

TITLE 9
CHAPTER 4
SOLAR ENERGY

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9-4-1: PURPOSE

- A. 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 does not address utility-scale solar energy systems, intended for the sale of electricity to utilities, industries, and/or businesses.
- B. This ordinance permits, as an accessory use, solar energy systems, while protecting the safety and welfare of adjacent and surrounding land uses through appropriate zoning and land use controls.
- C. 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.

9-4-2: DEFINITIONS

ACCESSORY USE: A use customarily incidental and subordinate to the primary use or building and located on the same lot therewith. A use which dominates the primary use or building in area, extent, or purpose shall not be considered an accessory use.

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.
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.
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:	A solar PV system that is interconnected with the utility grid via net metering and interconnection agreements with the utility.
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 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	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

WITH BATTERY BACK-UP):	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.
KILOWATT HOUR (kWh):	A unit of energy equivalent to one kilowatt (1 kW) of power expended for 1 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 1 hour of time.
NATIONAL ELECTRIC CODE:	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. Systems can be oriented east, southeast, southwest, and west, while still providing 75%-85% 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 throughout the year (and the local climate) 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 and architecture, building materials, east-west and building lot orientation, windows, landscaping, awnings, and 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, and which is 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 access is calculated using a sun path diagram.

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 electricity or transfer of stored heat.

SOLAR EASEMENT:

An easement recorded pursuant to U.C.A. §§ 57-13-1 and 57-13-2, 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 Utah 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 GLARE:

The potential for solar panels to reflect sunlight, with 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 consist of PV panels (or modules) that

combine to form an array; other system components may include mountain racks and hardware, wiring for electrical connections, power conditioning equipment, such as an inverter and/or batteries. For the purposes of this Ordinance, a solar PV system is defined as generating capacity of not more than 25 kilowatts for residential facilities and not more than two megawatts for non-residential facilities.

SOLAR PANEL (OR MODULE): A device for the direct conversion of sunlight into useable solar energy (including electricity or heat).

SOLAR PROCESS HEAT BASICS: 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. It consists 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 is when the sun is at its highest during its daily east-west path across the sky (this is also known as 0 deg 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.

9-4-3: APPLICABILITY

- A. This ordinance applies to all distributed solar systems installed and constructed after the effective date of this Ordinance. For purpose of this Ordinance, "solar energy system" means a distributed solar energy system as defined herein.
- B. Solar energy systems constructed prior to the effective date of this ordinance shall not be required to meet the requirements of this ordinance.
- C. All solar energy systems shall be designed, erected, and installed in accordance with applicable local, state, utility, and national codes, regulations, and standards.

9-4-4: SOLAR ENERGY SYSTEM REQUIREMENTS:

- A. To the extent practicable, and in accordance with River Heights City law, the accommodation of solar energy systems and associated electrical equipment, and the protection of access to sunlight for such, shall be encouraged in the application of the various review and approval provisions of the River Heights City code.
- B. Solar energy systems are permitted in all zoning districts as an accessory use to permitted and conditional uses.
- C. A solar energy system shall provide power for the principal use and/or accessory use of the property on which the solar energy system is located.
- D. Solar energy systems shall be installed by a licensed solar system installer.
- E. Roof-mounted solar energy systems are the preferred installation method in River Heights City. Ground-mounted or pole-mounted solar energy systems are to be installed as a last resort and shall be screened from public view with landscaping or other City-approved screening techniques. Screening that impedes the functionality of the ground-mounted or pole-mounted solar collector panels will not be required.
- F. The installation and construction of a roof-mount solar energy system shall be subject to the following development and design standards:
 - 1. A roof or building mounted solar energy system may be mounted on a principal or accessory building.

2. Any height limitations of the River Heights City 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, and that such structures do not obstruct solar access to neighboring properties.
 3. Placement of solar collectors on flat roofs shall be allowed by right provided that panels do not extend horizontally past the roof line in compliance with all adopted codes.
- G. The installation and construction of a ground-mount or pole-mount solar energy system shall be subject to the following development and design standards:
1. The height of the solar collector and any mounts shall not exceed 10 feet when oriented at maximum tilt.
 2. 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.
 3. The minimum solar energy system setback distance from the property lines shall be equivalent to the accessory building setback requirement of the underlying zoning district.
 4. All power transmission lines from a ground mounted solar energy system to any building or other structure shall be located underground and/or in accordance with the building electrical code, as appropriate.
 5. Ground-mounted systems must have a clear, brush free area, of 10 feet around the panels.
 6. A Zoning Clearance Permit is required for ground or pole mounted systems, which are considered an accessory use. (2-2017, 3-14-17)
- H. All electrical equipment associated with and necessary for the operation of solar energy systems shall comply with the setbacks specified for accessory structures in the underlying zoning district.
- I. 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.
- J. 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.

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

9-4-5: SAFETY AND INSPECTIONS

- A. 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 of adopted codes.
- B. The solar energy system shall comply with all applicable River Heights City Ordinances and Codes so as to ensure the structural integrity of such solar energy system. Please note that 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.
- C. Prior to operation, electrical connections must be inspected by the City Building Inspector.
- D. Any connection to the public utility grid must be approved by the appropriate public utility. (Rocky Mountain Power)
- E. 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 adopted codes. When no longer in operation, the batteries shall be disposed of in accordance with the laws and regulations of River Heights City and any other applicable laws and regulations relating to hazardous waste disposal.
- F. 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.

9-4-6: ABANDONMENT AND REMOVAL

- A. If a ground mounted solar energy system is removed, any earth disturbance as result of the removal shall be landscaped in accordance with River Heights City.
- B. A ground mounted solar energy system is considered to be abandoned or defective if it has not been in operation for a period of twelve (12) months. If abandoned, the solar energy system shall be repaired by the owner to meet federal, state, and local safety standards, or be removed by the owner within the time period designated by River Heights Building Code Official. If the owner fails to remove or repair the defective or abandoned solar system, River Heights City may pursue a legal action to have the system removed at the owner's expense.

9-4-7: APPEALS

- A. 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 River Heights City code.

- B. If a building permit for a solar energy system is denied because of a conflict with other goals of River Heights City, the applicant may seek relief from the River Heights City Appeal Authority, which shall regard solar energy as a factor to be considered, weighed, and balanced along with other factors.

9-4-8: SOLAR-READY ZONING

- A. 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.

- B. 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.

- C. River Heights City 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.

- D. When the Planning 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 hours of 9:00am and 3:00pm, Mountain 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.

- E. 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 River Heights City code.

- F. 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:
 - 1. 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.

2. Subject to the City's 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.
 3. A tall structure should be sited to the north of a short structure.
- G. Solar-Ready zoning should be considered as one among multiple considerations in planning new developments.

9-4-9: RESTRICTIONS ON SOLAR PROHIBITIONS

In Accordance with the Utah Code, River Heights City 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.

(1-2016, 3-22-16)