide solar thermal energy or solar PV electricity to a property owner, occupant, and/or facilities.

*Grid-tied Solar*: A solar PV system that is interconnected with the utility grid via net metering and interconnection agreements with the utility.

*Electricity Generation* (aka production, output): The amount of electric energy produced by transforming other forms of energy, commonly expressed in kilowatt-hours (kWh) or megawatt-hours (MWh).

*Electrical Equipment:* Any device associated with a solar energy system, such as an outdoor electrical unit/control box, that transfers the energy from the solar energy system to the intended on-site structure.

*Grid-tied Solar Photovoltaic Systems* (aka grid-tied PV, on-grid, grid-connected, utility-interactive, grid-intertied, or grid-direct): Solar photovoltaic electricity generation systems designed to serve the electricity needs of the building to which it is connected, thus offsetting a home's or business's electricity usage. Any excess electricity generated is sent to the electric utility grid, credited via a customer's net metering agreement with their local utility. Grid-tied are typically installed without a battery back-up system to store electricity. As such, these systems provide no power during an outage. Typical system components: PV panels, inverter(s), and required electrical safety gear.

*Ground-Mount System:* A solar energy system that is directly installed on specialized solar racking systems, which are attached to an anchor in the ground and wired to connect to an adjacent home or building. Ground-mount systems may be applicable when insufficient space, structural and shading issues, or other restrictions prohibit rooftop solar.

*Hybrid Solar Photovoltaic Systems* (aka grid-tied PV with battery back-up): Solar photovoltaic electricity generation systems designed to serve the electricity needs of the building to which it is connected, thus offsetting a home's or business's electricity usage, while also utilizing a battery back-up in the event of a power outage. This is the only system that provides the ability to have power when the utility grid is down. Typical system components include: PV panels, inverter(s), and required electrical safety gear, battery bank, and a charge controller.

*International Residential Code* (IRC): Part of the International Building Code (IBC), the IRC sets buildings standards for residential structures.

*Inverter*: A device that converts the Direct Current (DC) electricity produced by a solar photovoltaic system to useable alternating current (AC).

*Kilowatt* (kW): Equal to 1000 Watts; a measure of the use of electrical power.

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*Kilowatt-hour* (kWh): A unit of energy equivalent to one kilowatt (1 kW) of power expended for one hour of time.

*Mounting:* The manner in which a solar PV system is affixed to the roof or ground (i.e. roof mount, ground mount, pole mount).

*Megawatt* (MW): Equal to 1000 Kilowatts; a measure of the use of electrical power.

*Megawatt-hour* (MWh): A unit of energy equivalent to one Megawatt (1 MW) of power expended for one hour of time.

*National Electrical Code* (NEC): Sets standards and best practices for wiring and electrical systems.

*Net Meter*: On-grid solar PV systems connected to the utility grid use a net meter; typically provided and installed by the local utility, to measure the flow of electricity from the solar system for the purposes of net metering.

*Net Metering*: A billing arrangement that allows customers with grid-connected solar electricity systems to receive credit for any excess electricity generated on-site and provided to the utility grid.

*Off-Grid Solar Photovoltaic Systems with Battery Back-Up*: Solar photovoltaic electricity systems designed to operate independently from the local utility grid and provide electricity to a home, building, boat, RV (or remote agricultural pumps, gates, traffic signs, etc.). These systems typically require a battery bank to store the solar electricity for use during nighttime or cloudy weather (and/or other back-up generation). Typical system components include: PV panels, battery bank, a charge controller, inverter(s), required disconnects, and associated electrical safety gear.

*Orientation* (or Azimuth): In the northern hemisphere, true solar south is the optimal direction for maximizing the power output of solar PV. Although, systems can be oriented east, southeast, southwest, and west, while still providing 75-85 percent of maximum production, depending on the tilt. Proper orientation and access to sun are critical for achieving maximum energy production potential (ideally, the orientation of the solar energy system ensures that solar access is not obstructed by other buildings, shade trees, chimneys, HVAC systems, or other equipment).

*Passive Solar*: Techniques, design, and materials designed to take advantage of the sun's position (and the local climate) throughout the year to heat, cool, and light a building with the sun. Passive solar incorporates the following elements strategically to maximize the solar potential of any home or building (namely, maximizing solar heat gain in winter months and minimizing solar heat gain in summer months to reduce heating/cooling demand; and maximizing the use of daylighting to reduce demand for electricity for lighting): strategic design

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and architecture, building materials, east-west and building lot orientation, windows, landscaping, awnings, ventilation

*Photovoltaic* (PV) *System*: A solar energy system that produces electricity by the use of semiconductor devices, called photovoltaic cells, which generate electricity when exposed to sunlight. A PV system may be roof-mounted, ground-mounted, or pole-mounted.

*Pole-Mount Systems*: A solar energy system that is directly installed on specialized solar racking systems, which are attached to a pole, anchored and firmly affixed to a concrete foundation in the ground, and wired underground to an attachment point at the building's meter. Unlike ground-mount systems, pole-mount systems are elevated from the ground. Pole-mounted systems can be designed to track the sun (with single-axis or dual-axis tracking motors) and maximize solar output throughout the year.

*Power*: The rate at which work is performed (the rate of producing, transferring, or using energy). Power is measured in Watts (W), kilowatts (kW), Megawatts (MW), etc.

*PV-Direct Systems*: The simplest of solar photovoltaic electric systems with the fewest components (no battery back-up and not interconnected with the utility) designed to only provide electricity when the sun is shining. Typical system components include: PV panels, required electrical safety gear, and wiring.

*Racking*: Solar energy systems are attached securely and anchored to structural sections of the roof-mounted or pole-mounted systems. Specially designed metal plates called flashings prevent leaks and are placed under shingles and over bolts to create a water-tight seal.

*Roof-Mount System* (aka rooftop mounted, building mounted): A solar energy system consisting of solar panels are installed directly on the roof of a home, commercial building, and/or an accessory structure, such as a garage, pergola, and/or shed. Solar panels are mounted and secured using racking systems specifically designed to minimize the impact on the roof and prevent any leaks or structural damage. Roof-mount systems can be mounted flush with the roof or tilted toward the sun at an angle.

*Solar Access*: The ability of one property to continue to receive sunlight across property lines without obstruction from another's property (buildings, foliage or other impediment).

*Solar Array*: Multiple solar panels combined together to create one system.

*Solar Collector*: A solar PV cell, panel, or array, or solar thermal collector device, that relies upon solar radiation as an energy source for the generation of electricity or transfer of stored heat.

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*Solar Easement*: An easement recorded pursuant to O.C.G.A. § 44-9-20 -§ 44-9-24, the purpose of which is to secure the right to receive sunlight across the real property of another for the continued access to sunlight necessary to operate a solar energy system. According to Georgia law, parties may voluntarily enter into written solar easement contracts that are enforceable by law. An easement must be created in writing and filed, duly recorded and indexed in the office of the recorder of the county in which the easement is granted. A solar easement, once created, runs with the land and does not terminate unless specified by conditions of the easement.

*Solar Energy System*: A system capable of collecting and converting solar radiation into heat or mechanical or electrical energy and transferring these forms of energy by a separate apparatus to storage or to point of use, including, but not limited to, water heating, space heating or cooling, electric energy generation, or mechanical energy generation. This definition shall include Solar Thermal, Photovoltaic, and Passive Solar Systems.

*Solar Energy System, Small-Scale:* An Active Solar Energy System that occupies 1,750 square feet of surface area or less (equivalent to a rated nameplate capacity of about 10 kW DC or less).

*Solar Energy System, Medium-Scale*: An Active Solar Energy System that occupies more than 1,750 but less than 40,000 square feet of surface area (equivalent to a rated nameplate capacity of about 10 - 250 kW DC).

*Solar Energy System, Large-Scale*: An Active Solar Energy System that occupies more than 40,000 square feet of surface area (equivalent to a rated nameplate capacity of about 250kW DC or greater).

*Solar Farm*: A large-scale utility and/or commercial solar energy system, the full size of which is six acres or more.

*Solar Glare*: The potential for solar panels to reflect sunlight, with an intensity sufficient to cause annoyance, discomfort, or loss in visual performance and visibility.

*Solar Photovoltaic (Solar PV) System*: Solar systems consisting of photovoltaic cells, made with semiconducting materials, that produce electricity (in the form of direct current (DC)) when they are exposed to sunlight. A typical PV system consists of PV panels (or modules) that combine to form an array; other system components may include mountain racks and hardware, wiring for electrical connections, and power conditioning equipment, such as an inverter and/or batteries.

*Solar Panel* (or module): A device for the direct conversion of sunlight into useable solar energy (including electricity or heat).

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*Solar Process Heat*: Technologies that provide industrial specific applications, including ventilation air preheating, solar process heating, and solar cooling.

*Solar-Ready*: The concept of planning and building with the purpose of enabling future use of solar energy generation systems. Solar-ready buildings, lots, and developments make it easier and more cost-effective to utilize passive solar techniques and adopt active solar technologies in the future. Solar-ready buildings are built anticipating future installation of active solar energy systems (including structural reinforcement, pre-wiring or plumbing for solar, and east-west building orientation). Solar-ready lots are oriented to take maximal advantage of a location's solar resource. Solar-ready developments expand this concept to entire subdivisions.

*Solar Thermal System* (aka Solar Hot Water or Solar Heating Systems): A solar energy system that directly heats water, or other liquid using sunlight. Systems generally consist of a series of tubes that concentrate light to heat either water or a heat-transfer fluid (such as food-grade propylene glycol, a non-toxic substance) in one of two types of collectors (flat-plate collectors and evacuated tube collectors). The heated liquid is used for such purposes as space heating and cooling, domestic hot water, and heating pool water.

*Thin Film Solar PV*: Capable of generating electricity from the sun, thin film solar PV cells consist of layers of semiconductor materials (made from amorphous silicon, cadmium telluride, copper indium gallium diselenide, among other materials) a few micrometers thick, which allow for greater flexibility. Thin film is made by depositing one or more thin layers of photovoltaic material on a substrate; products include rooftop shingles and tiles, building facades, the glazing for skylights, and other building integrated materials.

*Tilt*: The angle of the solar panels and/or solar collector relative to their latitude. The optimal tilt to maximize solar production is perpendicular, or 90 degrees, to the sun's rays at true solar noon.

*True Solar Noon:* When the sun is at its highest during its daily east-west path across the sky (this is also known as 0° Azimuth). Solar energy systems can be manually or automatically adjusted throughout the year. Alternatively, fixed-tilt systems remain at a static tilt year-round

*Watts* (W): A measure of the use of electrical power (power (Watts) = voltage (volts) X current (Amps).

*Wiring*: Specified by electrical codes, solar PV system wires are routed from the panels or micro-inverters through conduit into the inverter and buildings meter.

## Sec. 53-3 Applicability

(1) This Ordinance applies to all distributed solar systems installed and constructed after the effective date of this Ordinance. For purposes of this Ordinance, "solar energy system" means a distributed solar energy system as defined herein.

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(2) Solar energy systems constructed prior to the effective date of this Ordinance shall not be required to meet the requirements of this Ordinance.

(3) All solar energy systems shall be designed, erected, and installed in accordance with applicable local, state, utility, and national codes, regulations, and standards.

## Sec. 53-4 Placement by Zoning District

Solar energy systems shall be authorized in the zoning districts of the City of Eatonton as follows:

| | All Roof Mounted | Ground – Small (< 1750 sq. ft.) | Ground – Medium (1750 – 40,000 sq. ft.) | Ground – Large ( >40,000 sq ft.) |
|---|---|---|---|---|
| A-1 Agricultural | Permitted (Accessory) | Permitted | Permitted | Permitted (Special Permit) |
| A-2 Agricultural | Permitted (Accessory) | Permitted | Permitted | Permitted (Special Permit) |
| R-1 Residential Low-Density | Permitted (Accessory) | Permitted (Accessory) | Permitted (Conditional) | Prohibited |
| R-2 Residential Low Density | Permitted (Accessory) | Permitted (Accessory) | Permitted (Conditional) | Prohibited |
| R-3 Residential Medium Density | Permitted (Accessory) | Permitted (Accessory) | Permitted (Conditional) | Prohibited |
| R-4 MHP Manufactured Home Park Districts | Permitted (Accessory) | Permitted (Accessory) | Permitted (Conditional) | Prohibited |
| C-1 Local Commercial District | Permitted (Accessory) | Permitted (Accessory) | Permitted (Conditional) | Permitted (Special Permit) |
| C-2 General Commercial District | Permitted (Accessory) | Permitted (Accessory) | Permitted (Conditional) | Permitted (Special Permit) |

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|---|---|---|---|---|
| I-1 Light Industrial District | Permitted (Accessory) | Permitted | Permitted | Permitted (Special Permit) |
| I-2 Heavy Industrial District | Permitted (Accessory) | Permitted | Permitted | Permitted (Special Permit) |
| DB-Downtown Business Overlay | Permitted as per underlying district | Permitted as per underlying district | Prohibited | Prohibited |

## Sec. 53-5 Solar Energy System Requirements

(1) To the extent practicable, and in accordance with Georgia law, the accommodation of solar energy systems and associated electrical equipment, shall be encouraged in the application of the various review and approval provisions of the Eatonton code.

(2) Solar energy systems are permitted in all zoning districts as noted in Section 53-4 of this Ordinance.

(3) A solar energy system may provide power for the principal use and/or accessory use of the property on which the solar energy system is located, but is not required to do so.

(4) The installation and construction of a *roof-mount solar energy system* shall be subject to the following development and design standards:

a. A roof or building-mounted solar energy system may be mounted on a principal or accessory building.

b. Any height limitations of the Eatonton Code shall not be applicable to solar collectors, provided that such structures are erected only to such height as is reasonably necessary to accomplish the purpose for which they are intended to serve.

c. Placement of solar collectors on flat roofs shall be allowed by right, provided that panels do not extend horizontally past the roofline.

(5) The installation and construction of a *ground-mount or pole-mount solar energy system* shall be subject to the following development and design standards:

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a. The height of the solar collector and any mounts shall not exceed 20 feet when oriented at maximum tilt.

b. The surface area of a ground- or pole-mounted system, regardless of the mounted angle, shall be calculated as part of the overall lot coverage.

c. The minimum solar energy system setback distance from the property lines shall be equivalent to the building setback or accessory building setback requirement of the underlying zoning district.

d. All power transmission lines from a ground-mounted solar energy system to any building or other structure shall, when practicable, be located underground and/or in accordance with the building electrical code as appropriate.

(6) The installation and construction of a *solar farm or utility-grade solar energy system* shall be subject to the following development and design standards

a. A minimum setback distance of 50 feet from all property boundaries shall be required, with the exception of property boundaries of adjoining parcels that are a part of a single solar farm project, as shown on the site plan. These property boundaries shall not be subject to this setback requirement. In such excepted case, a written waiver approved by the city and signed by the property owner(s) of all adjoining parcels included in the project shall be required.

b. Power inverters and other sound producing equipment shall be no less than 150 feet from any dwelling unit at the time of construction/installation.

c. All solar energy systems shall be completely enclosed with a minimum of six feet high chain link or security fencing as measured from the natural grade of the fencing perimeter.

d. Solar farms shall be constructed with evergreen vegetative screening where existing buffers do not obscure solar energy system perimeters from dwelling units on adjacent parcels. At maturity, required vegetative screening shall not be less than 15 feet tall, regardless of line-of-sight.

e. Permits for solar farms will include a contingent Decommissioning Plan, as specified in Section 53-7 of this Ordinance.

(7) All electrical equipment associated with, and necessary for the operation of solar energy systems shall comply with the following:

Electrical equipment shall comply with the setbacks specified for accessory structures in the underlying zoning district.

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(8) Solar panels are designed to absorb (not reflect) sunlight; and, as such, solar panels are generally less reflective than other varnished or glass exterior housing pieces. However, solar panel placement should be prioritized to minimize or negate any solar glare onto nearby properties or roadways, without unduly impacting the functionality or efficiency of the solar system.

(9) A solar energy system shall not be used to display permanent or temporary advertising, including signage, streamers, pennants, spinners, reflectors, banners or similar materials. The manufacturers and equipment information, warning, or indication of ownership shall be allowed on any equipment of the solar energy system provided they comply with the prevailing sign regulations.

(10) A solar energy system shall not be constructed until a building/zoning permit has been approved and issued.

## Sec. 53-6 Safety and Inspections

(1) The design of the solar energy system shall conform to applicable local, state and national solar codes and standards. A building permit, reviewed by department staff, shall be obtained for a solar energy system. All design and installation work shall comply with all applicable provisions in the National Electric Code (NEC), the International Residential Code (IRC), International Commercial Building Code, State Fire Code, and any additional requirements set forth by the local utility (for any grid-connected solar systems).

(2) *Emergency Access* – Roof-mounted solar energy systems shall be located in such a manner as to ensure emergency access to the roof, provide pathways to specific areas of the roof, provide for smoke ventilation opportunities, and provide emergency egress from the roof.

a. For buildings with pitched roofs, solar collectors shall be located in a manner that provides a minimum of one three-foot wide clear access pathway from the eave to the ridge on each roof slope where solar energy systems are located, as well as one three-foot smoke ventilation buffer along the ridge.

b. Residential rooftops that are flat shall have a minimum three-foot wide clear perimeter, and commercial buildings that are flat shall have a minimum four-foot wide clear perimeter between a solar energy system and the roofline, as well as a three-foot wide clear perimeter around roof-mounted equipment such as HVAC units.

c. To the extent practicable, the access pathway shall be located at a structurally strong location on the building (such as a load-bearing wall).

(3) The solar energy system shall comply with all applicable City of Eatonton Ordinances

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and Codes so as to ensure the structural integrity of such solar energy system. The existing roof structure and the weight of the solar energy system shall be taken into consideration when applying for a solar energy system permit.

(4) Prior to operation, electrical connections must be inspected by an appropriate electrical inspection person or agency, as determined by the City of Eatonton.

(5) Any connection to the public utility grid must be approved by the appropriate public utility.

(6) If solar storage batteries are included as part of the solar collector system, they must be installed according to all requirements set forth in the National Electric Code and State Fire Code when in operation. When no longer in operation, the batteries shall be disposed of in accordance with the laws and regulations of the City of Eatonton and any other applicable laws and regulations relating to hazardous waste disposal.

(7) Unless otherwise specified through a contract or agreement, the property owner of record will be presumed to be the responsible party for owning and maintaining the solar energy system.

## Sec. 53-7 Abandonment and removal

(1) If a ground-mounted solar energy system is removed, any earth disturbance as a result of the removal shall be landscaped in accordance with Eatonton Code.

(2) A ground or pole-mounted solar energy system is considered to be abandoned or defective if it has not been in operation for a period of 12 months. If abandoned, the solar energy system shall be repaired by the responsible party, as per Sec. 53-6 (7), meet federal, state, and local safety standards, or be removed by the owner within the time period designated by an Eatonton Building Code Official. If the owner fails to remove or repair the defective or abandoned solar energy system, the City of Eatonton may utilize the parameters of Eatonton Code, Chapter 14, Article III – Nuisance Abatement, including but not limited to a court summons, mandated repair, or demolition and removal of the violating property.

(3) Utility-grade or solar farm solar energy systems shall be subject to the creation of a Decommissioning Plan at time of permit approval. This plan shall include, at a minimum:

a. Defined conditions upon which decommissioning will be initiated (i.e. end of lease, safety hazard, etc.);

b. Removal of all non-utility owned equipment conduits, structures, fencing, roads and foundations; restoration of property to condition prior to solar farm development;

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c. The timeframe for completion of removal and decommissioning activities; and

d. Signed statement from the party responsible for completing the Decommissioning Plan acknowledging such responsibility.

Upon failure to accomplish the Decommissioning Plan, the Building Inspector may take action as authorized in the City Code, Chapter 14, Article III – Nuisance Abatement

## Sec. 53-8 Appeals

(1) If the owner of a solar energy system is found to be in violation of the provisions of this Ordinance, appeals should be made in accordance with the established procedures of the Eatonton Code.

(2) If a building permit for a solar energy system is denied because of a conflict with other goals of the City of Eatonton, the applicant may seek relief from the Planning and Zoning Commission, which shall regard solar energy as a factor to be considered, weighed, and balanced along with other factors.

## Sec. 53-9 Solar-Ready Zoning

(1) New structures will, to the extent possible and insofar as practical, be situated on the lot to take advantage of solar access, including the orientation of proposed buildings with respect to sun angles, the shading and windscreen potential of existing and proposed vegetation on and off the site, and the impact of solar access to adjacent uses and properties.

(2) To permit maximum solar access to proposed lots and future buildings, wherever reasonably feasible and where consistent with other appropriate design considerations, new streets shall be located on an east-west axis to encourage building siting with the maximum exposure of roof and wall area to the sun.

(3) Eatonton tree-planting programs shall take into account the impact of street trees on the solar access of surrounding properties and, where possible, efforts shall be made to avoid shading possible locations of solar collectors.

(4) When the Planning and Zoning Commission reviews and acts upon applications for subdivision approval or site plan approval, it shall take into consideration whether the proposed construction would block access to sunlight between the peak daylight hours of 9:00 am and 3:00 pm Eastern Standard Time for existing ground-mount, pole-mount, or roof-mount solar energy collectors, or for solar energy collectors for which a permit has been issued.

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(5) Where reasonable and appropriate, new subdivisions should be platted so as to preserve or enhance solar access for either passive or active systems, consistent with the other requirements of the Eatonton Code.

(6) The plan for development of any site within cluster subdivisions shall be designed and arranged in such a way as to promote solar access for all dwelling units. Considerations may include the following:

a. In order to maximize solar access, the higher-density dwelling units should be placed on a south-facing slope and lower-density dwelling units sited on a north-facing slope.

b. Subject to the Eatonton setback requirements, structures should be sited as close to the north lot line as possible to increase yard space to the south for reduced shading of the south face of a structure.

c. A tall structure should be sited to the north of a short structure.

(7) Solar-Ready zoning should be considered as one among multiple considerations in planning new developments.

## Sec. 53-10 Restrictions on Solar Prohibitions

In accordance with Eatonton Code Sec. 75 (Zoning), the City of Eatonton and the Planning and Zoning Commission maintains and reserves the right to refuse any plat or subdivision plan if deed restrictions, covenants or other agreements running with the land prohibit or have the effect of prohibiting reasonably sited and designed solar collectors or other renewable resource devices.

## Sec. 53-11 Adoption

This Ordinance shall take effect [XX days] after the date of its enactment. DULY ORDAINED AND ENACTED the _____day of _____, 20__, by the Council of the City of Eatonton in the County of Putnam, in the State of Georgia, in lawful session duly assembled.

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