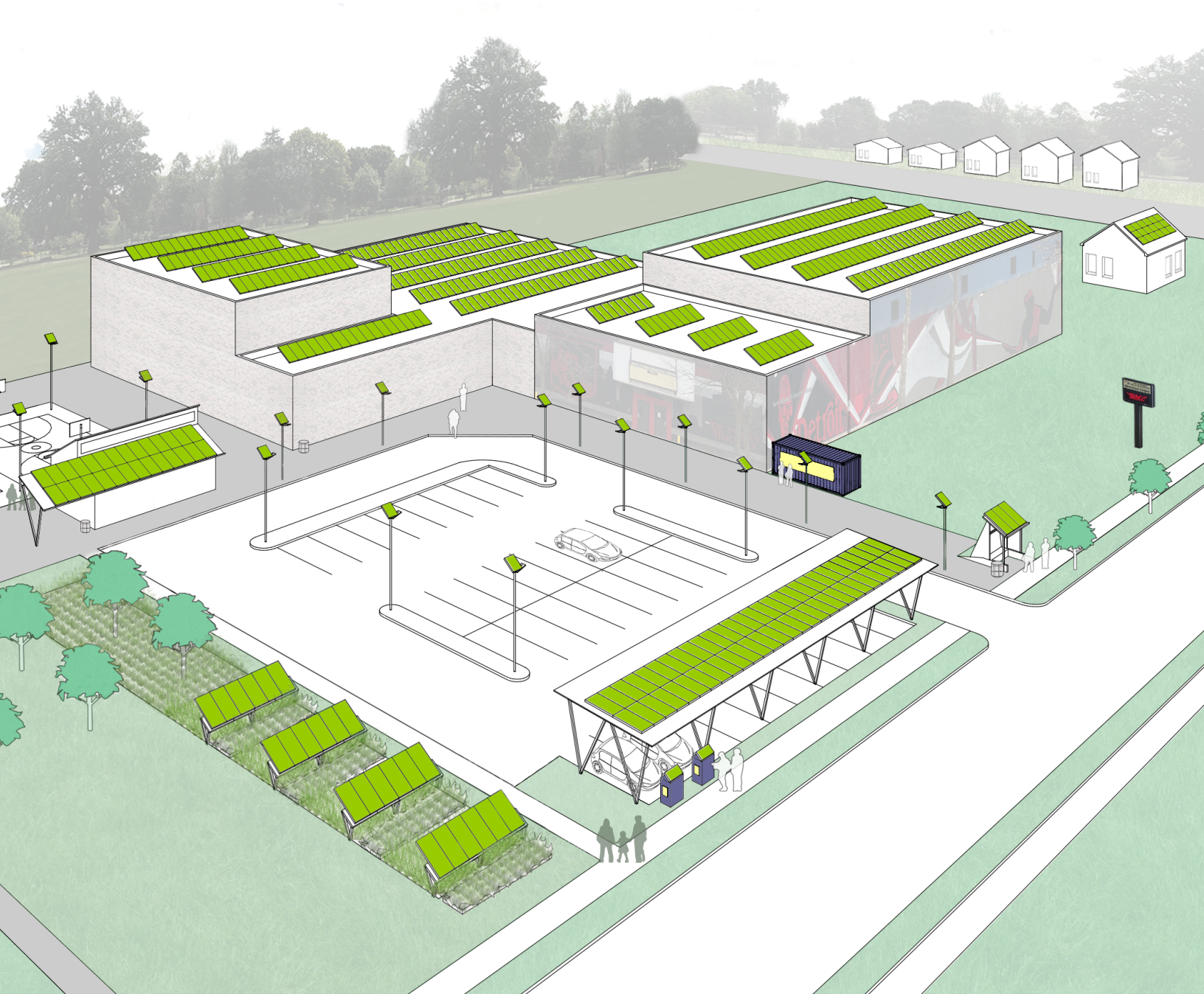
April 2019

Solar Policy Deployment Guide:

City Level Policy



Prepared for the City of Detroit

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Table of Contents

1 Executive Summary and Recommendations

This overall purpose of this report is to analyze how the City of Detroit can more effectively promote the development of privately owned local solar energy systems. To that end, this report provides the following: an analysis of the City of Detroit's existing local codes, regulations, policies, and programs regarding the development of solar energy systems; identification of potential obstacles including local codes, regulations, policies, and programs that may hinder the development of solar energy systems; a description of the limits on the City of Detroit's authority due to state law; and, an analysis of how other cities have amended local codes, regulations, policies, and programs to be more facilitative of the development of privately owned local solar energy systems.[1]

Local governments across the United States are playing an increasingly active role in promoting the development of privately owned solar energy systems. Many cities are setting goals for the development of solar energy systems, and are actively promoting the development of private solar energy systems to meet those goals. In order to promote the development of solar energy systems, cities generally amend zoning ordinances and building codes to clarify how these laws and regulations apply to solar energy systems, provide incentives to residents and businesses to encourage the development of solar energy systems, and, in some cases, require certain people and developers to install solar energy systems.

While many cities have set ambitious goals for the development of privately owned local solar energy systems, they are limited in their authority to regulate solar energy systems by state law. In Michigan, the Public Service Commission Act, which regulates public utilities, and the Stille-Derossett-Hale Single State Construction Code Act, which establishes a uniform building and electrical system that applies throughout the state, are key limitations on Detroit's authority to promote the development of private solar energy systems. However, these limitations are not unique. Many other cities have faced similar obstacles and have nonetheless found ways to effectively promote the development of solar energy systems.

In general, the generating capacity of solar energy systems in American cities has grown in the past five years. However, based on our review of these cities and their laws, policies, and programs, the reason for this expansion has varied in different municipalities. Cities with municipal utilities have direct control over their electric utility services and can adopt programs that actively promote privately owned solar energy systems by creating grid interconnection policies that are favorable for the development of solar energy systems in a variety of contexts.

In cities with one or more privately-owned electric utilities, the effective promotion of solar energy systems will not only require a local government that is willing to do things such as amend local codes to provide clarity to solar developers and ease permitting burdens, but will also require the local government to actively incentivize the development of solar energy systems and to cooperate with the local utility to further the city's vision for solar development.

Based on our review of local codes, policies, and programs in 20 municipalities, and considering state limitations on Detroit's regulatory authority, we believe the following recommendations, if adopted, will more actively promote the development of privately owned solar energy systems in Detroit.

1.1 Recommendation 1 - Set a Goal for Private Solar Energy System Capacity

Many cities have set goals for the development of local solar energy systems within their respective jurisdictions. Commonly, these goals are expressed in terms of the collective nameplate capacity of solar energy systems operating within a city's boundaries. Setting and publicizing a goal can serve two purposes. First, setting a goal is an important tool for signaling that the development of solar energy systems is a priority to public and private stakeholders,

1 The policies and ordinances of over 20 municipalities and model ordinances were surveyed for this report. They include: Massachusetts Model Solar Ordinance; Ann Arbor, MI; Indianapolis, IN; Evanston, IL; Minneapolis, MN; Ames, IA; Huntsville, AL; Troy, MI; Boulder County, CO; Milwaukee, WI; San Antonio, TX; Chicago, IL; Seattle, WA; Philadelphia, PA; New York City, NY; New Orleans, LA; Newark, NJ; Cincinnati, OH; Baltimore, MD; Buffalo, NY; Kansas City, MO; Boston, MA.

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including city departments, private developers, and a privately-owned electric utility. Second, setting a goal can help a city measure its incremental progress, and can help identify the strengths and weaknesses of its policies.

Many cities have included goals regarding the development of local solar energy systems in their sustainability or climate action plans.

1.2 Recommendation 2 -

Amend Zoning Ordinance to Promote Solar Energy Systems

One local law that many cities have updated to facilitate the development of privately owned local solar energy systems are zoning ordinances. Detroit has taken limited steps to promote the development of solar energy systems through its zoning ordinance. In 2016, Detroit amended its zoning ordinance to expressly permit a solar generation station as a conditional use in parks and recreation districts.[2] This amendment was primarily enacted to facilitate the development of a 10-acre solar array by DTE Energy at O'Shea Park.[3] However, other than this limited amendment, the zoning ordinance does not speak to other types of solar energy systems that may be allowed as a principal use in other zoning districts and it also does not speak to solar energy systems as an accessory use. As illustrated in section 6 below, many local governments have taken the step of amending their zoning ordinances to specifically address the development of solar energy systems as both a principal and accessory use. Below are several zoning-specific recommendations:

Principal Use

- Detroit should amend its zoning ordinance so that it is more facilitative of solar energy systems as a principal use. Many cities allow solar energy systems as a principal use in a variety of pre-existing zoning districts.

Accessory Use

- The zoning ordinance should expressly permit solar energy systems as an accessory use in all zoning districts.

Definitions

- A baseline definition of a "solar energy system" should be added to the Detroit zoning ordinance. That definition should be inclusive of both photovoltaic systems and solar thermal systems. It should also be inclusive of ancillary solar equipment, such as batteries.

- Different sub-definitions to distinguish between different types of solar energy systems should be added. For example, many cities have specific definitions for ground-mounted solar energy systems and roof-mounted solar energy systems so that they can be regulated differently.

- When appropriate, specific definitions should be created for the different solar energy system use

2 Ord. No. 13-16, May 20, 2016

3 Joe Guillen, DTE plans 10-acre solar array in Detroit, Detroit Free Press (Mar. 27, 2016), available at *https://www.freep.com/story/news/local/michigan/detroit/2016/03/27/dte-plans-10-acre-solar-array-detroit/82251592/*

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typologies. For example, Baltimore specifically defines private, commercial, and community solar energy systems, and provides different regulations for each.

Location Requirements for Ground-Mounted Solar Energy Systems

- Detroit's zoning ordinance generally requires accessory structures to be located in the rear yard. An amendment to the zoning ordinance that allows a ground-mounted solar energy system to be located in front yards, at least in instances where it is necessary for solar access, should be considered.

Location Requirements for Roof-Mounted Solar Energy Systems

- Detroit should clarify that roof-mounted solar energy systems may be installed on any portion of the roof of an accessory structure and principal structure.

Setback Requirements

- Detroit should create solar-specific setback requirements, particularly for ground-mounted systems. These requirements should include different requirements for different use typologies.

Height Limits

- Detroit should create solar-specific height requirements for both ground-mounted and roof-mounted solar energy systems. Additionally, Detroit should consider creating distinct height limits for roof-mounted systems that are located on a flat roof and a pitched roof.

1.3 Recommendation 3 - Provide Incentives for the Development of Solar Energy Systems

Local governments are restricted in how they can actively incentivize solar energy systems. Some cities have started to require solar energy systems for certain developments as a condition for receiving a building permit. However, there is no such requirement in the existing state building code, and local governments are preempted from deviating from the state code. Therefore, Detroit cannot require certain developments to install solar energy systems as a condition for obtaining a building or electrical permit. Additionally, Michigan local governments preempted from regulating any private electric utility operating within its jurisdiction through legislation. However, it does have the power to influence a private electric utility through its franchise agreement. Detroit's franchise agreement with DTE and its connection to the development of private solar energy systems is detailed in the state report. Given their limited power to provide incentives, local governments have sought to incentivize the development of solar energy systems in a number of unique ways.

1.3.1 Provide Zoning Incentives or Requirements for the Development of Solar Energy Systems for Certain Projects

While local governments are preempted from creating their own construction code, they can still amend their zoning ordinances to require or incentivize the installation of accessory solar energy systems. Numerous local governments in Michigan have amended their zoning ordinances to incentivize green building practices in general. For example, East Lansing has adopted a Green Building Policy that requires new municipal construction over 5,000 square feet to attain LEED certification and requires new private developments that receive municipal incentives over 15% of the total project cost to attain LEED certification.[4] Ypsilanti has adopted an ordinance that grants development projects pursuing LEED certification up to three stories and 35 feet of additional building height. Cities outside of Michigan have amended their zoning ordinance to require certain development to attain LEED certification.[5] This strategy could be applicable to either incentivize or require certain developments to install solar energy systems.

1.3.2 Explore the Feasibility of Bulk Purchasing Programs

Numerous cities have incentivized the installation of solar energy systems by organizing and funding a program to purchase solar equipment in bulk. By purchasing the equipment in bulk, savings can be passed on to residents and can reduce the startup cost associated with purchasing solar equipment. Frequently, local governments will partner with local non-governmental organizations to operate a bulk purchasing program. For the past three years, the city of Cincinnati has partnered with the Greater Cincinnati Energy Alliance to operate a robust bulk purchasing program, commonly referred to as the "Solarize Cincy Program." Cincinnati's program offers residents savings between 5 and 20%

4 City of East Lansing, Policy Resolution 2009-01, Resolution to Adopt "Green" Building Policy , available at *https://www.cityofeastlansing.com/DocumentCenter/View/466/PR2009-1-Green-Building-Policy-PDF*

5 Kansas City, MO., Code § 2-1604; Pittsburgh, PA., Code § 915.06

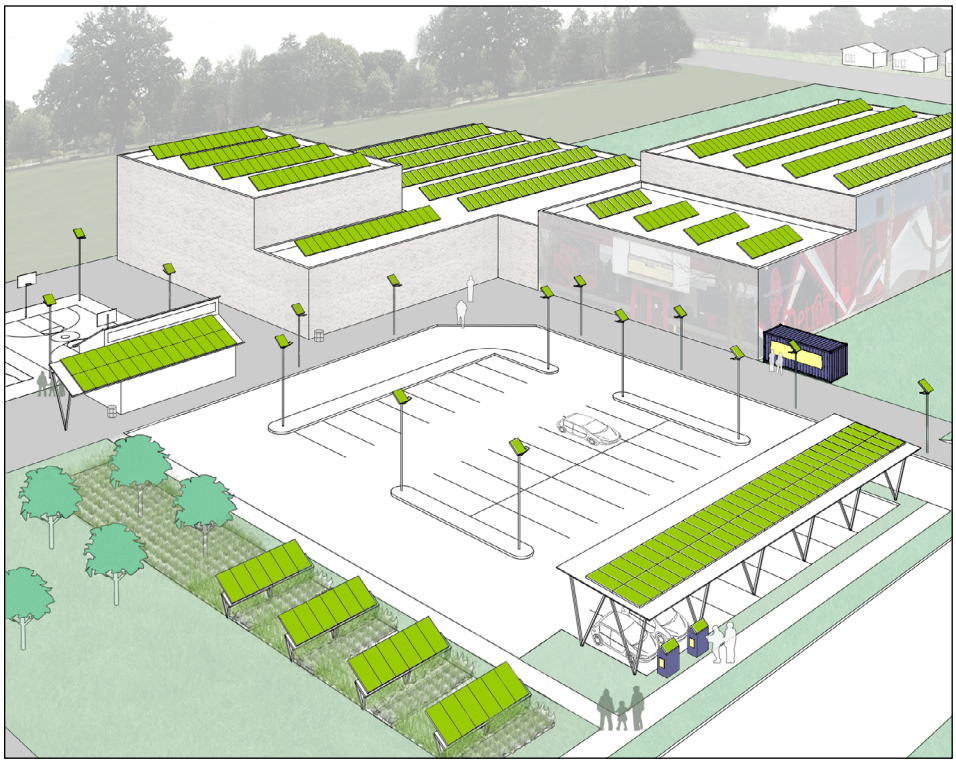
of the normal cost of solar installations.[6] The program also offers free solar assessments.[7] Last year, Solarize Cincy increased residential solar installations by 42%.[8]

1.3.3 Reduce Permitting Fees

While Detroit is preempted from creating its own construction code, it does have the authority to administer the state construction code within its jurisdiction. This includes assessing permitting fees. One simple way that local governments have tried to incentivize the installation of solar energy systems is by reducing permitting fees. Similar to Detroit, many local governments have a sliding permit fee, with the fee ultimately being dependent on the cost of the project. To reduce permitting fees, many local governments will exempt the cost of solar equipment from being considered in setting the permitting fee, and will only consider labor costs. Additionally, as is described below, local governments commonly adopt reduced permitting fees for certain types of solar energy projects.

1.4 Recommendation 4 - Streamline Permitting Processes

One common issue that can frustrate a person who desires to install a solar energy system is the permitting process. The installation of a solar energy system will require both a building and electrical permit, and potentially a zoning permit as well. However, not all solar energy systems involve the same degree of complexity. Many local governments will create a streamlined permit process for small-scale, accessory use solar



energy systems. A streamlined permitting process commonly requires applicants to submit a single, combined building and electrical permit application and has a reduced flat fee. Additionally, many cities process a streamlined permit application in one day.

1.5 Utilizing Recommendations to Promote Solar Energy Systems

Based on our review of codes, policies, and programs in other municipalities, the recommendations provided above are not all created equal, and one or two in isolation may not effectively promote the development of solar energy system. For example, amendments to the zoning ordinance alone are likely not enough to facilitate a significant expansion of solar energy systems. None of the local solar developers that we met with in preparation of this report stated that Detroit's zoning ordinance was a significant obstacle to solar development. Instead, all of them expressed concerns that DTE and the Michigan Public Service Commission were dis-incentivizing the development of solar energy systems. Additionally, based on the review of 20 zoning ordinances, a zoning ordinance that comprehensively addresses solar energy systems is not always correlated with robust solar development. One illustrative example is Indianapolis, which has the most installed solar energy capacity of any Midwestern city. Indianapolis' status as a leading solar city seem-

6 City of Cincinnati, City, GCEA Announce Solarize Cincy 2018 Program Launch, available at *https://www.cincinnati-oh.gov/oes/news/city-gcea-announce-solarize-cincy-2018-program-launch/*

7 Id.

8 Id.

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ingly has little to do with its zoning ordinance or other local programs. Instead, it appears to be the result of Indianapolis Power and Light, the local private utility, voluntarily offering $0.20 to $0.24 cents per kilowatt-hour for solar over a 10-year period from 2010 to 2012, which was a rate well above the national average.[9]

Ultimately, a zoning ordinance that specifically accounts for the development of solar energy systems will minimize undue obstacles and ensure the orderly development of systems in a way that protects the public welfare. Therefore, it can reduce potential transaction costs for a person interested in installing a solar energy system, and can provide them with clarity as to what is and is not allowed. Similarly, streamlining permitting processes and reducing permitting fees can reduce transaction costs, but only slightly compared to other costs involved in installing a solar energy system. In general, these recommendations ensure that the development of solar energy systems occurs in an orderly and efficient fashion.

However, whether someone installs a solar energy system is overwhelmingly dependent on how much a person stands to financially benefit from that system as opposed to alternative courses of action. For example, the decision of a resident or business that is contemplating the installation of a solar energy system will be overwhelmingly dependent on how much they stand to benefit from the electricity generated by a solar energy system, as opposed to purchasing electricity from DTE. While cities can play a role in providing financial incentives to people that install solar energy systems, DTE and the Michigan Public Service Commission are more central actors. In short, an amended zoning ordinance that comprehensively addresses solar energy systems and a streamlined permitting process can ensure that proposals to install solar energy systems in a variety of contexts are processed for zoning, building, and electrical permits in a clear and efficient manner. How many zoning, building, and electrical permit applications a city receives for the installation of solar energy systems is largely dependent on the financial incentives, or lack thereof, associated with the system.

9 Within one year, Indianapolis Power and Light had received applications for 170 Mw of proposed solar projects. Dan Ferber, As Indiana utility ends feed-in tariffs, some question motive, Energy News Network, Aug. 23, 2012, available at *https://energynews.us/2012/08/23/midwest/as-indiana-utility-ends-feed-in-tariffs-some-question-motive/*

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2 The Role of Local Government in Solar Energy System Development

Over the course of the past two decades, cities have played an increasingly important role in the development of solar energy systems. In general, the desire to promote the development of solar arises from increasing concerns regarding climate change. As severe climate-related events, such as heat waves and rain storms, increase in frequency and intensity, it is frequently local governments that are burdened with responding. As noted by Saint Paul Mayor Chris Coleman, cities "…are on the front lines when it comes to combating climate change."[10] In Detroit, Mayor Duggan was one of 407 mayors from across the country that signed on to a joint statement promising to adopt, honor, and uphold the commitments to the goals described in the Paris Agreement.[11] Local governments have begun asking themselves not only how they can help mitigate greenhouse gas emissions to do their part in mitigating climate change as a whole, but also how it can be better prepared for a climate changed world that will be increasingly defined by extreme heat, heavy precipitation, and other climate-related hazards in order to protect its residents.[12]

In general, cities have sought to promote the use and development of solar to reduce both public and private contributions to greenhouse gas emissions, and to enhance the resiliency of its energy infrastructure. Regarding greenhouse gas emissions, with an increasing percentage of the human population living in urban areas, it has been estimated that cities are currently responsible for 60 to 70% of human-induced greenhouse gas emissions.[13] According to a greenhouse gas inventory conducted by the University of Michigan in 2012, in Detroit, the majority of greenhouse gas emissions are caused by facilities that generate electricity that is used by residential, commercial, institutional, and industrial buildings.[14] Specifically, the inventory estimated that Detroit's citywide annual greenhouse gas emissions were 10.6 million tons of carbon dioxide equivalent, with 6.7 million tons of carbon dioxide equivalent, or 63%, being the result of emissions from electricity generation facilities that power and heat residential, commercial, and industrial buildings in Detroit.[15] By promoting the installation of solar energy systems, cities can play a role in reducing human-induced greenhouse gas emissions, the primary driver of climate change. In addition to promoting the development of solar energy systems to reduce greenhouse gas emissions, cities are also promoting solar to enhance the resiliency of their energy infrastructure in the face of climatic changes that will likely impact energy demand and supply. Hot summer weather and heat waves have become more common in Detroit over the last six decades.[16] Relatedly, Detroit currently experiences six more very hot, humid days and hot, dry days and two additional heat waves per summer, compared to 1959.[17] Due to still increasing atmospheric levels of carbon dioxide,[18] it is expected that summer temperatures and the frequency and intensity of heat waves will continue to increase in coming decades.[19] The expected increase in temperature, frequency of hot days, and frequency of heat waves will lead to an increased demand for cooling, which is directly correlated with an increased demand for electricity to power cooling units. Additionally, existing electricity infrastructure is vulnerable to the impacts of climate change that may make providing reliable and

10 The U.S. Conference of Mayors, U.S. Mayors Report on a Decade of Global Climate Leadership: Selected Mayor Profiles, at 28 (Dec. 2015).

11 Climate Mayors, 407 U.S. Climate Mayors commit to adopt, honor and uphold Paris Climate Agreement goals, June 1, 2017, available at *https://medium.com/@ClimateMayors/climate-mayors-commit-to-adopt-honor-and-uphold-paris-climate-agreement-goals-ba566e260097*

12 See, Id.

13 United Nations Human Settlements Programme, Cities and Climate Change: Policy Directions, 2017, available at *http://www.citiesalliance.org/sites/citiesalliance.org/files/CA_Images/UNH_GRHS2011_CitiesClimateChange.pdf*

14 Jill Carlson et al., City of Detroit Greenhouse Gas Inventory: An Analysis of Citywide and Municipal Emissions for 2011 and 2012, at 18, Sept. 15, 2014, available at *http://css.umich.edu/sites/default/files/css_doc/CSS14-21.pdf*

15 Id.

16 Union of Concerned Scientists, Heat in the Heartland: 60 Years of Warming in the Midwest, at 19, July 2012, available at *https://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/Heat-in-the-Heartland-Full-Report.pdf*

17 Id.

18 Brandon Miller, Greenhouse gas reaches alarming new record, CNN, May 3, 2018, available at *https://www.cnn.com/2018/05/03/us/dangerous-co2-record-wxc/index.html*

19 Id.

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affordable energy services increasingly difficult. Heavy precipitation events, including thunderstorms, are predicted to become more frequent and more intense as a result of the changing climate. These events will increasingly have the potential to damage energy distribution systems, which may cause prolonged electricity service outages.

To reduce greenhouse gas emissions and increase climate resiliency, city governments have sought to promote the use renewable energy systems by either privately-owned or publicly-owned utilities to satisfy the energy needs of its residents, businesses, and industry. This has included the promotion of local solar energy systems, which are solar energy systems located within the city limits, on a variety of scales ranging from large arrays with several acres of solar energy systems to small solar energy systems that are installed on a single-family home. In the urban environment, solar energy systems are generally preferred to other types of renewable energy systems because they are more easily deployed than wind energy systems due to their lower profile. Additionally, the installed price of solar energy has dropped by as much as 50% in recent years, making them more economically feasible.[20]

Many cities have set specific, quantifiable targets regarding the development of private solar energy systems. For example, in 2008, Boston's Mayor Thomas Menino set a goal of increasing privately-owned local solar electric capacity to 25 megawatts by 2020.[21] In its draft 2017 Climate Action Plan, the city of Pittsburgh set a goal of increasing its privately-owned renewable energy capacity by 200 megawatts by 2030.[22] In 2015, New York City set a goal of increasing its privately-owned rooftop solar capacity by 250 megawatts by 2025.[23] Los Angeles has gone one step further and has not only set targets for the development of 900 megawatts of local solar by 2023 and 1,500 megawatts by 2035,[24] but has developed a diversified strategy to ensure that the development of local solar is inclusive of everyone. Specifically, it has set a goal of promoting the development of 40 megawatts of community solar, 450 megawatts of feed-in-tariff solar, and 410 megawatts of net-metered solar.[25] Local governments' interest in local solar development has appeared to produce tangible results. As shown in Table 1 on the following page electricity generation capacity of solar energy systems has changed between 2013 and 2017 in several cities.

City governments have taken several different approaches to promoting the development of local private solar. Certain cities in California have adopted local ordinances that require solar energy systems be included with new residential and commercial buildings. For example, in 2016, San Francisco adopted an ordinance that requires all newly constructed residential buildings with 10 occupied floors or less and all newly constructed nonresidential buildings that have a gross floor area of 2,000 square feet or more and have 10 or fewer floors, to install photovoltaic systems and/or solar thermal systems as a condition for obtaining a building permit.[26] However, requiring certain developments to include solar energy systems is still novel.

Rather than require the development of solar energy systems, many local governments will seek to create a facilitative environment for the development of privately-owned local solar energy systems through a variety of ordinances, policies, and programs. As detailed in section 2 below, the development of local solar energy systems involves both state and local law, which may limit local legislative authority. Nonetheless, at the local level, cities have sought to promote the development of solar energy systems in three ways:

20 U.S. Dept. of Energy, Advancing Clean Electric Power Technologies: Technology Assessments, 2015, available at *https://www.energy.gov/sites/prod/files/2015/12/f27/QTR2015-4P-Solar-Power.pdf*

21 A Climate of Progress: City of Boston Climate Action Plan Update 2011, at 24, available at *https://www.cityofboston.gov/Images_Documents/A%20Climate%20of%20Progress%20-%20CAP%20Update%202011_tcm3-25020.pdf*

22 City of Pittsburgh Draft Climate Action Plan, Version 3.0, at 15, available at *http://apps.pittsburghpa.gov/redtail/images/606_PCAP_3_0_Draft-_9-26-17.pdf_*

23 One New York: The Plan for a Strong and Just City, at 305, available at *https://onenyc.cityofnewyork.us/wp-content/uploads/2018/04/OneNYC-1.pdf*

24 pLAn, at 23, available at *http://plan.lamayor.org/wp-content/uploads/2017/03/the-plan.pdf*

25 Los Angeles Department of Water and Power, 2015 Power Integrated Resource Plan, at ES-33, Dec. 31, 2015, available at *https://planning.lacity.org/eir/CrossroadsHwd/deir/files/references/M419.pdf*

26 San Francisco, CA., Code § 4.201.2

Table 1 – Changes In Local Solar Generation Capacity, 2013 – 2017 [27]

City	Total Solar PV Installed (Mw), 2013	National Rank, 2013	Total Solar PV Installed (Mw), 2017	National Rank, 2017
Los Angeles	132	1	349	1
San Antonio	84	6	195	6
New York City	33	8	147	7
Indianapolis	56	7	117	8
New Orleans	22	11	39	16
Boston	12	20	33	19
Kansas City, MO	2	39	18	23
Chicago	11	21	15	27
Baltimore	5	28	13	29
Philadelphia	9	22	11	30
St. Louis	< 1	51	10	31
Minneapolis	2	38	9	32
Buffalo	3	34	9	33
Cleveland	1	42	3	48
Milwaukee	1	46	3	51
Detroit	**1**	**43**	**1.4**	**59**

1.) Updating local ordinances and codes, specifically the zoning ordinance, to remove potential barriers and to ensure the orderly and safe development of a variety of solar power systems in the context of a variety of solar-related uses. By expressly addressing the development of solar power systems in a variety of different contexts, city governments can eliminate unintended burdens and provide regulatory clarity to people that want to develop different types of solar uses now and in the future, and can ensure that development proceeds in a manner that enables the future development of a variety of solar uses and that solar energy systems will be ensured of adequate access to sunlight.

2.) Relaxing local permitting processes, specifically regarding electric and building permits, for solar energy systems by creating expedited permits for certain systems to reduce permitting timelines, and by reducing permitting fees.

3.) Providing financial or development incentives, or developing a local program that seeks to reduce the financial costs of acquiring or installing a solar energy system.

27 Information relied upon to determine the total local solar generation capacity of each city varies. The total capacity of many cities, including Detroit, was determined based on information provided by the local public utility. However, for some cities, other sources of public information were relied on. Abi Bradford and Bret Fanshaw, Shining Cities 2018: How Smart Local Policies Are Expanding Solar Power In America, April 2018, available at *https://environmentamerica.org/sites/environment/files/reports/EA_shiningcities2018_scrn%20%282%29.pdf*; Judee Burr, Tony Dutzik, Jordan Schneider, and Rob Sargent, Shining Cities: At the Forefront of America's Solar Energy Revolution, April 2014, available at *https://environmentamerica.org/sites/environment/files/reports/EA_shining_cities_scrn_0.pdf*

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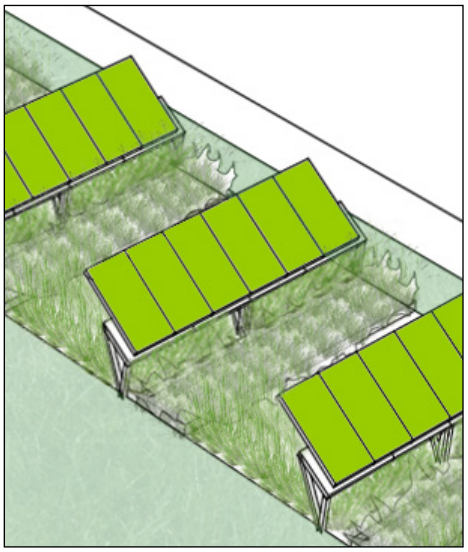
3 Local Legislative Authority, Solar Energy Systems, and the Limits of Preemption

While municipal governments in Michigan enjoy a high degree of autonomy to regulate local affairs, the authority of local governments to take legislative action is limited by state law. The Michigan constitution establishes that a city "…shall have the power to adopt resolutions and ordinances relating to its municipal concerns, property and government…" and states that the enumeration of powers to cities by the constitution shall not limit or restrict this general grant of powers.[28] While this constitutional grant of authority to city governments is broad, it is also expressly limited. The Michigan constitution also states that the powers granted to city governments are "subject to the constitution and law," meaning that city ordinances are subject to the laws of the state.[29] As such, a city may not enact an ordinance if it directly conflicts with the state statutory scheme or if the state statutory scheme occupies the field of regulation, even where no direct conflict exists.[30]

There are three primary areas of regulations that are relevant for the development of solar energy systems: regulations governing the interconnection of a solar energy system and exchange of energy to the grid; regulations governing the installation of solar energy systems; and regulations governing the use of land for generating solar energy.

Regarding the interconnection of solar energy systems and exchange of energy to the grid, local governments have limited regulatory authority. The electricity needs of Detroit are served by DTE Electric Company, which is an investor-owned public utility regulated by the Michigan Public Service Commission. Michigan law provides that the Michigan Public Service Commission "…is vested with complete power and jurisdiction to regulate all public utilities in the state…" including the power to regulate "…all rates, fares, fees, charges, services, rules, conditions of service, and all other matters pertaining to the formation, operation, and direction of all public utilities."[31] While a local government can establish utility rates by contract and franchise, it does not have the legislative power to fix charges made by public utility companies.[32] As such, local governments are preempted from enacting legislation that regulates utility rates within its jurisdiction, and it may only influence rates through its franchise agreement with a public utility.[33] Additional information regarding state regulation of public utilities can be found in in the companion policy report on state laws and regulations.

Similarly, local governments have limited authority regarding the regulation of the construction of solar energy systems. As is described in more detail below, the Stille-Derossett-Hale Single State Construction Code Act establishes



a uniform set of construction codes that apply throughout the state.[34] The requirements of these codes are described in section 5.

However, local governments do enjoy a significant amount of authority in regulating land use through zoning ordinances. Many local governments across the country have used this authority to create clear regulations for solar energy systems, which provides clarity to solar developers and ensures the orderly development of such systems in a manner that accounts for local concerns. Much of this report will focus on how local governments have amended their zoning ordinances to facilitate the development of local solar energy systems.

28 Michigan Constitution, Article VII, § 22
29 Id.; MCL 117.4j(3)
30 *People v. Llewellyn,* 401 Mich. 314 (1977)
31 MCL 460.6
32 Detroit v. Michigan Public Utilities Commission, 288 Mich. 267, 287 (1939)
33 Id.
34 Infra section 5.

4 Solar Energy Systems and Detroit's Existing Zoning Ordinance and Master Plan of Policies

In Michigan, local governments have a high degree of autonomy for regulating the use and development of land within their jurisdiction. This is primarily done through a zoning ordinance and a master plan. According to the Detroit City Charter, the purpose of the master plan is to set guidelines to assist the Mayor and others in proposing, and the City Council in evaluating and implementing, specific proposals for the total development of the City and its residents.[35] The master plan is not regulatory in nature; instead, it exists to guide development. Conversely, the Detroit zoning ordinance is regulatory in nature. While a zoning ordinance and a master plan are two distinct documents, the Michigan Zoning Enabling Act does state that "[a] zoning ordinance shall be based upon a plan designed to promote the public health, safety, and general welfare…"[36] It is unclear just how consistent a zoning ordinance and a master plan must be.

4.1 Detroit Master Plan and Solar Systems

While the Master Plan of Policies does not speak to solar systems directly, it does speak to the maintenance and improvement of local infrastructure systems, including energy supply and transmission systems.[37] Specifically, the master plan notes that disruptions of critical infrastructure services could impact the health, safety, and welfare of local citizens.[38] To address this goal, the master plan establishes a policy of cooperating with state and federal authorities to continually assess infrastructure systems and remedy potential vulnerabilities.[39]

4.2 Detroit Zoning Ordinance and Solar Systems

In general, a solar energy system installed in Detroit will be regulated as either a principal use or an accessory use. A principal use is defined as "the main use to which a premises is devoted."[40] For example, a solar power system that is not co-located with a structure and is used to generate electricity for sale to a third party would be considered a principal use. An accessory use is defined by the Detroit zoning ordinance as a use that "is incidental to a principal building or a principal use legally existing on the same zoning lot, is subordinate in area, extent and purpose to the principal building or principal use, and contributes to the comfort, convenience, or necessity of the occupants, business or industry of the principal structure of principal use served."[41] For example, a solar energy system that is co-located with a single-family home to supplement the home's electricity needs would be an accessory use.

4.2.1 Solar Energy Systems as Principal Use

A solar energy system as a principal use will either be classified as a solar generation station, a basic utility, a major utility, or a power or heating plant with fuel storage on-site. The definitions for these uses as described in the Detroit zoning ordinance are provided below:

- **Solar generation station:** "An energy generation facility in excess of one acre comprised of one or more freestanding, ground mounted devices that capture solar energy and convert it to electrical energy for use in locations other than where it is generated."[42]

- **Basic utility:** "Infrastructure services that need to be located in or near the area where the service is provided. Basic Utilities uses generally do not

35 Detroit City Charter 8-104
36 MCL 125.3203
37 City of Detroit Master Plan of Policies, at 38, available at *http://www.detroitmi.gov/Portals/0/docs/Planning/Master%20Plan%20Text.pdf*
38 Id.
39 Id.
40 Detroit, MI., Code § 61-16-153
41 Detroit, MI., Code § 61-16-31
42 Detroit, MI., Code § 61-16-174

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regularly have employees at the site…"[43]

- **Major utility:** "Major, area-wide infrastructure services that typically have employees at the site…"[44]
- **Public residential-area utility facility:** Undefined by Detroit zoning ordinance
- **Power or heating plant with fuel storage on-site:** Undefined by Detroit zoning ordinance

A solar generation station, public residential-area utility facility, power or heating plant with fuel storage on-site basic utility, and major utility are allowable in the following districts:

Table 2 – Land Use Table Regarding Solar Energy Systems

	Residential						Business						Industrial					Special	
	R 1	R 2	R 3	R 4	R 5	R 6	B 1	B 2	B 3	B 4	B 5	B 6	M 1	M 2	M 3	M 4	M 5	Parks and Rec.	SD 4
Solar Generation Station[45]																		C	
Public Residential-Area Utility Facilities[46]	C	C	C	C														R	
Basic Utility, All Other[47]																		R	C
Power Or Heating Plant With Fuel Storage On-Site[48]										C	R	R	R	R	R	R	R		
Major Utility, All Other[49]																C	C		

In Table 2 above, a "C" denotes that the use is a conditional use in the corresponding zoning district and an "R" denotes that it is a by-right land use. A blank cell indicates that the use is not allowed in the corresponding zoning district. If a solar energy system is determined to be a use that is not listed in the Detroit zoning ordinance, then it will be regarded as a "new or unlisted use," which may be approved by Detroit Buildings, Safety, Engineering & Environmental Department (BSEED) making a "similar use interpretation."[50] To make a similar use determination, BSEED determines which use category covers the proposed use, and within that use category, which specific land use category applies to the proposed use.[51] If it is determined that no existing land use category applies to the proposed, unlisted use, then the proposed use is classified as a conditional land use that is only allowable in an intensive industrial district (M4) or a special industrial district (M5).[52]

Regarding solar generation stations, the zoning ordinance also describes several conditions that may be attached to the zoning specifically for solar generation stations. These conditions may relate to the

43 Detroit, MI., Code § 61-16-192
44 Id.
45 Detroit, MI., Code § 61-12-30
46 Id.
47 Id.
48 Detroit, MI., Code § 61-12-31
49 Id.
50 Detroit, MI., Code § 61-12-7
51 Id.
52 Id.

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following: height of the installation; setbacks and screening from rights-of-way and adjacent properties; landscaping; glare mitigation; site security; location of on-site power lines; lighting; signage; removal requirements upon decommissioning; stormwater management; construction period impacts; general site maintenance; and off-street parking to be attached to any approval.[53]

4.2.2 Solar Energy Systems as Accessory Use

It is possible for a solar energy system co-located with a principal use to satisfy the definition of "accessory use" provided in the Detroit zoning ordinance. An accessory use is allowed to accompany any by-right use or approved conditional use.[54] In order to satisfy the definition of an "accessory structure" under the Detroit zoning ordinance, the solar energy system must satisfy specific requirements.

First, the solar energy system must be located on the same zoning lot as the principal use.[55] A zoning lot is defined as "[a] single tract of land located within a single block that at the time of filing for a building permit is designated by its owner or developer as a tract to be used, developed, or built upon as a single unit under single or unified ownership or control…"[56] A zoning lot may consist of a single lot, a portion of a lot, or some combination of complete lots and portions of lots or of portions of lots.[57] Therefore, a solar energy system located on the same parcel as the principal use, on a parcel that is directly adjacent or part of a grouping of parcels that are all contiguous and adjacent to a principal use will be considered to be on the same zoning lot and may be an accessory use. However, a solar energy system that is not on the same parcel as the principal use, is not on a parcel that is directly adjacent to the principal use, and is not on a group of parcels that are all contiguous and adjacent to a principal use will not be considered to be on the same zoning lot and cannot be an accessory use. In general, parcels that are divided by an alley cannot be part of a single zoning lot unless the alley is vacated. A petition for vacating any dedicated alley in a residential area may be presented to the city council by not less than two-thirds of the owners abutting the alley.[58]

Second, the solar energy system must be subordinate in area, extent, and purpose to the principal building or use.[59] Michigan courts have found that uses that take up more space than the principal use cannot be considered as subordinate to the principal use.[60] Therefore, if a solar energy system occupies a greater area than the principal use, then it may not be considered an accessory use. It is unclear what is required to ensure that a solar energy system is subordinate in purpose to the principal building. Michigan courts have found that uses that are expanded beyond what is necessary to service the principal use may not be regarded as an accessory use.[61] Therefore, a solar energy system that produces more energy than is needed for the principal use not be regarded as an accessory use.

Third, the solar energy system must contribute to the comfort, convenience, or necessity of the occupants, business, or industry of the principal structure or principal use served.[62] Therefore, a solar energy system must provide energy to the principal use for it to be considered an accessory use.

4.2.3 Setbacks, Height Limits, and Location Regulations in Detroit's Zoning Ordinance

Assuming a solar energy system qualifies as an accessory or principal use in accordance with the definition provided in the zoning ordinance, it still must comply with existing zoning ordinance regulations regarding its placement, height, and size. Specifically, the zoning ordinance requires the following:

- Principal uses and its accessory uses, including solar energy system, must comply with the front, side, and rear setback requirements specified in the zoning ordinance, which vary

53 Detroit, MI., Code § 61-12-142(5)
54 Detroit, MI., Code § 61-12-361
55 Detroit, MI., Code § 61-16-31
56 Detroit, MI., Code § 61-16-124
57 Id.
58 Detroit, MI., Code § 50-6-1
59 Detroit, MI., Code § 61-16-31
60 *Ida Twp. v. Southeast Mich. Motorsports,* 2013 Mich. App. LEXIS 1561 (2013)
61 *Groveland v. Jennings,* 106 Mich. App. 504, 513 (1981), citing *Arundel Supply Corp. v. Cason,* 265 Md. 371 (1972) (holding that "…the washing, screening and batching of materials 'trucked in' from other places…" was not an accessory use")
62 Detroit, MI., Code § 61-16-31

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based on the principal use and the zoning district. For example, the required front setback for a single-family dwelling in a R1 district is 20 feet.[63] Setbacks must be unobstructed from the ground level to the sky, unless a specific exception applies.[64] Accessory structures are generally allowed in the rear yard, but not in any front or side yard.[65] Therefore, ground-mounted solar energy systems as an accessory use would not be permitted in any required front or side yard. In R1 and R2 districts, accessory structures cannot occupy more than 50% of the rear yard and cannot be located closer than 10 feet to any principal building.[66] In general, the combined area occupied by all buildings used as, or accessory to, single family dwellings and two-family dwellings cannot exceed 35%.[67]

- Principal buildings and any roof-mounted solar energy system must comply with height limits. Similar to setback requirements, height limits vary based on the principal use and the zoning district. For example, the height limit for a single-family dwelling in a R1 district is 35 feet.[68] The Detroit zoning ordinance does exempt certain rooftop structures from the height regulations, including structures that are used for mechanical purposes so long as it does not occupy 30% or more of the gross area of the roof.[69] It is unclear whether a roof-mounted solar energy system and any associated equipment would be regarded as a structure that is used for mechanical purposes. If not, then any roof-mounted solar energy system cannot exceed the applicable maximum height regulations.

If a solar energy system is classified as the principal use of the property, then it must comply with principal use regulations described in the zoning ordinance.[70] It is clear that a ground-mounted solar energy system that is over one acre in size would be classified as a solar generation station.[71] The specific siting regulations that a solar generation station would have to comply with would be determined on a case-by-case basis. It is unclear what use a solar energy system that is less than one acre would be classified as, or if it would be treated as a new or unlisted use.

63 Detroit, MI., Code § 61-13-3
64 Detroit, MI., Code § 61-13-144
65 Detroit, MI., Code § 61-13-146
66 Detroit, MI., Code § 61-13-128
67 Detroit, MI., Code § 61-13-105; Detroit, MI., Code § 61-13-107
68 Detroit, MI., Code § 61-13-3
69 Detroit, MI., Code § 61-13-153
70 Detroit, MI., Code § 61-12-1
71 Detroit, MI., Code § 61-16-174

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5 Solar Energy Systems and the Existing Construction Code

The Michigan Stille-Derossett-Hale Single State Construction Code Act requires the state to develop a state construction code that consists of rules governing the construction, use, and occupation of buildings and structures.[72] The Michigan Construction Code includes the building code, the residential code, and the electrical code.[73] In general, the state is responsible for administering and enforcing the Act and the construction code.[74] However, a local government may assume responsibility for the administration and enforcement of the Act within its jurisdiction.[75] Detroit has assumed the responsibility for administering each component of the construction code within its jurisdiction.[76] While Detroit may administer the construction code adopted by the state, it is precluded from adopting its own construction code requirements by state law.[77] In general, the construction code consists of numerous model codes developed by the International Code Council and the National Fire Protection Association.

The Michigan Stille-Derossett-Hale Single State Construction Code Act generally requires a person to obtain a building permit before the construction or alteration of a building or structure.[78] Notably, the building permit requirement is broad and would likely apply to either building-mounted or ground-mounted solar energy systems. In order to obtain a building permit, Michigan law requires an applicant to submit a completed application form, which must be accompanied by specifications of the building or structure, full and complete copies of the plans drawn to scale of the proposed work, a site plan showing the dimensions and the location of the proposing building or structure and other buildings or structures on the same premises, and the requisite fee.[79]

5.1 Residential Code

The residential code applies to the construction, alteration, enlargement, replacement, and repair of detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height.[80]

Michigan has adopted the 2015 edition of the international residential code with limited exceptions.[81] The 2015 international residential code does describe rules regulating the installation solar energy systems. The 2015 residential code also describes standards for the installation of roof-mounted, building-integrated, and ground-mounted solar energy systems. It requires the following:

- All photovoltaic panels and modules shall be listed and labeled.[82]
- Systems connected to the utility grid shall use inverters listed for utility interaction and inverters must be listed and labeled.[83]
- Rooftop-mounted photovoltaic panels or modules must have the same fire classification as the roof assembly, shall be installed in accordance with the

72 MCL 125.1504(1)

73 Mich. Admin. Code R. 408.30101 et seq.

74 MCL 125.1508b(1)

75 Id.

76 Bureau of Construction Codes, Statewide Jurisdiction List, April 30, 2018, available at *https://www.michigan.gov/documents/lara/Statewide_Jurisdiction_List_621774_7.pdf*

77 MCL 125.1508a

78 MCL 125.1510(1); The word "construction" is broadly defined to mean "...the construction, erection, reconstruction, alteration, conversion, demolition, repair, moving, or equipping of buildings or structures." MCL 125.1502a(n); Similarly, the terms "building" and "structure" are broadly defined. A "building" is a "...structure affording shelter for use or occupancy..." and includes "...parts of the building..." MCL 125.1502a(g); A "structure" is broadly defined as "...that which is built or constructed...a piece of work artificially built up or composed of parts joined together in some definite manner." MCL 125.1502a(bb)

79 MCL 125.1510(1)

80 Mich. Admin. Code R. 408.30501a

81 Mich. Admin. Code R. 408.30500

82 2015 Michigan Residential Code, R324.3.1

83 2015 Michigan Residential Code, R324.3

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manufacturer's instructions, and shall be listed and labeled.[84]

- Roof structures that provide support for PV panel systems shall be designed to support the system.[85]
- Building-integrated systems, such as photovoltaic shingles, must be listed and labeled, attached in accordance with the manufacturer's installation instructions.[86]
- Ground-mounted photovoltaic systems shall be subject to the fire separation distance requirements determined by the local jurisdiction.[87]

Chapter 23 of the 2015 residential code provides standards for the design, construction, installation, alteration, and repair of equipment and systems using thermal solar energy to provide space heating or cooling, hot water heating, and swimming pool heating.[88] In general, the residential code requires the following for thermal solar energy systems:

- Roof shall be constructed to support the loads imposed by roof-mounted solar collectors.[89]
- System components containing fluids shall be protected with temperature and pressure relief valves or pressure relief valves.[90]
- Piping shall be insulated in accordance with the requirements of Chapter 11, unless piping is used to collect additional solar energy.[91]
- System components shall be protected from damage resulting from freezing of heat-transfer liquids at the winter design temperature.[92]
- Roof and wall penetrations shall be flashed and sealed to prevent entry of water, rodents, and insects.[93]
- Solar thermal systems shall comply with description label and warning label requirements.[94]

While the International Code Council has published its 2018 version of the International Residential Code, it has not been adopted by Michigan. The 2018 International Residential Code does contain additional regulations regarding roof access requirements for roof-mounted solar energy systems[95] and stationary storage battery systems.[96] However, since the 2018 edition of the International Residential Code has not been adopted by the state, these regulations are not applicable.

As noted above, in general, Michigan law requires a person to obtain a building permit before construction or alteration of any building or structure, which likely includes the installation of a solar energy system. However, it may be possible for a small ground-mounted solar energy system to be exempt from the general requirement to obtain a building permit. The residential code exempts one-story detached accessory structures with a floor area of 200 square feet or less from the building permit requirement.[97]

5.2 Building Code

The building code regulates the construction, alteration, demolition, use, and occupancy of buildings and structures not covered by the residential code.[98] Michigan has adopted the 2015 edition of the International Building Code with limited exceptions.[99] The 2015 international building code does describe rules regulating the installation of solar energy systems.

- Building-integrated photovoltaic products and roof-mounted photovoltaic systems must be

84 2015 Michigan Residential Code, R324.4, R907
85 2015 Michigan Residential Code R324.4.1
86 2015 Michigan Residential Code R324.5, R905.16
87 2015 Michigan Residential Code R324.6.1
88 2015 Michigan Residential Code, M2301.1
89 2015 Michigan Residential Code M2301.2.2
90 2015 Michigan Residential Code M2301.2.3
91 2015 Michigan Residential Code M2301.2.5
92 2015 Michigan Residential Code M2301.2.6
93 2015 Michigan Residential Code M2301.2.9
94 2015 Michigan Residential Code M2301.2.10
95 2018 International Residential Code, R324.6
96 2018 International Residential Code, R327
97 Mich. Admin. Code R. 408.30505(a)(i)
98 Mich. Admin. Code R. 408.30401
99 Id.

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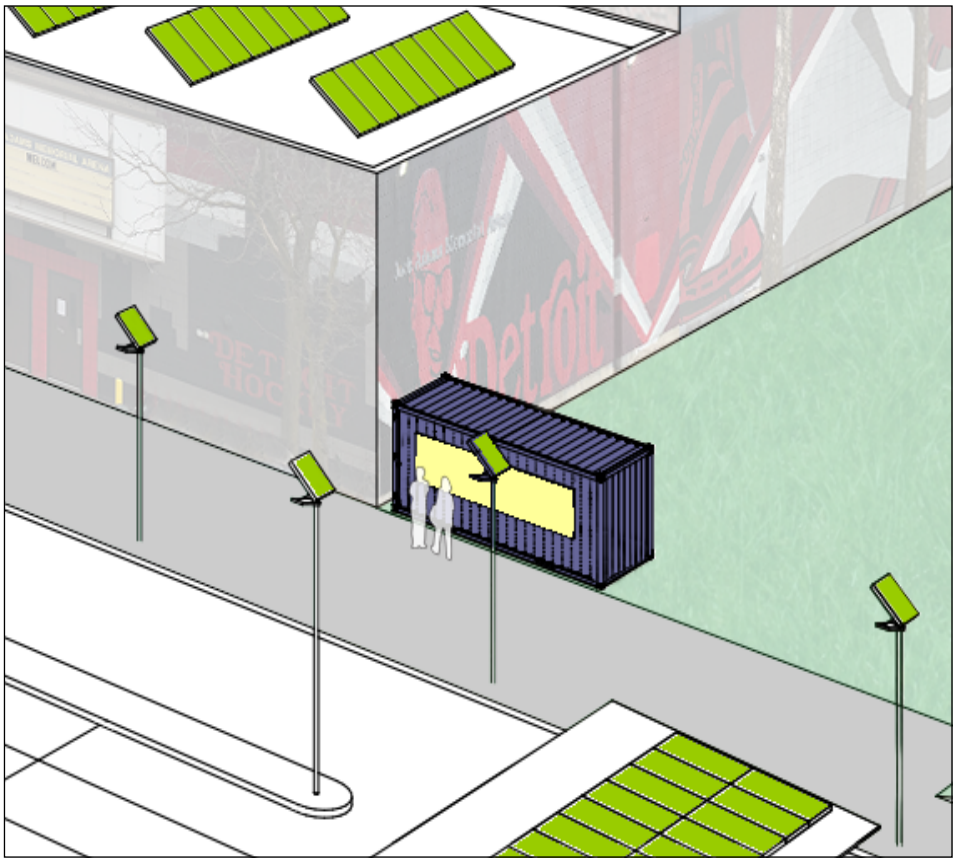
tested, listed, and identified with a fire classification.[100]

- Building-integrated photovoltaic products, such as photovoltaic shingles, must be listed and labeled and installed in accordance with the manufacturer's instructions and must comply with deck, underlayment, wind resistance, and fastener requirements.[101]
- Roof-mounted photovoltaic systems must be tested, listed, and identified with a fire classification.[102]
- Roof-mounted photovoltaic systems must be installed in accordance with the manufacturer's instructions, be listed and labeled, and meet wind resistance requirements.[103]
- Roof surfaces that support a solar photovoltaic system shall be designed to accommodate the full weight of the system, including concentrated loads from support frames and snow drift loads created by the panels.[104]
- Ballasted roof-mounted photovoltaic systems must be designed to resist sliding and uplift resulting from lateral and vertical forces.[105]

It may be possible for a small ground-mounted solar energy system to be exempt from the general requirement to obtain a building permit. The building code exempts one-story detached accessory structures with a floor area of 120 square feet or less from the building permit requirement.[106]



5.3 Electric Code

The electric code regulates the installation, replacement, alteration, relocation, and use of electrical systems or material.[107] Michigan has adopted the 2014 edition of the National Electrical Code, which was published by the National Fire Protection Association.[108] The 2014 National Electrical Code does describe numerous technical rules regulating solar photovoltaic systems.[109] It also requires that photovoltaic systems must be permitted to supply a building or other structure with electricity and requires the installation and all associated wiring and interconnections to be performed by a qualified person.[110]

100 2015 Michigan Building Code, R1505.8, R1505.9
101 2015 Michigan Building Code, R1507.17
102 2015 Michigan Building Code, R1510.7.2
103 2015 Michigan Building Code, R1510.7.3, R1510.7.4, R1510.7.1
104 2015 Michigan Building Code, R1607.12.5.2
105 2015 Michigan Building Code, R1613.6
106 Mich. Admin. Code R. 408.30409(a)(i)
107 Mich. Admin. Code R. 408.30801
108 Id.
109 *See,* National Fire Protection Association, National Electrical Code, Article 690, 2014 Ed.
110 Id. at R. 690.4(A), R. 690.4(C).

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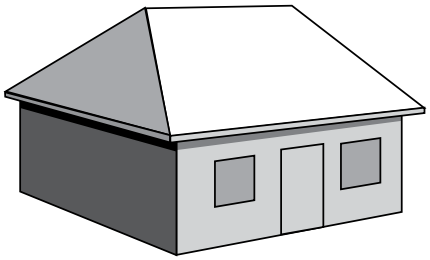
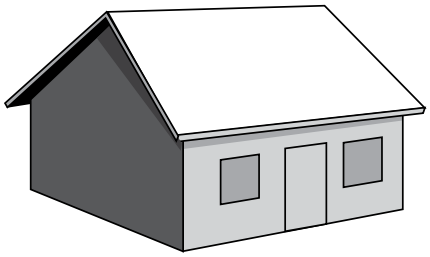


Hip-Roof



Single-Ridge Roof

5.4 Fire Code

Unlike with the building, residential, and electrical code, local governments in Michigan are free to adopt their own fire codes. Detroit has adopted the National Fire Protection Association's 2015 edition of the Fire Prevention Code,[111] which contains specific requirements for both building-mounted and ground-mounted photovoltaic systems. In Detroit, the fire code is administered and enforced by the Fire Marshal.[112] The Fire Marshal has the authority to inspect any building or premises for dangerous or hazardous conditions or materials as described by the Fire Prevention Code.[113] Additionally, the Fire Marshal has the authority to issue permits, but only for specified operations.[114] The Detroit code of ordinances does not require a fire permit prior to the installation to a solar energy system.

Regardless of whether a permit is required, all solar energy systems must comply with the requirements described in the National Fire Protection Association's 2015 edition of the Fire Prevention Code. The Fire Prevention Code describes specific requirements for both building-mounted photovoltaic systems and ground-mounted photovoltaic systems.

Building-mounted photovoltaic systems must comply with marking and rooftop access requirements. Regarding markings, the fire code requires a label be permanently affixed to the main service disconnect panel serving alternate current and direct current to the photovoltaic system,[115] to the circuit breaker controlling the inverter or other photovoltaic system electrical controller serving ac and dc photovoltaic systems,[116] and on all interior and exterior dc conduits, raceways, enclosures, cable assemblies, and junction boxes.[117] Additionally, where a photovoltaic system is interconnected to a battery or other secondary power system, additional signage shall be required to indicate the location of the secondary power source shutoff switch.[118] Regarding rooftop access, the fire code generally requires that a roof-mounted system must be installed in a manner that provides emergency access to the roof, provides pathways to specific areas of the roof, provides for smoke ventilation opportunity areas, and provides emergency egress pathways from the roof.[119] For single- and two-family dwellings and townhomes, the rooftop pathway requirements vary based on the type of roof:

- **Hip-Roof:** Must be located in a manner that provides a single 3' wide clear access pathway from the eave to the ridge where the photovoltaic modules are located.[120]
- **Single-Ridge:** Must be located in a manner that provides two 3' wide clear access pathways from the eave to the ridge on each

111 Detroit, MI., Code § 19-1-21
112 Detroit, MI., Code § 19-1-22
113 Id.
114 Id.
115 National Fire Protection Association, Fire Code 2015 Ed., R. 11.12.2.1.1
116 Fire Code R. 11.12.2.1.2
117 Fire Code R. 11.12.2.1.3
118 Fire Code R. 11.12.2.1.4
119 Fire Code R. 11.12.2.2.1
120 Fire Code R. 11.12.2.2.2.1.1

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roof slope where modules are located.[121]

In general, photovoltaic systems on single- and two-family dwellings and townhomes must be located at least 3' below the ridge of the roof.[122] Additionally, for hip and valley roofs, if modules are to be located on both sides of a hip or valley, then they cannot be located closer than 1.5' to a hip or valley.[123] However, if modules are only located on one side of a hip or valley of equal length, then they can be allowed to be placed directly adjacent to the hip or valley.[124]

Photovoltaic systems on anything other than one- and two-family dwellings and town homes must meet the following rooftop access requirements:

- Must provide a minimum of 4' wide clear perimeter around the edges of the roof for buildings with a length or width of 250' or less, and a minimum of 6' wide clear perimeter for building with a length or width greater than 250'.[125]
- Must provide access pathways.[126]
- Arrays shall be not larger than 150' by 150' in distance in either axis and must provide for one of the prescribed ventilation options.[127]

While the fire code also specifies some requirements for ground-mounted photovoltaic systems, these requirements are fairly basic and straightforward. Specifically, a clear area of 10' shall be provided around a ground-mounted system, and gravel or other non-combustible base shall be installed and maintained under and around the installation.[128]

The fire code allows the local authority to grant exceptions to access, pathway, or ventilation requirements based on any of the following circumstances:[129]

- Consideration of proximity and type of adjacent exposures
- Alternative access opportunities, as from adjoining roofs
- Ground level access to roof
- Adequate ventilation opportunities beneath photovoltaic module arrays
- Adequate ventilation opportunities afforded by module setback from other rooftop equipment
- Automatic ventilation devices
- New technologies, methods, or other innovations that ensure adequate fire department access, pathways, and ventilation opportunities

121 Fire Code R. 11.12.2.2.2.1.2
122 Fire Code R. 11.12.2.2.2.2.2
123 Fire Code R. 11.12.2.2.2.1.3
124 Id.
125 Fire Code R. 11.12.2.2.3.1
126 Fire Code R. 11.12.2.2.3.2
127 Fire Code R. 11.12.2.2.3.3.1; NFPA 11.12.2.2.3.3.2
128 Fire Code R. 11.12.3.1; NFPA 11.12.3.2
129 Fire Code R. 11.12.2.2.1.1

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6 Updating Zoning Codes to Facilitate Local Solar Development

Until recently, many zoning ordinances did not address the development of solar. While this did not mean that zoning ordinances prohibited solar energy systems, it did mean that cities had not taken the time to think about and develop a system of local land use regulation specifically focused on solar energy systems. However, as cities have sought to increase the local development of solar energy systems, many have prudently sought to update their zoning ordinances. Updates to a local zoning ordinance to specifically address solar energy systems have two primary purposes.

First, adding language that specifically addresses the location and design of a solar energy system provides clarity to residents and businesses that desire to install solar energy systems within its jurisdiction. Second, solar zoning updates also regulate aesthetic and use issues that may not be adequately addressed elsewhere in the city's zoning ordinance. While each city's solar amendments to its zoning ordinance are unique and reflect its vision for the development of solar energy systems within its jurisdiction, there is a set of common solar zoning amendments. In general, cities update zoning ordinances to provide for new definitions regarding the different types of solar energy systems it will allow, describe in what zoning districts solar energy systems are allowed either as an accessory use or a principal use, and specify intensity and dimensional standards specific to solar energy systems, and describe basic design requirements.

6.1 Definitions

Many cities amend their zoning ordinance to include a base definition that describes what a solar energy system is for the purposes of the ordinance. In general, many cities either use the term "solar energy system" or "solar collector" to define the basic type of system that is regulated by the zoning ordinance. Appendix A includes the definitions adopted by several zoning ordinances from across the country pertaining to solar energy systems.

There are a few important points to note regarding the general definitions commonly found in local zoning ordinances. First, despite being similar in nature, there is no widely adopted model definition of a "solar energy system," "solar collector," or any other definition pertaining to solar equipment. Instead, cities generally define these terms in the manner necessary to meet their specific visions. Second, all definitions provided above allow for two distinct types of solar systems: photovoltaic systems that convert solar energy into electrical energy and thermal systems that utilize solar energy for domestic water heating. Some ordinances also expressly define "photovoltaic system" and "solar thermal system" to clearly distinguish between the two for regulatory purposes. Third, the majority of definitions of "solar energy system" expressly incorporate ancillary solar equipment, such as batteries.[130]

In addition to providing a basic definition of "solar energy system" or "solar collector," many will more specifically categorize solar systems for regulatory purposes based on their mounting location or use. First, it is common for zoning ordinances to specifically define both "ground-mounted solar energy systems" and "building-mounted solar energy systems."[131] Additionally, Minneapolis, for example, also provides a specific definition for "building-integrated solar energy systems."[132] Providing definitions that categorize solar energy systems by their mounting location allows cities to clearly describe different requirements, such as setback, height limit, and coverage requirements, for the different types of solar energy systems. Second, some cities, such as Baltimore, provide specific definitions based on a variety of potential solar energy systems use typologies, including private, commercial, and community uses.[133]

130 Ann Arbor, MI., Code § 5:83(2)(c) (defining "solar energy system" to include "ancillary solar equipment"); Minneapolis, MN., Code § 535.830 (defining "solar energy system" to include storage devices); Ames, IA., Code § 29.201(205) (defining "solar energy system" to include storage devices); New Orleans, LA., Code § 26.2; Newark, NJ., Code § 40:2-2

131 *See, e.g.,* Ann Arbor, MI., Code § 5:83(2)(e), (f); Minneapolis, MN., Code § 535.830; Ames, IA., Code § 29.201(206), (208); City of Chicago Department of Planning & Development, City of Chicago Solar Zoning Policy, Nov. 2015

132 Minneapolis, MN., Code § 535.830

133 Baltimore, MD., Code § 1-302(n)

6.2 Solar Energy Systems as Accessory Use

Most zoning ordinances reviewed expressly allowed for solar energy systems as accessory uses. By expressly describing where solar energy systems are allowable as an accessory use, a city can provide clarity to solar-interested residents and solar developers. Many zoning ordinances broadly allow for solar energy systems as an accessory use in all zoning districts.[134] However, other cities more specifically describe the types and sizes of solar energy systems that are allowable as accessory uses. For example, Massachusetts' model solar ordinance allows roof-mounted and small scale ground-mounted solar energy systems[135] as a by-right accessory use.[136] Medium scale ground-mounted solar energy systems[137] are only allowable as an accessory use in residential zoning districts pursuant to a special site plan review, but are allowable by-right in commercial or industrial zoning districts.[138] Chicago specifies that building-mounted solar energy systems are allowed as accessory structures in all zoning districts, but only allows ground-mounted systems in non-residential districts.[139]

6.3 Solar Energy Systems Principal Use

In addition to specifically describing in what zoning districts solar energy systems are allowed as an accessory use, many zoning ordinances will also describe in what zoning districts solar energy systems are allowed as a principal use. Where a local government allows solar energy systems as a principal use is highly dependent on local concerns and public opinion. Additionally, where solar energy systems are allowed as a principal use, they may be regulated differently depending on their size. For example, the Massachusetts Model Ordinance recommends that medium scale solar energy systems, which are systems that occupy more than 1,750 square feet but less than 40,000 square feet of surface area, be a by-right principal use in commercial and industrial districts, and would allow such systems in residential districts subject to site

134 *See, e.g.,* Indianapolis, IN., Code § Table 743-1; Minneapolis, MN., Code § 353.840(a); Ames, IA., Code § 29.1309(1); Troy, MI., Code § 12.05

135 Small-scale ground mounted solar energy systems are systems that occupy 1,750 square feet of surface area or less. Model Zoning for the Regulation of Solar Energy Systems, Department of Energy Resources, Massachusetts Executive Office of Energy and Environmental Affairs, Dec. 2014, available at https://www.mass.gov/files/documents/2016/08/nc/model-solar-zoning.pdf (hereinafter, "Mass. Model Ordinance")

136 Mass. Model Ordinance

137 Medium-scale ground mounted solar energy systems are systems that occupy between 1,750 square feet and 40,000 square feet of surface area. Mass. Model Ordinance.

138 Id.

139 City of Chicago Department of Planning and Development, City of Chicago Solar Zoning Policy, at 14, Nov. 2015

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plan review.[140] It would also allow large scale solar energy systems, which are systems that occupy more than 40,000 square feet of surface area, in commercial and industrial districts subject to site plan review and in some residential districts.[141] Boulder County also regulates solar energy systems differently depending on their size, but does so based on the nameplate capacity of the system rather than the occupied area.[142] Milwaukee's zoning ordinance allows solar farms as a by-right principal use in all residential,[143] industrial,[144] and park districts[145] and as a special us in all commercial districts.[146] Numerous other cities allow for solar energy systems as a principal use either as a by right or conditional and use. A list of the local ordinances surveyed that allow for solar energy systems as a principal use is provided in Appendix B.

6.4 Intensity and Dimensional Standards for Solar Energy Systems

In addition to specifically describing where solar energy systems are allowed, whether as an accessory use or as a principal use, many local governments will also describe intensity and dimensional standards specifically for solar energy systems. In general, intensity and dimensional standards serve two functions in the context of solar energy systems: they address aesthetic and nuisance concerns as well as fire safety. Intensity and dimensional standards are less concerned with the design of the solar energy system itself, such as the color of the panels or material used for mounting structures, although such issues are addressed by some zoning ordinances. Instead, intensity and dimensional standards commonly address locational issues such as how far a solar energy system should be setback from a property line, maximum height limits, permissible arrangements of solar energy systems, and how much space solar energy systems may occupy on a given property. Many ordinances describe distinct sets of intensity and dimensional regulations for building-mounted and ground-mounted solar energy systems.

6.4.1 Ground-Mounted Solar Energy System

In general, local governments have created more intensity and dimensional standards for ground-mounted systems than for roof-mounted systems. These standards commonly include restrictions on where solar energy systems may be located in relation to the principal use (commonly referred to as "yard requirements"), how far systems must be setback from property lines, how much of a given lot a system can cover, and height limits.

6.4.1.1 Front, Side, and Rear Yards

A common issue addressed by many zoning ordinances is where ground-mounted systems may be located, particularly as an accessory use. Many zoning ordinances will specify whether solar energy systems are allowable in front, side, and/or rear yards. In general, many cities allow ground-mounted solar energy systems in rear and/or side yards.[147] However, the approach cities have taken to regulating the location of ground-mounted solar energy systems in front yards is more varied. Some cities expressly prohibit locating solar energy systems in a front yard.[148] Both Ames, Iowa and Troy, Michigan allow ground-mounted solar energy systems to be located in a front yard subject to the approval of a special use permit.[149] Other cities expressly allow for solar energy systems to be located in a front yard.[150] In general, concerns regarding ground-mounted solar energy systems being located in front yards appears to be aesthetical. For example, in 2017 the city of Ann Arbor proposed an amendment to their zoning ordinance which would have allowed ground-mounted systems to be located in front yards.[151] However, some residents raised concerns that allowing solar energy systems in front yards would disrupt the neighborhood aesthetic and would cause reduction in neighboring property values.[152] In response to the oppo-

140 Mass. Model Ordinance
141 Id.
142 Boulder County, CO., Code § 4-514.M.2; 4-514.H.2; 4-128.F.2
143 Milwaukee, WI., Code Table 295-503-1
144 Milwaukee, WI., Code Table 295-803-1
145 Milwaukee, WI., Code Table 295-903-2-a
146 Milwaukee, WI., Code Table 295-603-1
147 *See, e.g.,* Ann Arbor, MI., Code § 5:83(3)(b)(1); Indianapolis, IN., Code § 743-06(AA)
148 Id.
149 Ames, IA., Code § 29.1309(3)(a)(i); Troy, MI., Code § 12.05(A)
150 *See, e.g.,* Seattle, WA., Code § 23.44.046.A.3; Baltimore, MD., Code § 15-517(c)(1)
151 Proposed Zoning Ordinance Amendments – Solar Panels in R1-R2 districts, 17-0931, June 8, 2017
152 Memorandum from Brent Lenart (Planning Manager) and Matt Kowalski (Senior Planner) on Proposed Amendment to Chapter 55 to add Section 5:83 (Solar Energy Systems) to the Mayor and City Council (Jan. 11, 2018)

sition, the Ann Arbor city council amended the ordinance to only allow ground-mounted solar energy systems in rear or side yards.

6.4.1.2 Setback Requirements

In addition to specifying whether ground-mounted solar energy systems are allowed, many zoning ordinances will also specify how far a ground-mounted solar energy system must be setback from the property line. In general, setback requirements for solar energy systems as an accessory use are significantly less than setback requirements for systems as a principal use. For accessory uses, some zoning ordinances only require solar energy systems to be at least a few feet from the property line.[153] In cities that do allow solar energy systems to be a principal use, their zoning ordinances may require greater setback requirements.[154]

6.4.1.3 Lot Coverage

Zoning ordinances, including Detroit's, often include restrictions as to the percentage of a given lot that may be covered by principal or accessory buildings and structures. These restrictions may unduly limit the development of ground-mounted solar energy systems, both as an accessory use and as a principal use. Solar energy systems that are principal uses are generally not subject to any special lot coverage restriction. However, zoning ordinances do frequently contain language that describes lot coverage requirements for solar energy systems as accessory uses. Some zoning ordinances will exclude solar energy systems from lot coverage calculations.[155] More commonly, zoning ordinances will create a unique lot coverage requirement that is only applicable to accessory, ground-mounted solar energy systems. These requirements vary, and are detailed below.

Table 3 – Lot Coverage Requirements Regarding Accessory, Ground-Mounted Solar Energy Systems in Zoning Ordinances

City	Requirement
Ann Arbor, MI	System cannot occupy greater than 35% of the required rear setback area.[156]
Evanston, IL	System cannot have a footprint greater than 25% of the principal building's footprint.[157]
Minneapolis, MN	In residential district, the area of the solar collector surface of a ground-mounted system shall not exceed 5% of the lot area.[158]
Ames, IA	In non-residential district, system shall not exceed the footprint of the building served, except for industrial districts. In residential district, system may cover up to one-tenth of the footprint of the principal building or 100 square feet, whichever is greater.[159]
Philadelphia, PA	Total surface area of all ground-mounted systems on a lot cannot exceed 1,000 square feet.[160]
Newark, NJ	No lot with solar energy systems shall be covered more than 85% by structures.[161]

153 *See, e.g.,* Ann Arbor, MI., Code § 5:83(3)(b)(1) (requiring ground-mounted systems to be at least 3 feet from the property line); Ames, IA., Code § 29.1309(3)(a)(ii) (requiring ground-mounted systems to be at least 6 feet from the property line; Milwaukee, WI., § 295-505-4(o) (requiring ground-mounted systems that are less than 20' in height to be setback at least 1.5' from all side and rear lot lines and to comply with existing setback requirements for the front lot line)

154 *See, e.g.,* San Antonio, TX., Code § 35-398(b)(2)(b) (requiring a 30' side and rear setback for solar farms when they abut a residential use or residential zoning district)

155 *See, e.g.,* Indianapolis, IN., Code § 740-03(A)

156 Ann Arbor, MI., Code § 5:83(3)(b)(5)

157 Evanston, IL., Code § 6-4-6-8(F)(2)

158 Minneapolis, MN., Code § 535.840(c)(2)

159 Ames, IA., Code § 29.1309(3)(f)

160 Philadelphia, PA., Code § 14-604(7)(b)(3)

161 Newark, NJ., Code § 40:6-2-51(3)(b)

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6.4.1.4 Height Limits

Lastly, many zoning ordinances, including Detroit's, have maximum height limits for accessory structures. In regard to ground-mounted solar energy systems, zoning ordinances will generally either exempt the system from existing maximum height limits for accessory structures,[162] or will specify maximum height requirements for ground-mounted systems.[163] These solar specific maximum height limits range from 10 feet to 21 feet. Additionally, some zoning ordinances establish different height limits for ground-mounted solar energy systems that are accessory uses as opposed to principal uses,[164] and for ground-mounted systems that are located in a front yard. [165]

6.4.2 Building-Mounted Systems

Many local governments have developed intensity and dimensional standards specifically for building-mounted solar energy systems. While these standards address some of the same issues as described above for ground-mounted systems, such as height limits and setback requirements, some also address how solar systems must be arranged on a rooftop to ensure that roof-top systems meet aesthetic expectations and fire safety needs. In general, there are two types of building-mounted systems: roof-mounted systems and wall-mounted systems.

6.4.2.1 Mounting Location and Position

Unlike ground-mounted systems, it is relatively rare for zoning ordinances to specify where solar energy systems may be located on a building. Regarding wall-mounted systems, some ordinances do expressly provide that solar energy systems can be installed on the front, rear, or side of a building for clarity's sake.[166] Chicago prohibits the location of wall-mounted systems on the street-facing façade in residential districts.[167] Regarding roof-mounted systems, the vast majority of local governments allow solar energy systems to be located anywhere on the roof. Some ordinances specify that solar energy systems may be mounted on the roof of any principal or accessory structure.[168] No city ordinance that was reviewed prohibits the location of a solar energy system on any specific portion of the roof, such as a street-facing portion. However, New Orleans' ordinance does express a preference for roof-mounted systems on a pitched-roof to be located in place where visibility of the system from the street is minimized.[169]

In addition to specifying permissible mounting locations, some cities will also specify how roof-mounted solar energy systems should be positioned. Specifically, some zoning ordinances will express a preference that roof-top systems, particularly systems on pitched roofs, be mounted as flush as possible or parallel with the roof.[170]

6.4.2.2 Setbacks and Projection Limits

For building-mounted systems, local governments generally describe limits as to how far non-roof mounted systems may project out from a building, how far they can encroach upon a property line setback, and how far roof-mounted systems must be setback from the roof edge.

Regarding non-roof mounted systems, projection limits vary but generally are not more than a few feet.[171] Chicago's solar policy describes different projection limits for building-mounted systems in residential and non-residential districts.[172] Additionally, non-roof mounted systems are

162 Milwaukee, WI., Code § 295-605-2-f-1-i

163 Ann Arbor, MI., Code § 5:83(3)(b)(2) (21' max); Indianapolis, IN., Code § 743-06-AA(2) (May exceed maximum height requirement by 18"); Evanston, IL., Code § 6-4-6-8(F)(1) (10' max); Minneapolis, MN., Code § 535.840(c)(1) (20' or height of principal structure, whichever is less); Baltimore, MD., Code § 15-517(c) (15' for commercial solar energy systems; 10' for a community-based or private solar energy system if located in a side or year yard; 30" for a community-based or private solar energy system located in a front yard)

164 Baltimore, MD., Code § 15-517(c) (15' for commercial solar energy systems; 10' for a community-based or private solar energy system if located in a side or year yard; 30" for a community-based or private solar energy system located in a front yard)

165 Id.

166 Evanston, IL., Code § 6-4-6-8(C)(2)

167 Chicago Department of Planning & Development, City of Chicago Solar Zoning Policy, at 13, Nov. 2015

168 *See, e.g.,* Minneapolis, MN., Code § 535.830; Kansas City, MO., Code § 88-810-1895-B

169 New Orleans, LA., Code § 21.6.DD.2.b

170 *See, e.g.,* Chicago Department of Planning & Development, City of Chicago Solar Zoning Policy, at 12, Nov. 2015; Ames, IA., Code § 29.1309(4)(g)

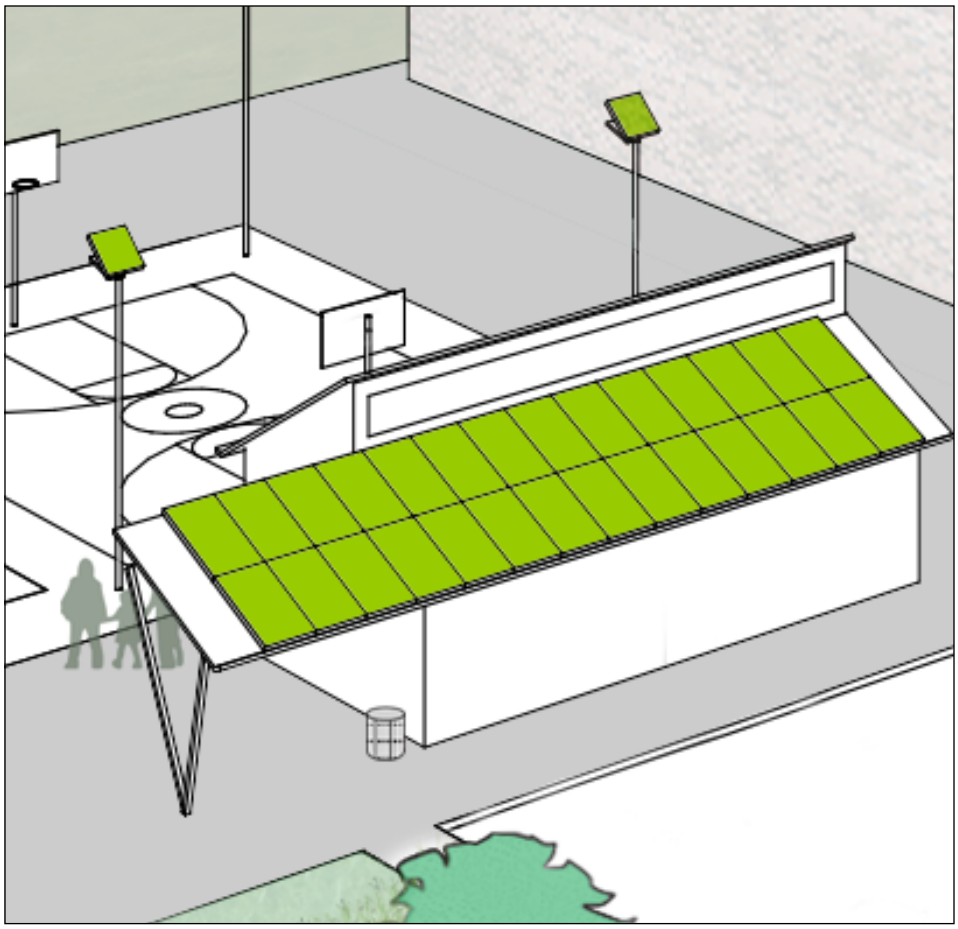
171 *See, e.g.,* Evanston, IL., Code § 6-4-6-8(C) (non-roof mounted system cannot extend more than 5' from exterior wall); Ames, IA., Code § 29.1309(4)(g) (Cannot project more than 5' from the building)

172 Chicago Department of Planning & Development, City of Chicago Solar Zoning Policy, at 13, Nov. 2015 (In residential districts, side-mounted systems cannot project more than 18" into the side setback, and rear-mounted systems cannot extend more than 3' into the rear setback; in non-residential districts, no system may project more than 3' from the structure)

still generally required to comply with setback requirements unless otherwise stated. Some cities will specify setback requirements for non-roof mounted systems[173] or will allow such systems to encroach upon certain setbacks to a limited degree.[174] Some zoning ordinances will simply specify that the system cannot extend beyond the edge of the roof.[175] Other ordinances specify that systems must be setback a certain distance from the roof edge.[176]

6.4.2.3 Height Limits

While most zoning ordinances include generally applicable maximum height limits that would regulate the height of solar energy systems, these regulations may create an undue obstacle to the development of solar. This is particularly true for roof-mounted systems, which may be included in calculating the maximum height of a building.[177] While Detroit's zoning ordinance does exempt certain structures, such as chimneys and roof structures used for mechanical purposes, from being included in determining the height of a building, it does not specifically address solar energy systems.[178] Many cities have amended their zoning ordinance to both remove undue burdens that maximum height limits may present to the installation of solar energy systems, and to ensure that such systems do not disturb the aesthetic character of the community. Many zoning ordinances will differentiate between roof-mounted systems and ground-mounted systems regarding their maximum height limits.



For roof-mounted systems, cities have taken several approaches, each of which is described below:

1. Wholly exempt roof-mounted solar energy systems from existing height limits without creating any additional height restrictions.[179]
2. Exempt roof-mounted solar energy systems from existing height limits, but subject the system to specific height limits that apply only to solar energy systems.[180]
3. Allow roof-mounted solar energy systems to exceed existing height limits by specific amounts.[181]

173 *See, e.g.,* Evanston, IL., Code § 6-4-6-8(C) (stating that non-roof mounted systems on a side or rear wall must be setback at least 3' from the property line)

174 *See, e.g.,* Ames, IA., Code § 29.1309(4)(c) (stating that a system attached to a residential property cannot extend more than 50% into any required side or rear setback, and cannot extend at all into any front setback)

175 *See, e.g.,* Chicago Department of Planning & Development, City of Chicago Solar Zoning Policy, at 13, Nov. 2015

176 *See, e.g.,* Minneapolis, MN., Code § 535.840(b)(2) (stating that that a roof-mounted system must be setback at least 1 foot from the exterior perimeter of the roof for every one foot that the system extends above the parapet wall or the roof surface on which it is mounted)

177 Detroit, MI., Code § 61-13-152

178 Detroit, MI., Code § 61-13-153

179 Milwaukee, WI., Code § 295-505-2-h-2-i

180 Indianapolis, IN., Code § 743-06-AA

181 Kansas City, MO., Code § 88-305-09-B(4)

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4. Limit roof-mounted solar energy systems to a maximum height that is the lesser of a certain amount above the existing height limit, or a specific height limit that only applies to solar energy systems.[182]

5. Require roof-mounted solar energy systems to comply with the existing height limits.[183]

6. Require roof-mounted solar energy systems to comply with existing height limits and height limits specifically applicable to solar energy systems.[184]

For local governments that create maximum height limits that are specifically applicable to solar energy system, some will create different requirements for roof-mounted systems on a flat roof and a sloped roof. For example, Newark has set a maximum height limit of 6 feet for solar energy systems installed on a flat roof, and 8 inches for solar energy systems installed on a pitched roof.[185]

6.5 Design and Location Standards for Solar Energy Systems

The majority of zoning ordinances contain no design requirements for solar energy systems. Evanston, Illinois requires systems to be neutral in color, requires a roof-mounted system to be generally matching in color to the roof, and requires frames of anodized aluminum or painted steel.[186] Minneapolis prohibits the use of unfinished lumber for ground-mounted systems.[187] Other local governments describe general design requirements, such as a requirement that the system be maintained in a safe and attractive manner.[188] While local ordinances generally do not describe robust design standards for solar panels and its mounting structure, they do commonly contain a requirement that all wires shall be underground or otherwise concealed,[189] and that systems must minimize glare from solar panels.[190] Additionally, a limited number of zoning ordinances include some screening requirements, particularly for ground-mounted systems. While these requirements vary, they generally require that solar energy systems be screened from the view of adjacent property owners. In general, screening is more frequently required for solar energy systems that are the principal use of the property[191] and is less common for accessory solar energy systems.[192]

182 Cincinnati, OH., Code § 1703-5.60(H)

183 Ann Arbor, MI., Code § 5:83

184 Newark, NJ., Code § 40:6-2-51(1)(d)

185 Id.

186 Evanston, IL., Code § 6-4-6-8(B)

187 Minneapolis, MN., Code § 535.840(c)(3)

188 *See, e.g.,* Ames, IA., Code § 29.1309(19)

189 *See, e.g.,* Ames, IA., Code § 29.1309(20); San Antonio, TX., Code § 35-398(b)(2)(h); New Orleans, LA., Code § 20.3.DDD

190 Minneapolis, MN., Code § 535.840(b)(3), (c)(5); Chicago Department of Planning & Development, City of Chicago Solar Zoning Policy, at 11, Nov. 2015; New Orleans, LA., Code § 21.6.DD.1(b)

191 New Orleans, LA., Code § 20.3.DDD (requiring that a solar farm or solar garden must be screened with a masonry wall or solid fence that is at least 7' in height); Huntsville, AL., Code § 73.1.1.5.k (requires that a photovoltaic solar energy production facility must be visually screened from the view of abutting residential properties via plantings, existing vegetation, or fencing)

192 The following cities do include a screening requirement for accessory systems: Baltimore, MD., Code § 15-517(d) (requires all ground-mounted systems to be screened from public view); Ann Arbor, MI., Code § 5:83(3)(a)(4) (requires the submission of a description of screening materials with zoning compliance permit application for solar energy systems as an accessory use in R1 and R2 districts, and single-family uses in R3 and R4 districts)

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7 Permitting for Solar Energy Systems

Table 4 – Permitting Processes

City	Expedited Permit Eligibility	Fee	Approval Timeline
Milwaukee, WI[193]	(i) Systems of less than 10 kilowatts; (ii) that are co-located with a one- or two-family dwelling; (iii) that are flush-mounted on a roof; (iv) and with a total load of less than five pounds per square foot	$70	Same day
Chicago, IL[194]	Roof-mounted systems with a nameplate capacity less than 13.44 kilowatts	$275	Same day
Philadelphia, PA[195]	(i) Systems that are 10 kW DC or less and the inverter has a continuous AC capacity of 13.44 kW or less; (ii) system is on the roof of a one- or two-family dwelling; (iii) equipment weighs less than five pounds/square foot; (iv) equipment imposes less than 45 pounds/square foot point load in any location; (v) the height of the system is less than 18" above the adjacent roof; (vi) a 3' clearance is provided around all equipment	$25 per $1,000 in labor costs (excluding equipment costs)	Same day

There are generally two types of permits that may be applicable for solar energy systems: zoning permits and construction permits. Zoning permits are not required for all solar energy systems. In Detroit, systems that are an accessory use may not require a zoning permit. However, some local governments do require a zoning permit for certain types of systems, such as systems that will be a principal use or systems as an accessory use in limited situations. In general, zoning permits seek to ensure that a solar energy system will not disrupt the aesthetic character of the neighborhood.

Construction permits, including electrical and building permits, are generally required subject to limited exceptions. Construction permits are meant to ensure that the solar energy system will be installed in a manner that ensures the safety of those living or working on the property with the solar energy system as well as first responders and neighbors.

7.1 Construction Permitting

Across the country, requiring a person to obtain construction permits prior to installing a solar energy system is common. In an attempt to encourage the development of solar energy systems, cities have employed a variety of approaches to speed up the permitting process. One very simple approach is to develop a solar permitting checklist for individuals and companies interested in solar development.[196] A solar permitting checklist does not alter existing permitting processes, but it does describe all of the different permits that a person interested in installing a solar energy system may have to obtain. The City of Detroit's Buildings, Safety Engineering and Environmental Department has created a brochure that describes the documentation that is required to obtain an electrical and building permit for photovoltaic panels, and what is required to establish a solar generation station, as well as a permitting process map. Many cities have also gone beyond creating a solar permitting checklist, and have created expedited

193 City of Milwaukee Solar Electric Permit Process, available at *http://city.milwaukee.gov/ImageLibrary/Groups/cityMilShines/Documents/2014/MkePermittingProcessSpring2014.pdf*

194 City of Chicago, Small Installations and the Easy Permit Process, available at *https://www.cityofchicago.org/city/en/progs/env/small_installationsandtheeasypermitprocess.html*

195 City of Philadelphia, Guidebook for Solar Photovoltaic Projects In Philadelphia (2nd Ed.), Mar. 2011, available at *https://beta.phila.gov/media/20160421161005/solar-photovoltaic-project-guidebook.pdf*

196 City of Indianapolis, Solar Photovoltaic Systems Required Documents Checklist, available at *http://www.indy.gov/eGov/City/DPW/SustainIndy/Energy/Documents/City%20of%20Indianapolis%20Solar%20Permitting%20Checklist.pdf*; City of Evanston, Solar Submittal Checklist, available at *https://www.cityofevanston.org/home/showdocument?id=26405*; City of Minneapolis, Permit Applicant Checklist for Residential Solar Energy Installations, available at *http://www.ci.minneapolis.mn.us/www/groups/public/@regservices/documents/webcontent/convert_272925.pdf*

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permitting processes for specific types of solar projects, which will typically reduce permitting fees and processing times.

Ann Arbor, Michigan has developed an expedited construction permit for certain types of solar energy systems. Ann Arbor provides an expedited construction permit for people that are seeking to install a solar energy system with a rated capacity of 12 kilowatts or less that is co-located with a single-family home, so long as the project meets the eligibility criteria described in the permit application.[197] Additionally, Ann Arbor does not assess a fee for electrical permits for solar panels installed on residential property.[198]

Similar to Ann Arbor, many cities across the country have sought to expedite the construction permitting process and cut permitting fees to encourage the installation of solar energy systems. Above are a few examples of expedited solar permit processes from local governments across the country:

7.2 Zoning Permitting

Similar to Detroit's zoning ordinance, many zoning ordinances will allow a person to establish an accessory use without the need for obtaining further zoning approvals.[199] However, some cities will require a person to obtain a zoning permit prior to installing an accessory solar energy system. For example, Ann Arbor requires a person to obtain a Zoning Compliance Permit prior to installing an accessory solar energy system in a R1 or R2 district, or with any single-family use in a R3 or R4 district.[200] An application for a Zoning Compliance Permit must include renderings of the proposed system, a plot plan or survey to indicate where the system is to be installed on the property, elevations showing the height of the system, and a description of the screening to be provided for ground-mounted systems.[201] Ames, Iowa has created a two-tiered zoning permit system for all accessory solar energy systems. In general, Ames requires all persons to obtain a Solar Energy System Zoning Permit prior to the installation of any accessory system, subject to limited exceptions.[202] Zoning Permit applications must include a plot plan, elevation views, manufacturer's photographs, manufacturer's spec sheet, and a demarcation of dimensions.[203] Additionally, ground-mounted accessory systems located in a front yard or wall-mounted systems located on the front façade must obtain a Solar Energy System Special Use Permit.[204] Applications for Solar Energy Systems Special Use Permit are reviewed for conformance with several criteria.[205]

197 City of Ann Arbor, Expedited Solar Permit Application – Residential Projects Only, available at *https://www.a2gov.org/departments/build-rent-inspect/building/permits/Documents/Expedited%20Solar%20Permit%20Applicationv3.pdf*

198 City of Ann Arbor, Electrical Permit Fees, available at *https://www.a2gov.org/departments/build-rent-inspect/building/Documents/Fees/Electrical_Fees_2017v1.pdf*

199 Detroit, MI., Code § 61-12-361

200 Ann Arbor, MI., Code § 5:83(3)

201 Id.

202 Ames, IA., Code § 29.1309

203 Id.

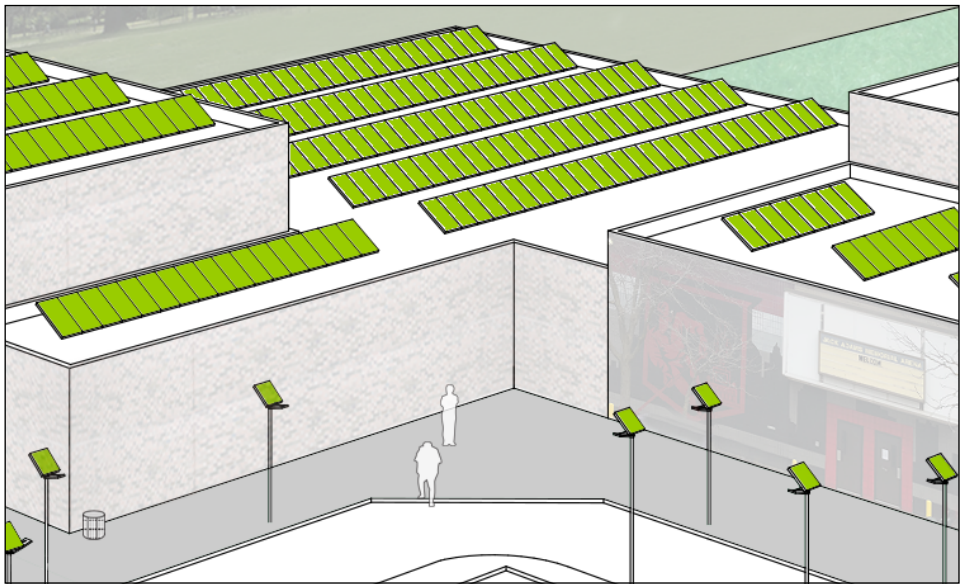
204 Ames, IA., Code § 29.1309(3)(a)(i); 29.1309(4)(b)

205 Ames, IA., Code § 29.1309(12)

8 Solar Access

Investing in a solar energy system comes with significant labor and equipment costs. While the upsides of clean, independent, renewable energy are numerous, there are also many potential barriers. For a person that is contemplating whether or not to install a solar energy system, one of the most common concerns is ensuring that the system has adequate access to sunlight, commonly referred to as "solar access," not only at the moment of installation, but also perpetually into the future. Ensuring adequate, long-term solar access is vital to guarantee that the investment made in the system is sound and that the costs can be recouped.

Persons that have installed solar energy systems have sought to secure solar access through a number of methods, including claiming an implied legal right to solar access and negotiating easements with abutting owners that restrict those owners from developing their property in a manner that will unduly impair a solar energy system's solar access. Additionally, in recent years, some local governments have taken the step of enacting local ordinances to establish legal rights to solar access to help facilitate the expansion of solar energy systems.



8.1 Common Law Right to Solar Access

English courts historically protected property owners' rights to sunlight through the doctrine of ancient lights. This judicially created doctrine granted a negative easement that guaranteed access to sunlight to a property owner that had received sunlight for a prescribed period of time.[206] Additionally, this judicially created easement prevented neighbors from, among other things, building new structures that would interrupt access to sunlight. While this doctrine was initially adopted by some United States courts in the 19th century, it has since fallen out of favor. In 1959, a Florida Appellate court in a famous decision stated that "no American decision has... held that...a landowner has a legal right to the free flow of light and air across the adjoining land of his neighbor."[207] Michigan, likewise, has rejected the doctrine of ancient lights.[208] The rejection of the doctrine of ancient lights by American courts was due, in part, to concerns that such a doctrine would obstruct the development of American cities.[209] However, it is possible that the innovation of solar energy systems may change how courts view solar access issues. The Wisconsin Supreme Court has recognized a property owner's right to sunlight for producing solar energy, and held that an unreasonable restriction of access to sunlight may amount to a private nuisance.[210] While this

206 *See, Story v. Odin,* 12 Mass. 157 (1815)
207 *Fontainbleau Hotel Corp. v. Forty-Five Twenty-Five, Inc.,* 114 So. 2d 357, 359 (Fla. Dist. Ct. App. 1959)
208 *Burke v. Smith*, 69 Mich. 380 (1888).
209 *See, Parker & Edgarton v. Foote,* 19 Wend. 309, 318 (1838)
210 *Prah v. Maretti*, 321 N.W.2d 182 (1982)

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judicial reasoning has not been adopted by Michigan courts, it illustrates the constantly evolving role courts play regarding solar access. However, for the time being, Michigan courts do not recognize any common law right to sunlight. This is significant because it means that the owner of solar energy system does not have any right to solar access, unless it is established by a privately negotiated agreement, or by state or local law.

8.2 Privately Negotiated Easements

While Michigan courts have not recognized a claim for an implied right to solar access and has not recognized a nuisance claim for unreasonable restrictions to solar access, a property owner that wishes to secure solar access may still do so by negotiating a solar easement with their neighbors. A solar easement is a privately negotiated real property agreement that involves the owner of a solar energy system paying a nearby property owner to restrict the development of their property beyond what is required by law to ensure the solar energy system will have solar access. The main purpose of a solar easement is to prevent excessive shading of the solar energy systems. Depending on the terms of the solar easement, the owner of a solar energy system may pay neighboring property owners to restrict the height of buildings, to restrict the height or location of trees on the neighbor's property, or both.

While privately-negotiated solar easements do provide the owners of solar energy systems with a method of creating a legal right to solar access, it is not a perfect tool for establishing solar access. First, an owner of a solar energy system will generally want to secure a permanent legal right to solar access, and will therefore seek either a perpetual or long-term solar easement. However, a neighboring property owner may be reluctant to agree to a solar easement that will impose a long-term or perpetual restriction on the use of their property. Second, even if a neighboring property owner is open to negotiating a solar easement with the owner of a solar energy system, those negotiations will involve transactional costs that will raise the overall price of solar development.

8.3 Local Solar Access Laws

Some local governments have sought to utilize local legislative authority to protect solar access. All local solar access laws balance the desire to protect solar access for existing or future solar energy systems to ensure a system's financial viability, and the need to avoid overly restricting development.

There are two methods by which local governments have sought to protect solar access: by requiring all development in designated solar access areas not impede a specified amount of solar access for all neighboring parcels through the utilization of a "solar fence," or by creating a solar access permitting scheme that allows the owner of a solar energy system to claim right to solar access.

8.3.1 Solar Fence

The solar fence is a concept that is incorporated into pre-construction permitting to ensure that new construction or modifications to an existing building do not unreasonably interfere with solar access. Solar fences function by prohibiting a new development from shading certain parts of any neighboring property during specific periods of a day. In a building permit application for any new construction, a hypothetical fence is placed on the property line around the whole of the property. The hypothetical fence's height, which is set by the ordinance, is used to determine the area of the neighboring property that shall have protected solar access. The shadow that the hypothetical fence would cast is the maximum shadow length that the structures are allowed to cast onto the neighboring property during the protected period of solar access. A period of solar access is the defined amount of sunlight that a person has a legal right to.

There are multiple methods by which a local government can describe period of access during which a solar energy system must have unimpeded solar access. In general, an ordinance will generally protect unimpeded solar access on a specific day during a specific timeframe. For example, it is common for many ordinances to protect unimpeded solar access for a period of several hours during December 21, which is the shortest day of the year.[211] However, some cities will utilize a different day for determining the protected period of use.[212] Some cities do not specify any specific day during which solar

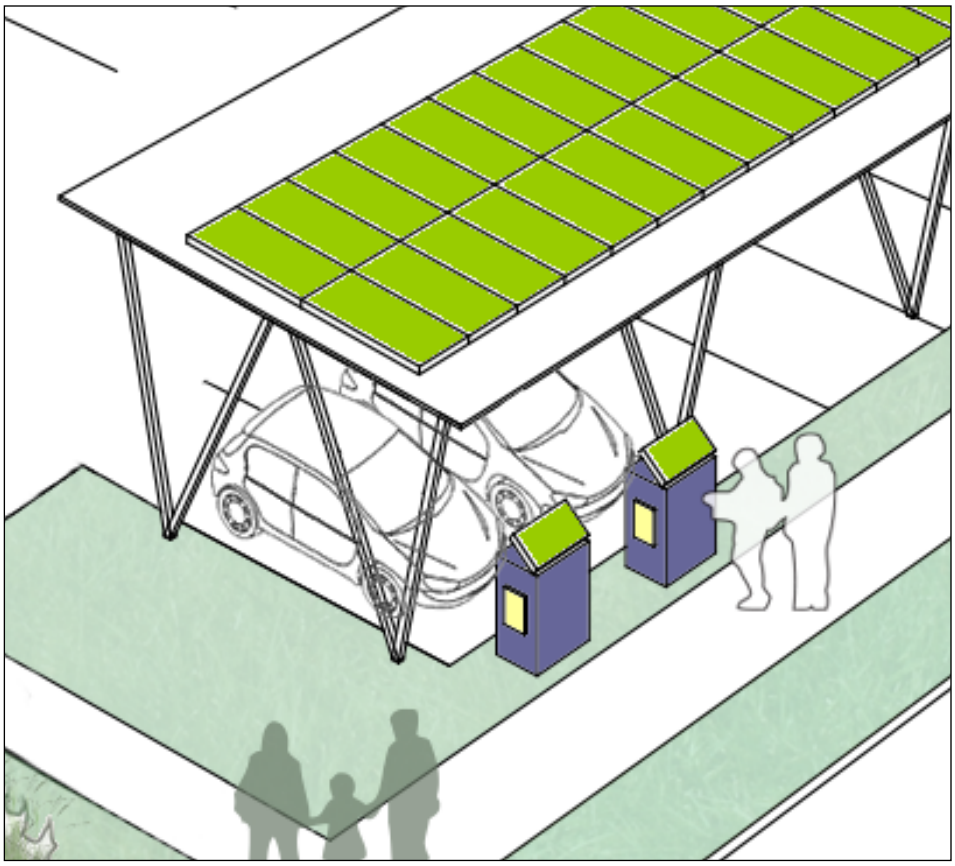
211 On December 21st, the amount of sunlight is naturally at its minimum in the Northern Hemisphere. Therefore, by utilizing this date to define the period of access that will be, the ordinance provides a bare minimum of solar access and also ensures that solar access will be maximized the rest of the year.; Boulder, CO.,Code § 9-9-17(d); San Luis Obispo, CA., § 16.18.170(B); Houston County, MN., § 29.8(3); Canton Township, MI., Code § Appendix A § 6.04(A)(4).

212 Clackamas County, OR uses January 21 as the reference date. Clackamas County, OR., Code § 1017.02(O)

access must be guaranteed, but instead require a daily period of use.[213] In addition to specifying a specific day on which unimpeded solar access will be protected, ordinances will also specify a specific timeframe. Some ordinances specify specific times during the day, such as between 10 a.m. and 2 p.m., or between 9 a.m. and 3 p.m.[214]

In summary, a solar fence functions by requiring property owners to incorporate a hypothetical fence at a specifically defined height in its pre-construction plans. The proposed construction is prohibited from developing the property in a manner that would cause any part of any neighboring property to be shaded during the legally required period of access, except for the portions of the property that would be shaded by the hypothetical solar fence. For example, if a neighbor plans to build an addition on an existing structure's second story, the shadow that the addition casts during the period of use must not shade a neighboring lot to a greater degree than the lot would be shaded by the hypothetical solar fence. The portions of the property not covered in shadows are guaranteed solar access during the defined period of access. In general, a solar fence with a lower height will provide greater protections for solar access for neighboring property owners.

The height of a solar fence may vary based on the specific characteristics of the property, such as its zoning classification. For example, Boulder's zoning ordinances divides all property into one of three solar access areas. The purpose of dividing property into different solar access areas is to provide maximum solar access protection for each area of the city in a manner that is consistent with



planned densities.[215] For example, Boulder's zoning ordinance provides for a 12 foot solar fence in low-density residential areas and a 25 foot solar fence in high-density residential and non-residential areas. As such, Boulder's zoning ordinance provides a greater degree of solar access protection for low-density residential developments. This is partially because low-density residential neighborhoods do not commonly include tall structures. Therefore, providing strong solar access rights in low-density neighborhoods will not frequently conflict with development interests.

Solar fences broadly establish a solar right for large groups of properties, regardless of whether the owners of those properties have or intend to install a solar energy system. As such, solar fences will inevitably create unnecessary solar access rights that are not utilized by a property owner who chooses not to install a solar energy system, but that nonetheless limits neighboring development. However, by broadly protecting solar access, solar fences proactively assure that all properties will have a reasonable amount of solar access to support the installation of a solar energy system either immediately or anytime in the future. Additionally, solar fences typically require developers rather than a city department to prepare the solar access analysis, which limits the city's transactional costs.

8.3.2 Solar Access Permit

Solar access permits are a more targeted method of ensuring solar

213 Sunnyvale, CA require a daily measurement of solar access. Sunnyvale, CA., § 19-4-19.56.020(a)
214 Prairie de Sac, WI., Code § 10-8-2(e); Sunnyvale, CA., Code § 19-4-19.56.020(a)
215 Boulder, CO., Code § 9-9-17(c)

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access than solar fences. With a solar access permit, solar access rights are created on a case-by-case basis only for those people that have installed or are immediately planning to install a solar energy system, and must provide the overseeing department with information about the proposed project before the permit is approved. This information might include the size, location, and placement of the solar array, topography of the property, and a justification as to why solar access needs to be permitted. Many localities offer solar access permits. Local governments take different approaches regarding the granting of solar access permits. Prairie de Sac, Wisconsin balances the request for access against the burden it would cause neighboring landowners.[216] Albuquerque, New Mexico weighs the benefits and harms as well, but does so from a public benefit point-of-view rather than for the burdened property owners.[217] Albuquerque also requires that the applicant prove that they will actually use the solar access beneficially and are not prospectively seeking the permit without plans to actually use it. Solar permitting schemes generally require that the city hold a public hearing prior to granting a solar permit, with notice of the hearing being given to neighboring property owners that may be impacted by the decision. Additionally, many will require that the holder of a solar permit provide just compensation to the owner(s) of any property burdened by the permit.

The scope of solar access permits can vary. Some cities' solar access permits only protect the permit holder from shading caused by vegetation.[218] Others cities' solar access permits broadly function to secure a solar access right subject to the conditions of the permit and authorizes the permit holder to seek the described remedies for any interference with that right.[219] Similar to solar fences, a solar permit generally only protects a specifically defined amount of sunlight.[220] Additionally, how solar access permits are enforced can vary. Cities grant enforcement authority to the permit holder,[221] or provide enforcement authority to both the permit holder and the city.[222] Once a solar permit is granted, it generally continues in perpetuity unless the solar access rights go unused for a specified period of time.[223]

216 Prairie de Sac, WI., Code § 10-8-5(a)

217 Albuquerque, NM., Code § 14-11-7(C)(1)(b)

218 Boulder's solar access permits are only for Solar Access Area 3, where solar fences are not applicable. Boulder, CO., Code § 9-9-17(h)(2)(A); Ashland only offers solar access permits against vegetation, as its setback requirements only apply to built structures. Ashland, OR., Code § 18.4.8.060.

219 Prairie de Sac, WI., Code § 10-8

220 Boulder, CO., Code § 9-9-17(h)(3)(E)

221 Boulder, CO., Code § 9-9-17(h)(13) (stating that a solar access permit is enforceable by the beneficiary if, and only if, the beneficiary has properly recorded the permit in the real property records of the Boulder County Clerk and Recorder with respect to each affected lot)

222 Ashland, OR., Code § 18.4.8.070(B) (stating that if vegetation is allowed to grow contrary to a Solar Access Permit, the owner of property with the Solar Access Permit or the City, on complaint by the holder of the Solar Access Permit)

223 Albuquerque, NM., Code § 14-11-7(D); Boulder, CO., Code § 9-9-17(h)(10); Prairie de Sac, WI., Code § 10-8-10

9 Historic Districts

The establishment of local historic districts and local historic district commissions is governed by state law and local ordinance. While the Michigan Local Historic Districts Act of 1970 broadly describes the process by which a local government may establish historic districts, how a local government may establish a historic district commission, and the powers and duties of the historic district commission, local governments have a broad amount of discretion both in regards to regulating construction activity, including the development of solar energy systems, in historic districts.

9.1 Detroit Historic Districts

The Detroit City Code allows any person residing, doing business, or owning property in the city to request that the city council designate an area or resource as a historic district.[224] Upon receiving a request, the city council may adopt a resolution directing that the Historic Designation Advisory Board conduct a study to determine whether the proposed district meets the criteria for designation.[225] Ultimately, the city council has the power to establish historic districts, modify the boundaries of an existing historic district, or eliminate a historic district by ordinance.[226] Currently, Detroit has 140 total historic districts. These districts vary in size. Some, such as the Boston Edison district, consist of several blocks. Others, such as Ossian Sweet House, consist of a single property.

9.2 Permitting Process

Once a property is included in a historic district, state law requires a person to obtain a permit before performing any work that affects the exterior appearance of any building, structure, or open spaces on the property.[227] No permit may be issued and proposed work cannot proceed until either the local historic district commission (HDC) or HDC staff either issues a certificate of appropriateness or until the HDC issues a notice to proceed.[228]

However, Michigan law allows "ordinary maintenance" to be done in a historic district without a permit.[229] In general, work that maintains the existing external appearance is considered ordinary maintenance.[230] The Detroit HDC has described numerous types of work that may qualify as ordinance maintenance.[231] It is clear that the installation of a new solar energy system would not qualify as ordinary maintenance.

9.2.1 Staff Review for Minor Classes of Work

State law allows a HDC to delegate its authority to issue certificates of appropriateness for specified minor classes of work to its staff.[232] However, state law does not define the minor classes of work that a HDC may delegate to staff; instead, local HDCs may determine the minor classes of work it will delegate. The Detroit HDC has delegated its authority to issue certificates of appropriateness to its staff for specified classes of work.[233] In a resolution approved on June 13, 2018, the Detroit HDC delegated its authority to approve the installation of solar panels in Detroit historic districts, so long as the solar energy system meets the following five conditions:[234]

1.) The solar panels are installed in areas with limited-to-no visibility to the public-right-of-way.

2.) Ground-mounted panels to be located in a rear yard.

3.) Roof-mounted panels shall be flat-mounted, located on a rear roof elevation and/or garage, with adequate distance from roof edges and ridge; panels shall be a matte, dark finish consistent with the color of the existing roofing material.

224 Detroit, MI., Code § 25-2-4(a)
225 Id.
226 Detroit, MI., Code § 25-2-4(e)
227 MCL 399.205(1); Detroit, MI., Code § 25-2-18
228 MCL 399.205(1)
229 MCL 399.210; MCL 399.201a(p)
230 MCL 399.201a(p)
231 City of Detroit Historic District Commission, What You Need To Know About Local Historic Districts, Last Revised Jul. 18, 2013, available at *http://www.detroitmi.gov/Portals/0/docs/HistoricDistrictComm/2016%20HDC%20Brochure.pdf* (hereinafter, "Detroit HDC Guidance")
232 MCL 399.205(10)
233 Detroit HDC Guidance
234 Detroit Hist. Dist. Comm'n Res. 18-03 (Jun. 13, 2018)

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4.) Wall-mounted panels won't cover existing architectural features, nor damage existing wall materials.

5.) The installations shall comply with the National Park Service, Technical Preservation Services document, "Incorporating Solar Panels in a Rehabilitation Project" (ITS Number 52).

9.2.2 HDC Review for All Non-Minor Classes of Work

Any type of work that is not expressly included in the list of work items delegated to HDC staff must be permitted by the HDC either through a certificate of appropriateness or a notice to proceed. Certain types, specifically resource additions, demolitions, or new construction, must be subject to a public hearing.[235] Based on the definition of a resource under the Detroit City Code,[236] it appears that that the installation of a solar energy system in a historic district, either as an accessory use or a principal use, would require a public hearing. However, two applications for the installation of solar energy systems in Detroit historic districts on February 1, 2018 did not involve a public hearing.[237]

Within 60 calendar days after its receipt of a complete application, the HDC must issue one of the following decisions:[238]

- **Certificate of appropriateness** (CoA): If the proposed work will be appropriate according to the defined elements of design for the historic district and the Secretary of the Interior's standards for rehabilitation and guidelines for rehabilitating historic buildings.[239]

- **Denial:** If the proposed work will be inappropriate according to the Secretary's standards and the defined elements of design for the historic district.[240]

- **Notice to proceed:** If the work is not appropriate, but it is deemed necessary to do the work because the resource presents hazards to the occupants or public, is a deterrent to a major improvement program that will be of substantial benefit to the community, or when the resource presents "undue financial hardship to the owner when a governmental action, an act of God, or other events beyond the owner's control created the hardship, and all feasible alternatives to eliminate the financial hardship…have been attempted and exhausted by the owner."[241]

The Detroit HDC has published a guidance document that describes its review of proposals to install solar energy systems in historic districts. The guidance document provides a few key conditions that must be satisfied for the installation of the solar energy system to be approved by the Detroit HDC: [242]

1.) Must be located on a flat-roof, or proposed for the rear elevation of a gable roof, so that the panels will not be visible from the public-right-of-way.

2.) Must be flat-mounted panels (not angle-mount), with minimal height/profile.

3.) Panels must have a matte, dark finish and should have a lip installed along the perimeter of the panels to further hide them from view.

If the HDC fails to act on a complete application within 60 days, BSEED must issue the applicant a building permit for the proposed work, unless the applicant and the HDC have agreed to an extended decision deadline.[243] A denial issued by the HDC is binding on BSEED.[244] If an application is denied, the applicant can either appeal the decision or re-submit an amended application.[245] Aggrieved applicants who wish to appeal decisions by the HDC must first appeal to the State Historic Preservation Review Board within 60 days of the HDC's decision. Decisions by the state board may be appealed to the circuit court that has jurisdiction over the local HDC that made the original decision.[246]

235 Detroit, MI., Code § 25-2-23

236 A "resource" is defined as "…one…or more publicly or privately owned historic or non-historic buildings, structures, sites, objects, features, or open spaces located within a historic district, including but not limited to fences, walls, significant landscape features, surface textures, and street furniture." Detroit, MI., Code § 25-2-2(t)

237 Preservation Detroit, HDC & HDAB News *http://preservationdetroit.org/resources/hdc-hdab-news/*.

238 Detroit, MI., Code § 25-2-20 through 26

239 Detroit, MI., Code § 25-2-24(1)

240 Detroit, MI., Code § 25-2-24(3)

241 MCL 399.205(6)

242 City of Detroit, Historic District Commission, How do I…install solar panels? Information needed for HDC review (only) (hereinafter, "Detroit HDC Guidance")

243 Detroit, MI., Code § 25-2-24(4)

244 Detroit, MI., Code § 25-2-26

245 Detroit HDC Guidance

246 MCL 399.205(2)

10 Appendix A – Solar Energy System Definitions

Appendix A – Definitions of Solar Systems in Zoning Codes

Jurisdiction	Solar Term	Definition
Massachusetts Model Ordinance	Solar Energy System	A device of structural design feature, a substantial purpose of which is to provide daylight for interior lighting or to provide for the collection, storage, and distribution of solar energy for space heating or cooling, electricity generation, or water heating.
Ann Arbor, MI	Solar Energy System	A system (including solar collector surfaces and ancillary solar equipment) either affixed to a permanent principal or accessory building or functioning as a freestanding structure, that collects, stores, and distributes solar energy for heating or cooling, generating electricity, or heating water. Solar energy systems include but are not limited to photovoltaic (PV) power systems and solar thermal systems.
Evanston, IL	Solar Collector	A silent device, structure, or part of a device or structure, which is used primarily to transform solar energy into thermal, chemical, or electrical energy. The solar collector shall be used as part of a system which makes use of such energy for the purpose of water heating or cooling, or power generation.
Minneapolis, MN	Solar Energy System	A device of structural design feature intended to provide for collection, storage, and distribution of solar energy for heating or cooling, electricity generation, or water heating.
Ames, IA	Solar Energy System	All exterior and above-ground parts of a panel or other solar energy device including legs/braces and/or supporting devices, the primary purpose of which is to provide for the collection, inversion, storage, and distribution of solar energy for electricity generation, space heating, space cooling, or water heating, primarily for on-site use.
Troy, MI	Solar Collector	A device or combination of devices or structures that collects, transfers, or transforms direct solar, radiant energy into thermal, chemical, or electrical energy, and that contributes significantly to a structure's energy supply. In addition to such functions, solar collectors may also serve as a part of a structure's roof, wall, window, or other structural member.
Milwaukee, WI	Solar Collector	A device, structure, or part of a device, the substantial purpose of which is to transform solar energy into thermal, mechanical, chemical, or electrical energy.
Seattle, WA	Solar Collector	Any device used to collect direct sunlight for use in the heating or cooling of a structure, domestic hot water, or swimming pool, or the generation of electricity.
New Orleans, LA	Solar Energy System	Equipment that directly converts then transfers or stores solar energy into usable forms of thermal or electric energy.

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Appendix A – Definitions of Solar Systems in Zoning Codes

Jurisdiction	Solar Term	Definition
Newark, NJ	Solar Energy System	Any solar collector panels, films, shingles, or other solar energy devices or solar structural components mounted on a building or on the ground and including other appurtenant structures and facilities, whose primary purpose is to provide for the collection, storage, and distribution of solar energy received from the sun and provides power for the principal use of the property whereon said system is located.
Baltimore, MD	Alternative Energy System	Equipment used to generate thermal or electrical energy from a renewable resource, including commercial alternative systems, community-based alternative energy systems, and a private alternative energy system.

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11 Appendix B – Solar Energy Systems as Principal Use

City	Solar Energy System	Districts	Approval
Milwaukee, WI	Solar Farm: Ground-mounted array of any size	All residential, industrial, park, institutional, and downtown districts	By Right
		Commercial and lakefront overlay districts	Conditional
San Antonio, TX	Solar Farm: Ground-mounted array of any size	Light industrial, general industrial, heavy industrial, mixed light industrial, mixed heavy industrial, entertainment district, rural development district, farm and ranch district, quarry district, sand and gravel district,	By Right
		Neighborhood commercial, commercial districts, office districts, urban development districts, manufactured housing district, mixed use district, form based zoning development district, transit oriented development district	Conditional
New Orleans, LA	Solar Farm: Solar energy system operated by a public or private utility	Centers for industry district	By Right
		Rural development district	Conditional
	Solar Garden: Solar energy system that supplies power primarily for use by the principal and accessory uses of a group of buildings	Rural development district, historic urban neighborhood districts, suburban neighborhoods residential districts, suburban neighborhoods non-residential districts	Conditional
		Centers for industry district	By Right
Newark, NJ	Solar Energy System	Industrial districts	By Right
Baltimore, MD	Community-Based System: Systems that produce energy for supply to the grid and is supported by community members who purchase energy from the system and financially benefit from the system	Detached and semi-detached residential districts, rowhouse and multi-family residential districts, business districts, industrial districts	By Right
	Community Based System on lot that is less than 0.5 acres	Detached and semi-detached residential districts, rowhouse and multi-family residential districts	Conditional
	Commercial System: Designed to produce greater levels of energy for consumers with high energy demands, or for supply to electric grid	Industrial districts	By Right
Buffalo, NY	Solar Farm: Generate and produce electricity for distribution to consumers	Educational campus, light industrial, heavy industrial	By Right
		Secondary employment center, medical campus, strip retail, flex commercial	Conditional

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