

TO: Pueblo County Planning Commission

FROM: Darren Coffey, AICP

Denise Nelson, PE, CFM, ENV SP, LEED AP

DATE: July 22, 2021

RE: Pueblo Regional Development Plan (Comprehensive Plan) and Pueblo County Code (Zoning Ordinance) Amendments Regarding Solar Energy Facilities

Pueblo County staff requested a consultant review the Comprehensive Plan and Zoning Ordinance with consideration to amendments as may be appropriate regarding solar energy facilities. The County has approved several facilities and continues to receive applications and, as a result, requires a better understanding of the land uses issues regarding solar energy generation.

A number of Comprehensive Plan and Zoning Ordinance amendments are recommended for discussion by the Pueblo County Planning Commission and the Board of County Commissioners to bring greater clarity and specificity for how the County reviews and potentially authorizes solar energy facilities.

Solar facilities are industrial/commercial facilities that can take up a large amount of agricultural, industrial, or commercial land for twenty years or more. Solar facility proposals need to be carefully weighed against other potential uses of the same properties over that time.

Overview of the Solar Industry

U.S. solar photovoltaic (PV) installations have grown from generating 1.2 gigawatts (GW) in 2008 to over 100 GW today according to the Solar Energy Industries Association (www.seia.org). The latest U.S. Solar Market Insight forecasts the market will grow four times by 2030 and reach over 419 GW.

The energy grid has seen a dramatic increase in solar generation due to many factors:

1. The cost of solar technology decreased dramatically (80%) since 2010.
2. The demand from companies and other entities for renewable energy is growing.
3. The Federal Government offers tax credits that subsidize solar development.

Solar Facilities in Pueblo County

Pueblo Countyreceived the SolSmart Bronze award in the spring of 2018 for supporting rooftop solar installations. According to Pueblo County’s own website:

“Pueblo has 107% more sun than Berlin, Germany, a world leader in solar, and 99% as much solar as Yuma, AZ, the sunniest city in the United States. It is estimated that 33,000 buildings in Pueblo are suitable for solar, with an energy generation potential of 463,400 MWh. This would be enough to run all of Pueblo County on renewable energy!”

The County has also permitted and/or reviewed applications for a dozen ground-mounted solar facilities totaling over 1,300 MW capacity on over 30,000 acres (see Attachment A. Pueblo County Permitted and Proposed Solar Projects).

Solar Facilities in Colorado

Colorado has seen a dramatic increase in its installed solar capacity, growing from 600 MW in 2015 to more than 1,500 MW installed by 2020, making Colorado 13th in the nation for solar capacity. There are 350 solar companies based in Colorado that employ about 7,000 people throughout the state.

In 2004, Colorado voters passed the country’s first renewable energy standard which allows the Colorado Public Utilities Commission to adopt net metering standards. Renewable energy personal property that is located on a residential classified property, owned by the residential property owner, and produces energy that is used by the residential property is exempt from Colorado property taxation.

In 2019, the Governor announced the state’s goal of achieving 100% renewable energy by 2040. The state is offering $5 million in funding for local governments via a grant program to support the development and construction of renewable and clean energy infrastructure. Grant applications opened June 15, 2021, and will remain open while funding is available. To support the transition to renewable energy, the Colorado Energy Office conducted a study identifying the possibility of generating 11,090 MW with floating solar panels, including 350 MW in Pueblo County.

This accelerated development of renewable energy will increase the duties of local governments and state agencies tasked with land use, permitting, and environmental decision making. Local governments must determine if solar facility applications are in accord with their Comprehensive Plan and Zoning Regulations.

Comprehensive Plan

Existing Plan

Pueblo’s Comprehensive Plan (Pueblo Regional Development Plan) was adopted on July 2, 2002, and last amended on August 29, 2014. The plan does not specifically mention solar or other energy generation facilities. The plan describes the general trends and future preferences for development with an emphasis on the continued preservation of agricultural lands and enhancements to public infrastructure.

The Factual Foundation chapter includes a section on Land Capacity Analysis that addresses the capacity for growth in terms of location, water service, school districts, and the impact on wildlife areas. The analysis of land capacity and demand for development were used to create the Regional Development Plan. This plan has four components: Guiding Principles, Development Action Areas, Future Land Uses, and the Regional Transportation Plan.

The Guiding Principles address five categories. Items relevant to solar development are:

* The Regional Development Principles include a goal to identify lands that would accommodate future industrial growth.
* The Urban Development Principles include a goal to provide public services and infrastructure for urban growth.
* The Rural Development Principles include a goal to preserve the agricultural character of the region’s rural lands and communities.
* The Design Character & Environmental Quality Principles include a goal to enhance the region’s natural and historic character.
* The Neighborhood Principles call for addressing wildlife corridors.

The Future Land Use section describes the general character of 15 land use categories and includes maps indicating these areas. Of note, the category:

* “Rural/Ranch,” the most widespread land use within Pueblo County, encourages the preservation of open space with limited commercial development that primarily serves as agricultural support.
* “Production Agriculture” is to preserve soils that are prime for agricultural purposes. It states that not all land within this designation is suitable for agricultural purposes and, therefore, non-agricultural development is permitted but should support the preservation of surrounding agricultural lands.
* “Employment Center – Industry” is for lands that are located near rail lines and highways, brownfields, and wastewater treatment facilities. This land use designation is primarily limited to industrial land uses with new heavy industrial uses subject to special permit or other reviewed processes as opposed to permitted by right.

Analysis

The language in Pueblo’s Comprehensive Plan thoroughly describes the existing and desired County character with the intent for development while continuing to preserve the County’s agricultural lands. The plan does not describe specific criteria or siting parameters for solar facilities, other energy generating facilities, or any other specific types of uses.

The Factual Foundation chapter offers an opportunity to discuss capacity and energy service along with other utilities. The Regional Development Plan chapter provides an appropriate avenue to introduce a solar energy plan.

The current and future land use maps could be updated, or new supplemental maps could be added to show data relevant to solar facility siting. For example, brownfield sites (such as former industrial or commercial site) are typically not suitable for other types of development or use (these sites typically contain low levels of environmental pollution such as hazardous waste or industrial byproducts) but may be suitable for solar facilities. Existing and planned electric power generation and distribution facilities dictate the need for additional generation and guide the location of facilities. Prime agricultural land defined, in part, as Critical Production Areas (CPAs) has been prioritized by the county for preservation. These sites are identified on a map that can help facilitate their avoidance by solar developers.

Recommended Amendments

Short-term Updates

* Amend the “Factual Foundation” chapter, “**Land Capacity Analysis**” section by adding the following content as a new subsection:

Capacity and Energy Service

The electrical grid is an interconnected system powered by numerous electricity generating sources to provide power to homes, businesses, industries, and farms. Electricity is distributed via high voltage transmission lines to local substations, where voltage is reduced, and power is delivered to customers via distribution lines.

Energy across the County is supplied by [Xcel Energy](http://www.xcelenergy.com/) (Public Service Company of Colorado), [Black Hills Energy](https://www.blackhillsenergy.com/), the Southeast Colorado Power Association, the San Isabel Electric Association, and the Mountain View Electric Association. Recent state legislation, plans, and executive orders requiring renewable energy sources, energy storage systems, transmission improvements, and more were addressed in the collaboratively prepared “10-Year Transmission Plan for the State of Colorado” (February 3, 2020). The plan lists planned and conceptual projects to ensure the amount of electricity generated meets the demand and is provided reliably to all customers. The plan will likely lead to an increase in the number of distributed renewable energy generation and storage facilities, some of which may be proposed to be in Pueblo County.

* Amend the “**Regional Development Plan**” chapter by adding the following content at the end (just prior to the “Plan Implementation” chapter):

Regional Solar Energy Plan

Pueblo County’s abundant agricultural and rural/ranch areas, combined with its electrical infrastructure and transportation system, are attractive to the solar industry. The growth in solar facilities has increased the workload of County staff and state agencies tasked with land use, permitting, and environmental decision making. The County must determine if a solar facility application is both in accord with their Comprehensive Plan and in compliance with their zoning regulations.

In general, solar photovoltaic (PV) energy generation can either be installed on structures (rooftop or integrated), floating on water, or ground mounted. PV installation on structures of all shapes and sizes can produce adequate energy for onsite use and stimulate economic jobs related to manufacturing, installation, and maintenance. Structure-mounted PV is addressed via the County’s SolSmart program. Floating PV is not desired at this time.

Ground-mounted solar is a primary land use as permitted by the County. Ground-mounted solar is typically defined with three categories:

Small-scale is a solar facility of less than one (1) acre. This size is approximately equivalent to a rated capacity of about ten (10) kilowatts (kW) to 250 kW alternating current. Facilities are generally generating electricity from sunlight primarily to reduce onsite consumption of utility power for residential, agricultural, commercial, and industrial applications.

Medium-scale is a solar facility of between one (1) acre and ten (10) acres. This size is approximately equivalent to a rated capacity of about 250 kW to one (1) megawatt (MW) alternating current. Facilities are generally generating electricity from sunlight primarily to reduce onsite consumption of utility power for commercial and industrial applications.

Utility-scale is a solar facility of more than ten (10) acres. This size is approximately equivalent to a rated capacity of about one (1) MW alternating current or greater. Facilities are generally generating electricity from sunlight to provide electricity to a utility provider.

Small-scale solar facilities are allowable by-right as an accessory use in accord with the underlying zoning requirements.

As used in this Comprehensive Plan, a large solar facility is either a medium-scale or utility-scale solar facility as defined. These facilities are an industrial land use that occupy significant acreage. Many solar facilities are located in agricultural or rural/ranch areas that may have had other future land use potential.

The County will consider large solar facilities in districts zoned agricultural (A-1) and PuebloPlex (P-1) with preference for brownfield sites such as capped landfills or other reclaimed or adapted reuse sites. The following site features should be addressed to mitigate the potential negative impacts of solar facilities on County land use patterns as part of the evaluation of a 1041 Permit application:

Permitted as primary uses in zoning districts: A-1 and P-1;

Permitted as accessory uses to existing power plants regardless of zoning district;

The total size shall be larger than one (1) acre and no more than 2,500 contiguous acres unless located in the P-1 zoning district;

No more than 65% PV panel coverage over the project site unless located in the P-1 zoning district;

Located outside Critical Production Areas (CPAs), ranch, or forested areas;

Further than one (1) mile from Development Action Areas;

Further than one (1) mile from other existing or permitted solar facilities unless located in the P-1 zoning district;

Within one (1) mile of existing transmission lines; and

Sited to mitigate negative impacts to residences; historic, cultural, recreational, or environmentally sensitive areas; and scenic viewsheds.

Battery energy storage facilities maybe considered as an accessory use to large solar facilities, other energy generation facilities, and substations. These facilities are also an industrial land use but require more safety requirements than solar facilities.

Long-term Updates

* Identify, catalogue, and map relevant features, including:
* Brownfield sites and County-owned land;
* Major electrical facilities (i.e., transmission lines, generation facilities, etc.); and
* Prime farmland including Critical Protection Areas (CPAs) or farmlands of statewide importance as defined by the USDA and the State of Colorado, respectively.

Pueblo County Code

Existing Ordinance

The Pueblo County Code (Zoning Ordinance) was revised November 15, 2007 and adopted on January 1, 2008. “Title 17 Land Use” regulates the County’s land use. Regulations relevant to solar facilities are in:

* “Division I. Zoning” and
* "Division II. Areas and Activities of State and Local Interest, specifically
  + Chapter 17.168 Site Selection and Construction of Major Facilities of Public Utilities."

Chapter 17.04 General Provisions and Definitions, section “17.04.040 Definitions” does not include any definitions related to solar or other energy facilities. However, Chapter 17.90 PuebloPlex Zoning District, section “17.90.010 Definitions” includes:

“**Energy Generation Facility**” means a facility designed and operated for the generation and distribution of electricity for the primary purpose of selling electricity generated to the electric power grid, including facilities which use fossil fuels, solar energy, hydroelectric energy, geothermal energy, biomass energy or wind energy as a resource. This definition does not apply to on-site generation equipment when such use is an accessory use.

“**Solar Farm**” means an installation or area of land in which a large number of solar panels are configured to generate electricity.

In addition, Chapter 17.105 Mineral Resource Extraction Regulations, section “17.105.040 Definitions” includes:

**Reclamation**. The employment, during and after an operation, of procedures reasonably designed to minimize as much as practicable the disruption from an operation and provide for the establishment of plant cover, stabilization of soil, protection of water resources, or other measures appropriate to the subsequent beneficial use of the affected lands. Mining shall not be defined to include any other type of operation such as concrete, asphalt, or other manufacturing operations. Additional special use permits as well as the appropriate zoning will be required for those operations if they are to occur within the permit area for mining operation and processing. All mining operation and processing shall comply with all State and Federal regulations related to mining, air quality, water quality and water law, and stormwater.

Most zoning districts allow utilities (as outlined in [Section 17.120.130](http://county.pueblo.org/government/county/code/title17/chapter17-120#17.120.130)) as a use by review. Section “17.120.130 Public utilities” addresses electric and other utilities that serve five (5) or more customers.

Chapters 17.68 Special Industrial District (I-1), 17.72 Light Industrial District (I-2), and 17.76 Heavy Industrial District (I-3) allow “electric power plant” by Special Use Permit by the Planning Commission.

Chapter 17.90 PuebloPlex Zoning District allows Areas and Activities of State Interest, subject to Title 17 - Division II. Area and Activities of State and Local Interest by Board Approval. As noted above, Division II includes Chapter 17.168 Site Selection and Construction of Major Facilities of Public Utilities" which provides regulations for solar facilities larger than two acres under the 1041 Permit process. Section “17.168.020 Definitions” includes:

"**Major facilities of a public utility**" means transmission lines, power plants, substations, pipelines, and storage areas of utilities as herein separately defined.

"**Power plant**" means any of the following:

1. Any fossil fuel, biofuel, or similar electrical energy generating facility with a generating capacity of one hundred (100) megawatts or more, and any appurtenant facilities thereto, or any addition or series of additions thereto increasing the existing design capacity of the facility by one hundred (100) megawatts or more.
2. Any solar or wind electrical energy generating facility with a generating capacity in excess of two (2) megawatts, and any appurtenant facilities thereto, or any addition or series of additions thereto increasing the existing design capacity of the facility in excess of two (2) megawatts.
3. Any nuclear or hydropower electrical generating facility.

"**Substation**" means any facility designed to provide switching, voltage transmission, or voltage control required for the transmission of electricity at one hundred fifteen (115) kilovolts or more, but does not have as a primary purpose the transformation of voltage to fifty (50) kilovolts or less for distribution purposes.

"**Transmission lines**" mean any electric transmission line and appurtenant facilities, which transmit electricity at one hundred fifteen (115) kilovolts or more.

Section “17.168.040 Guidelines” states:

A permit to conduct site selection and construction of a major facility by a public utility shall be issued by the permit authority following a public hearing upon the application for such a permit, provided that, at such hearing, the preponderance of evidence shall establish the following:

1. The health, safety and welfare of the citizens of this jurisdiction will be protected and served;
2. The facility will not adversely impact the physical, economic, or social environment of this jurisdiction, except as permitted in Section 17.168.040(C);
3. When an adverse impact is expected to occur, reasonable modifications and programs and other reasonable mitigating actions will be implemented and maintained to minimize the degree of adversity of the impact;
4. Other feasible alternatives to the proposed facility have been assessed, and the proposed facility represents the best interest of the people of this jurisdiction and the best utilization of resources in this jurisdiction;
5. There exists a need, or a reasonably foreseeable need, for the facility as proposed;
6. Adequate resources (e.g., schools, water and air, roads, labor) exist, or will exist, for the construction and efficient operation of the facility;
7. The facility does not conflict with this jurisdiction’s adopted Comprehensive Plan, or a Comprehensive Plan in the required statutory process of adoption, and all feasible actions have been taken to avoid conflict with other adopted plans of this jurisdiction, region, State and nation.

The development standards for relevant districts are:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **District** | **Building height (ft)** | **Front yard setback (ft)** | **Side yard setback (ft)** | **Rear yard setback (ft)** | **Area (acres)** |
| A-1 | None | 25 | 15 | 15 | 35 |
| P-1 | 60 | 48 | None | None | 2.5 |

The following chapters offer sections with standard requirements that may be appropriate for solar facility requirements:

* Chapter 17.68 Special Industrial District (I-1)
  + 17.68.160 Performance Standards.
  + 17.68.170 Screening and Buffering.
* Chapter 17.90 PuebloPlex Zoning District (P-1)
  + 17.90.070 Board Approval Procedure.
  + 17.90.080 Development Plan Requirements.
* Chapter 17.105 Mineral Resource Extraction Regulations
  + 17.105.060 Operational Restrictions
  + 17.106.070 Specific Development and Performance Standards.
  + 17.105.080 Procedure for Mining Operation and Processing Requests.
  + 17.105.090 Procedures and Policies Following Approval of a Special Use Permit for Mining Operation and Processing by the Planning Commission.

* Chapter 17.120 Supplementary Regulations
  + 17.120.160 Fences, walls and hedges.
  + 17.120.180 Outdoor Lighting.

The County process for reviewing solar facilities less than 2 MW capacity is provided in Chapter 17.140 Appeals - Article 1.” The process for solar facilities 2 MW or greater is provided in Chapter 17.148 Administrative Regulations.

Analysis

While the Zoning Ordinance allows for energy generating facilities and/or utilities in 19 zoning districts, medium-scale and utility-scale solar facilities should only be permitted in a limited number to minimize conflicts with other uses, primarily residential, commercial, or industrial development. Zoning districts that may best accommodate these larger solar facilities include A-1 and P-1. Medium-scale and utility-scale solar facilities located in other zoning districts as accessory to existing power generating primary uses may also be permitted.

The permitted size and scale of a proposed solar facility may vary based on the location, the character of the area, and the extent of the facility. If the proposed location is near an identified population center or visible from a major road, then a smaller size or additional screening and buffering provisions may be appropriate. If a proposed location is more remote, not visible from a major road, or if the facility will occupy only a relatively small portion of a larger site, then a larger size and scale facility may be appropriate.

The Zoning Ordinance does not provide specific application requirements, development standards, or performance standards for solar facilities. In addition, the County would like to consider adjusting the facility size limit so that the process for solar facilities 1 MW or greater is provided in Chapter 17.168 Site Selection and Construction of Major Facilities of Public Utilities under Chapter 17.148 Administrative Regulations.

To ensure that solar facilities are comprehensively and efficiently addressed, we recommend amending the Pueblo County Code with a proposed new chapter specifically addressing utility-scale and medium solar facilities,

Recommended Amendments

* Under section “**17.04.040 Definitions**” and section “**17.168.020 Definitions**,” add the following:

**“Battery Energy Storage Facilities”**

One or more battery cells for storing electrical energy stored in a Battery Energy Storage System (“BESS”) with a Battery Management System (“BMS”).

**“Battery Energy Storage System (BESS)”**

A physical container providing secondary containment to battery cells that is equipped with cooling, ventilation, fire suppression, and a battery management system.

**“Battery Management System (BMS)”**

An electronic regulator that manages a battery energy storage system by monitoring individual battery module voltages and temperatures, container temperature and humidity, off-gassing of combustible gas, fire, ground fault and DC surge, and door access and being able to shut down the system before operating outside safe parameters.

**“Brownfield”**

A former industrial or commercial site typically containing low levels of environmental pollution such as hazardous waste or industrial byproducts.

**“Decommissioning and Reclamation Plan”**

A plan to disconnect, remove, and properly dispose of equipment, facilities, or devices and reclaim the site.

**“Electric Power Plant”**

A facility designed and operated for the generation and distribution of electricity for the primary purpose of selling electricity generated to the electric power grid, including facilities which use fossil fuels, solar energy, hydroelectric energy, geothermal energy, biomass energy or wind energy as a resource. This definition does not apply to on-site generation equipment when such use is an accessory use.

**“Integrated Photovoltaics”**

Photovoltaics incorporated into building materials, such as shingles.

**“Photovoltaics (PV)”**

Materials and devices that absorb sunlight and convert it directly into electricity.

**“Rated Capacity”**

The maximum capacity of a solar facility based on the sum of each photovoltaic system’s nameplate capacity reported as Watts Direct Current (WDC) or Watts Alternating Current (WAC).

**“Reclamation”**

The employment, during and after an operation, of procedures reasonably designed to minimize as much as practicable the disruption from an operation and provide for the establishment of plant cover, stabilization of soil, protection of water resources, or other measures appropriate to the subsequent beneficial use of the affected lands. Reclamation shall comply with all State and Federal regulations related to air quality, water quality and water law, and stormwater.

**“Solar Facility, Medium-Scale”**

A facility between one (1) acre and ten (10) acres. This size is approximately equivalent to a rated capacity of about 250 kW to one (1) megawatt (MW) alternating current. Facilities are generally generating electricity from sunlight primarily to reduce onsite consumption of utility power for commercial and industrial applications.

**“Solar Facility, Small-Scale”**

A solar facility of less than one (1) acre. This size is approximately equivalent to a rated capacity of about ten (10) kilowatts (kW) to 250 kW alternating current. Facilities are generally generating electricity from sunlight primarily to reduce onsite consumption of utility power for residential, agricultural, commercial, and industrial applications.

**“Solar Facility, Utility-Scale”**

A solar facility of more than ten (10) acres. This size is approximately equivalent to a rated capacity of about one (1) MW alternating current or greater. Facilities are generally generating electricity from sunlight to provide electricity to a utility provider.

**“Solar PV Panel Coverage”**

The total acres covered by blocks of photovoltaic panels including spaces between panels but excluding wildlife corridors, mandated setbacks, wetlands, and other avoided natural or cultural features.

* Under section “**17.90.010 Definitions**” revise the definitions as noted in italics:

*“****~~Energy Generation Facility~~ Electric Power Plant****”* means a facility designed and operated for the generation and distribution of electricity for the primary purpose of selling electricity generated to the electric power grid, including facilities which use fossil fuels, solar energy, hydroelectric energy, geothermal energy, biomass energy or wind energy as a resource. This definition does not apply to on-site generation equipment when such use is an accessory use.

*“****~~Solar Farm~~ Solar Facility****”* means an installation or area of land in which a large number of solar panels are configured to generate electricity.

* Under section “**17.168.020 Definitions**” revise the definition as noted in italics:

"**Power plant**" means any of the following:

1. Any fossil fuel, biofuel, or similar electrical energy generating facility with a generating capacity of one hundred (100) megawatts or more, and any appurtenant facilities thereto, or any addition or series of additions thereto increasing the existing design capacity of the facility by one hundred (100) megawatts or more.
2. Any *~~solar or~~* wind electrical energy generating facility with a generating capacity in excess of two (2) megawatts, and any appurtenant facilities thereto, or any addition or series of additions thereto increasing the existing design capacity of the facility in excess of two (2) megawatts.
3. *Any solar electrical energy generating facility with a generating capacity one (1) megawatt or greater, and any appurtenant facilities thereto, or any addition or series of additions thereto increasing the existing design capacity of the facility to one (1) megawatt or greater.*
4. Any nuclear or hydropower electrical generating facility.

* Add the attached new section “**17.168.050. Solar Facilities**” specifically addressing medium-scale and utility-scale solar facilities and ancillary battery facilities to Pueblo County Code, Title 17, Division II.

Conclusion

These proposed amendments to the Comprehensive Plan and Zoning Ordinance, once approved by the Planning Commission and the Board of County Commissioners, will provide further guidance to the solar industry and County staff in how to prepare and evaluate future solar facility applications. By modifying and utilizing the existing 1041 Permit process, the County ensures continuity and predictability in the processing and evaluation of these complex large-scale development applications.

**cc:** Sabina Genesio, County Manager

Carmen Howard, Director of Planning & Development

Marci Day, County Attorney

**encl:**

**Attachment A.** Pueblo County Permitted and Proposed Solar Projects

**Attachment B.** Proposed Pueblo County Code, Section 17.168.050. Solar Facilities.