

Appendix A.1: Electric utility discussion.

Municipal Utility

The City of Tallahassee has a municipally owned utility that services the area with approximately 122,000 customers, they provide electricity, water, and gas to the city (City of Tallahassee Electric System Integrated Planning, 2019). Of their customer base approximately 84% are residential (City of Tallahassee Electric System Integrated Planning, 2019). The utility's service area encompasses a 221 square mile area and operates three generating stations (City of Tallahassee Electric System Integrated Planning, 2019). Tallahassee Utility (TU) was awarded "A-P-P-A's 2012 Energy Innovator Award" (City of Tallahassee, 2012) and received the 2018 Utility of the Future Award (WXTL Tallahassee, 2018). The utility hosts a long list of Demand Side Management (DSM) programs that include financial incentives (i.e., rebates, loans, grants), information campaigns (i.e., audit, R.E.A.C.H), and innovative demand reduction strategies (i.e., night and weekend pricing, meter response programs) (City of Tallahassee Electric System Integrated Planning, 2019). TU's effective billing rate for standard service is \$0.10267 per kWh, effective off-peak billing rate is \$0.05640 per kWh, and effective on-peak billing rate is \$0.2136 per kWh (City of Tallahassee, 2020).

The city of Fort Collins has a municipally owned utility responsible for providing electricity, street lights, water, wastewater treatment, and stormwater management. Electricity is received wholesale from Platte River Power Authority and is used to serve 70,500 homes and businesses across more than 55 square miles. About 63,000 of their customers are residential. The utility has received multiple awards for its services including "Utility of the Year" by the Colorado Solar Energy Industries Association in 2018 and designation by the American Public Power Association (APPA) as a Smart Energy Provider and four awards, primarily for their DEED program involvement. The utility has a variety of incentives available to its customers to promote energy efficiency and conservation. These include home energy audits, a variety of rebates, and home efficiency loans. FCU, unlike TU, applies time-of-day pricing to all its residential customers, with an effective off-peak billing rate of \$0.0710 per kWh, and an effective on-peak billing rate of about \$0.2195 per kWh in the non-summer months and \$0.2585 per kWh in summer months (City of Fort Collins, 2020b).

Appendix A.2: State Policy Comparison

While both states may have similar adoption levels of solar participation in terms of sheer numbers, it is clear that Colorado has more state level resources to support the adoption and implementation of solar policy. The table# below provides a summary of each state's incentives.

Table #: State Level Renewable Energy Incentives

Name	State	Category	Policy/Incentive Type	Created
EZ Investment Tax Credit Refund for Renewable Energy Projects	CO	Financial Incentive	Corporate Tax Credit	10/30/15
U.S. Department of Energy - Industrial Assessment Center (IAC): Colorado State University	CO	Technical Resource	Energy Analysis	6/24/15
Interconnection Standards	CO	Regulatory Policy	Interconnection	12/20/05
Green Colorado Credit Reserve	CO	Financial Incentive	Loan Program	11/5/14
Residential Energy Upgrade (RENU) Loan Program	CO	Financial Incentive	Loan Program	8/3/18
Net Metering	CO	Regulatory Policy	Net Metering	12/16/04
C-PACE: Colorado Commercial Property Assessed Clean Energy	CO	Financial Incentive	PACE Financing	5/24/16
Renewable Energy Property Tax Assessment	CO	Financial Incentive	Property Tax Incentive	2/16/07
Local Option - Property Tax Exemption for Renewable Energy Systems	CO	Financial Incentive	Property Tax Incentive	4/27/07
Property Tax Exemption for Residential Renewable Energy Equipment	CO	Financial Incentive	Property Tax Incentive	6/16/10
Renewable Energy Standard	CO	Regulatory Policy	Renewables Portfolio Standard	11/4/04

Local Option - Sales and Use Tax Exemption for Renewable Energy Systems	CO	Financial Incentive	Sales Tax Incentive	4/27/07
Sales and Use Tax Exemption for Renewable Energy Equipment	CO	Financial Incentive	Sales Tax Incentive	5/27/09
U.S. Department of Energy - Industrial Assessment Center (IAC): University of Miami	FL	Technical Resource	Energy Analysis	6/24/15
U.S. Department of Energy - Industrial Assessment Center (IAC): University of Florida	FL	Technical Resource	Energy Analysis	4/11/17
Energy Efficiency Goals	FL	Regulatory Policy	Energy Efficiency Resource Standard	12/16/10
Solar Equipment Certification	FL	Regulatory Policy	Equipment Certification	1/1/00
Interconnection Standards	FL	Regulatory Policy	Interconnection	3/11/08
Net Metering	FL	Regulatory Policy	Net Metering	3/7/08
Property Tax Abatement for Renewable Energy Property	FL	Financial Incentive	Property Tax Incentive	7/10/13
Solar and CHP Sales Tax Exemption	FL	Financial Incentive	Sales Tax Incentive	1/1/00

Source: DSIRE, 2020d; DSIRE, 2020e

Appendix A.3 Local ordinances and solar policies

Tree Protections:

Tallahassee trees that must be protected during development are defined as:

- Any dogwood of 4 inch DBH or greater (official flowering tree of the city)
- Any hardwood or long leaf pine tree of 12 inches DBH or greater
- Any tree of 18 inches DBH or greater (that is not defined as invasive or a hazard)
- Any tree four inches DBH or greater (that is not defined as invasive or a hazard) which is located in the lot perimeter zone of any development site except for sites being developed for detached single-family dwellings. The lot perimeter zone is the building set back or 20 feet, whichever is less
- Any patriarch tree
- Any tree within a canopy road tree protection zone
- Any tree in a wetland
- Any tree planted to meet the replanting, reforestation, or landscaping requirements of this chapter
- Any exceptional specimen trees, identified by the city urban forester, certified arborist or city environmental biologist.

Existing significant trees (six (6) inches and greater in diameter) within the LOD and within natural habitat buffer zones shall be preserved to the extent reasonably feasible and may help satisfy the landscaping requirements of this Section as set forth above. Such trees shall be considered "protected" trees within the meaning of this Section, subject to the exceptions contained in subsection (2) below. Does not apply to dead, dying or other hazardous trees. Does not apply to defined invasive species.

Solar Zoning Ordinance

The siting of solar panels is regulated at both the city and county level for Tallahassee. County level zoning ordinances define the classifications for solar panels - building mounted, accessory ground mounted, and utility scale - and specify requirements regarding height, setbacks, size, and approved zoning districts. A notable difference for Tallahassee from Fort Collins, Leon County Ordinance No 2020-01 specifies that building-mounted solar systems must be able to endure a wind load of 120 miles per hour. Given the detail provided by the ordinance at the county level, Tallahassee ordinances specific to solar simply deal with pricing structures for the energy produced. Leon County provides the following statement preceding the ordinance: "Whereas, the Board of county Commissioners desires to encourage the use of alternative and sustainable forms of energy such as solar energy systems."

Solar panel siting is also regulated in Fort Collins; however, the structuring of the zoning code makes the relevant ordinances at both levels more scattered throughout the code, with Tallahassee simply having 3 ordinances dealing with price and Leon County only having 1 solar ordinance. In contrast, a search of Fort Collins' municipal code returns 44 codes and ordinances that mention solar and Larimer County 33 codes and ordinances. However once consolidated, these 77 codes and ordinances essentially cover the same topics as Leon County and Tallahassee combined. One difference between the two cities is that the majority of specifications regarding definitions and requirements in addition to pricing, for solar takes place at the city level rather than county. An additional difference between ordinances in the two cities is the attention given protection of access to sunlight for solar energy production in Fort Collins. While Tallahassee provides a statement about ability to obtain a solar easement, Fort Collins devotes more effort and specificity to the protection of solar access. The city prefaces this shade restriction ordinance in a similar way to Leon County's solar ordinance opening, stating: "It is the city's intent to encourage the use of both active and passive solar energy systems for heating air and water in homes and businesses, as long as natural topography, soil or other subsurface conditions or other natural conditions peculiar to the site are preserved. While the use of solar energy systems is optional, the right to solar access is protected." This solar access provision removes barriers to both rooftop/residential pv and community solar adoption in Fort Collins.

Regarding rooftop and residential pv, upon evaluation of the provisions set by the solar ordinances to which each city is subject, in both cities the specified setbacks may present barriers to adoption, especially depending on the typical size yard of a residence. These barriers seem to be slightly more restrictive in Fort Collins. Additionally, height limits for rooftop pv based on roof pitch specification in Fort Collins may also provide a layer of complexity when applying for a permit for building-mounted solar systems, also potentially presenting a barrier to adoption. Another consideration is the overall complexity of the permit process. While this could apply to community solar as well, given the professional nature of projects of that scale and assumed heightened access to resources, the permitting process for residential adoption as a barrier is of greater interest. Tallahassee's permit requirements appear to be fairly simple and straightforward, particularly for building-mounted systems, with much of the required information being provided by industry professionals (manufacturer's installation instructions, electrical diagram for an electrical contractor). The greatest challenge of the requirements is likely obtaining the wind load analysis, though considering the area, such analyses for new construction are likely common. For accessory ground-mounted systems, the permit requirements are exactly the same and simply include an additional site plan to display adherence to setbacks and proximity to other structures, trees, and easements. Fort Collins permit requirements; however, may potentially present a burden to adoption of residential pv, with description of requirements lacking the clarity of Tallahassee's and many of the requirements dictating visual factors that may not be easy for the layman to know how to report in this format without assistance. For example, one of the requirements states: "The applicant shall demonstrate that the height, location, setback or base elevation of a solar energy system minimizes potential

glare and visual impacts of the system on adjacent properties.” It is likely beyond the expertise of the typical homeowner to know how to demonstrate something like this. Appendix # gives a full list of the requirements for each city in the original language of the ordinances.

For community solar adoption, the set back, fencing, and landscaping requirements in place to protect viewsheds and land quality as well as promote safety in both municipalities could also present barriers to adoption. In Tallahassee, community solar may face further barriers given it cannot be placed on land planned to be agriculture/silviculture/conservation nor can it be placed on preservation areas. Table 1a below in Appendix A.2 compares the solar zoning ordinances of Leon County/Tallahassee and Fort Collins.

Table 1a: Solar Ordinance Summary (TAL = Tallahassee; FC = Fort Collins)

		Approved Districts	Height	Size/Capacity	Setbacks:	Additional
Building-Mounted Solar Systems	TAL	All	Cannot exceed 4 feet above height of principal building	None	None	Must be approved for a wind load analysis of 120 mph; Cannot be mounted to a free-standing wall or fence
	FC	All	<i>Non-residential and residential buildings:</i> <u>< 2:12 pitch:</u> 8ft <u>2:12 to 6:12 pitch:</u> 4ft <u>> 6:12 pitch:</u> 2ft <i>Single-family & duplexes:</i> 1ft if 2:12 pitch or less; 2 ft Shall not extend horizontally beyond any roof overhang unless permitted	None	None	None

Accessory Ground-Mounted Solar Systems (Small-Scale Solar Energy System)	T A L	All except preservation areas	Subject to zoning district's height specifications for structures	Must not exceed 100 kilowatts and one acre when located outside the Urban Service Area	Must adhere to front yard setback defined for district	None
	F C	All	Subject to building height limits within the zone district, except for light poles with integrated solar panels	Less the 0.5 acre; Total area of system cannot exceed 10% of the lot's net area (Larimer County code)	shall not be located within the front, side or rear building setbacks, or the front yard area. If necessary for the system's effectiveness, ground-mounted solar energy collectors may be located within the minimum setbacks for the zone district, provided that the solar energy collector is located no less than fifteen (15) feet from rights-of-way and five (5) feet from all other property lines	None

Utility-Scale Solar Systems (Medium- and Large-Scale Solar Energy Systems)	T A L	Industrial (M-1 and UF), Rural zoning districts; not allowed in areas designated agriculture/silviculture/conservation on the future land use map of the comprehensive plan	Subject to zoning district's height specifications for structures	M-1 and Industrial Districts: no limit; Urban Fringe and Rural Districts: Cannot exceed 800 acres	<i>Residential land, habitable dwelling, or roadway adjacent:</i> <u>50 acres or less</u> <i>system:</i> 75 ft <i>Larger than 50 acres:</i> 200 ft <i>Other land type adjacent:</i> <u>50 acres or less</u> <i>system:</i> principal structure setbacks for that zoning district <i>Larger than 50 acres:</i> 100 ft <i>Canopy Road adjacent:</i> <i>Any size:</i> 200 ft	6 ft fence enclosure; must use native perennial vegetation; dual use of other agricultural opportunities is encouraged
	F C	Medium - All Large – not specified	Subject to accessory building height limits within the zone district, except for light poles with integrated solar panels	Medium - 0.5 to 5 acres Large - Larger than 5 acres	Medium: shall not be located within the front, side or rear building setbacks, or the front yard area Large: set back from all property lines a minimum of thirty (30) feet, and shall be located at least one hundred (100) feet from	5-7 ft fence enclosure; Landscaping and/or screening materials shall be provided to assist in screening the facility from public rights-of-way and neighboring residences

				all residentially zoned land.	
Community Solar	TAL	<i>Optional Solar Farm Electric Service Rider:</i> <u>Residential Subscription Levels:</u> level 1 (25% of total monthly metered kWhs are designated as solar farm kWhs), level 2 (50% of total monthly metered kWhs are designated as solar farm kWhs), level 3 (100% of total monthly metered kWhs are designated as solar farm kWhs) <u>Rate:</u> \$0.05 per kWh			
	FC	Established Loomis distribution facilities credit: \$0.0128 per kWh energy and demand credit: \$0.0634 per kWh			
Shading	TAL	None			
	FC	<p>Buildings or structures greater than forty (40) feet in height shall be designed so as not to have a substantial adverse impact on the distribution of natural and artificial light on adjacent public and private property. Adverse impacts include, but are not limited to, casting shadows on adjacent property sufficient to preclude the functional use of solar energy technology (Land Use 3.5.1)</p> <p>While the use of solar energy systems is optional, the right to solar access is protected. Solar collectors require access to available sunshine during the entire year, including between the hours of 9:00 am and 3:00 pm, MST, on December 21, when the longest shadows occur. Additionally, a goal of this Section is to ensure that site plan elements do not excessively shade adjacent properties, creating a significant adverse impact upon adjacent property owners. Thus, standards are set forth to evaluate the potential impact of shade caused by buildings, structures and trees.(B)General Standard . All development shall be designed throughout to accommodate active and/or passive solar installations to the extent reasonably feasible.(C)Solar-Oriented Residential Lots . At least sixty-five (65) percent of the lots less than fifteen thousand (15,000) square feet in area in single- and two-family residential developments must conform to the definition of a "solar-oriented lot" to preserve the potential for solar energy usage.(D)Access to Sunshine . The elements of the development plan (e.g., buildings, circulation, open space and landscaping) shall be located and designed, to the maximum extent feasible, to protect access to sunshine for planned solar energy systems or for solar-</p>			

	oriented rooftop surfaces that can support a solar collector or collectors capable of providing for the anticipated hot water needs of the buildings in the project between the hours of 9:00 a.m. and 3:00 p.m. MST, on December 21. (Land Use 3.2.3)
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Term Definitions:

Building-Mounted Solar Systems Definition: a solar energy system that is mounted on a principal structure and may include solar thermal panels, solar hot water system panels and photovoltaic panels

Accessory Ground-Mounted Solar Systems Definition: a solar energy system that is a stand-alone ground-mounted accessory structure in conjunction with a principal use or structure on the site.

Utility Scale Solar System Definition: a photovoltaic system that is connected to either the local utility power grid or the high voltage transmission grid for distribution to customers in the electricity market as a commercial venture and providing more than 100 kw of AC power generation

Fort Collins Community Solar Project Definition: PV electric generating installation that is a qualifying facility, uses a qualifying renewable technology, is operated by Fort Collins Utilities or Platte River Power Authority directly or by any party pursuant to an “interconnection agreement” and/or “power purchase agreement” with Fort Collins Utilities, is located within the Platte River Power Authority electric service territory, and all electric power it produces is consumed within such territory; qualifying facility: electric-generating facility operated in parallel with the city of fort collins or platte river power authority electric distribution system that has been issued a permit to operate

Solar Permit Requirements in Tallahassee and Fort Collins:

Tallahassee Solar Permit Requirements:

1. The manufacturer’s installation instructions of the solar equipment
2. An electrical diagram of the system and all electrical connections, including inverter placements, storage devices and system disconnection locations. Electrical connections shall be completed by a Florida licensed electrical contractor
3. A wind load analysis for 120 mph (3 second gust) hurricane-force winds (or minimum required by the latest revision of the Florida Building Code)
4. A sketch diagram identifying the location of the solar energy equipment on the structure

Accessory Ground Mounted Permit Requirements:

1. The manufacturer’s installation instructions of the solar equipment

2. An electrical diagram of the system and all electrical connections, including inverter placements, storage devices and system disconnection locations. Electrical connections shall be completed by a Florida licensed electrical contractor
3. A wind load analysis for 120 mph (3 second gust) hurricane-force winds (or minimum required by the latest revision of the Florida Building Code)
4. A sketch diagram identifying the location of the solar energy equipment on the structure
5. Site plan identifying the location of the proposed accessory ground-mounted solar system in relation to property boundaries, any existing improvements on the property, trees and/or easements. Measurements for setback compliance shall be measured from the outermost edge of the structure (including the panels and/or associated mounting equipment) to any other structure or property line

Fort Collins Solar Permit Requirements:

1. To the maximum extent feasible, ancillary solar equipment shall be located inside the building or screened from public view.
2. The applicant shall demonstrate that the height, location, setback or base elevation of a solar energy system minimizes potential glare and visual impacts of the system on adjacent properties.
3. Support structures for ground-mounted solar facilities shall, to the extent reasonably feasible, use materials, colors and textures that complement the site context.
4. All solar energy system appurtenances, including, but not limited to, plumbing, water tanks and support equipment, shall be of a color that is complementary to the site location, and shall be screened to the extent reasonably feasible without compromising the effectiveness of the solar collectors. Solar panels/collectors are exempt from the screening requirements of this Section and Paragraph 3.5.1(I)(6).
5. To the maximum extent feasible, solar energy systems shall complement the visual characteristics of the site and the adjacent area.
6. Building-mounted solar energy systems are exempt from the height requirements of this Code, except that they must comply with the height limitations of this Section 3.8.32, including the following: