Center for RURAL Pennsylvania

A LEGISLATIVE AGENCY OF THE PENNSYLVANIA GENERAL ASSEMBLY

Solar Development in Rural Pennsylvania

October 1, 2021

Shippensburg University of Pennsylvania

AGENDA

9:00 AM **Call to Order, Senator Gene Yaw, Chairman**

9:05 AM **Welcoming Remarks, Dr. Charles Patterson, President of Shippensburg University of Pennsylvania and Center Board Member**

9:10 AM **Panel 1: Pennsylvania Policy Approaches to Solar Development**

- Thomas Murphy, Director, Penn State Marcellus Center for Outreach and Research, Penn State Extension
- Professor Mohamed Badissy, Assistant Professor of Law, Penn State Dickinson School of Law
- Michael Roth, Policy Director, Pennsylvania Department of Agriculture

9:40 AM **Panel 2: Considerations When Beginning a Solar Project**

- Brian Ross, Vice President for Renewable Energy, Great Plains Institute / SolSmart Advisor
- Daniel Brockett, Educator, Penn State Extension
- Paul Mason, Fourth Generation Dairy Farmer and Farm Bureau Member

10:10 AM **Panel 3: Considerations When Decommissioning a Solar Project**

- Ariane Benrey, Policy Analyst, Division of Clean Energy, New Jersey Board of Public Utilities
- Bruce Burcat, Executive Director, Mid-Atlantic Renewable Energy Coalition
- Scott Elias, Senior Manager of State Affairs, Solar Energy Industries Association
- Andrew Williams, Vice President of Policy & Corporate Affairs, Sol Systems, LLC

10:55 AM **Concluding Remarks and Adjournment, Senator Gene Yaw**

Please note: Shippensburg University requires all visitors to wear a mask when indoors, except while actively eating or drinking.

Supplemental Materials
From Brian Ross:
IN Solar Ordinance December 2020
SolSmart Program Guide 2021
In Renewable Energy Guide
Repowering and Decommissioning
Solar Siting Co-Benefits

PA State Grange Testimony

Center for Rural Pennsylvania

Solar Development Trends and Policy in the Commonwealth

October 1, 2021

Thomas B. Murphy, Director

Penn State University Marcellus Center for Outreach and Research

Chairman Yaw, Vice Chairman Pashinski, directors and members of the Center for Rural Pennsylvania, and distinguished guests, good morning, and thank you for the invitation to offer remarks pertaining to solar development trends in the Commonwealth. My name is Tom Murphy, and I am the Director of the Penn State Marcellus Center for Outreach and Research. Our Center's work is focused on energy transitions, primarily at the convergence of shale energy and renewables, with a specific interest in solar. My comments today will be tailored to the emergence of utility, or grid-scale, solar development which is occurring at an increasingly rapid pace in the state. This would also be considered "front of meter" solar development, as the electrical power which is produced is mostly directed into the PJM power grid and transmitted to downstream users across the multi-state region. This is distinctly different from "community solar" which is not currently permitted in PA, and/or rooftop solar, which would typically be used "behind the meter" by the host of the solar arrays. Rooftop solar is permitted in most locations across the state and there are currently two bills in Harrisburg seeking to approve the use of community solar in PA.

In 2007, 1% of the state's energy portfolio was produced from renewable resources, with the majority coming from solar. By 2019, that number had doubled to 2%. In a like timeframe, coal diminished from 55% to 17%. And natural gas increased from 8% in 2007 to 42% in 2019. In essence, increasingly large quantities of Marcellus and Utica natural gas pushed coal out of the energy mix and caused a significant impact to the longstanding energy paradigm in the state. Similar trends have been occurring in the multi-state region and the nation. On that wider view, cheaper natural gas, and lower cost solar have been the primary market-based driver to foster a wholesale switch to a lower carbon approach to power generation by the utility industry. Political mandates and policy shifts have also been key drivers and are increasingly advocating or mandating a more rapid shift due to climate metrics nationally and globally. It should also be noted that there are equally significant societal shifts in opinion of where communities of people and industry sectors want to source their energy going forward.

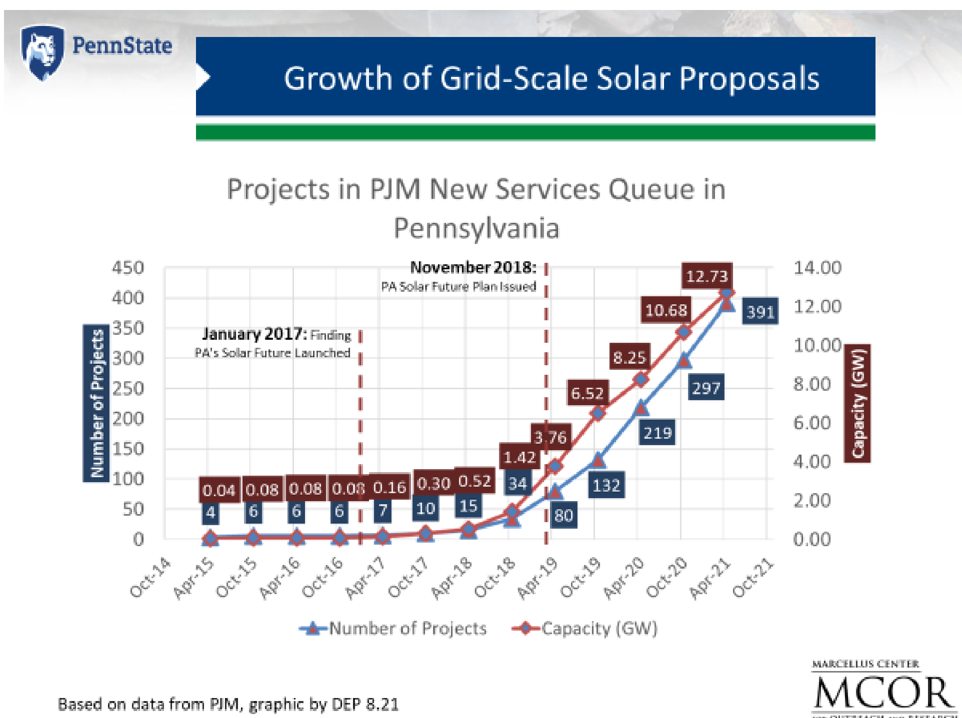
Along with the market trends of utilities shifting increasingly larger percentages of their electrical production to renewables, in this case grid scale solar, most of the largest oil and gas companies are now refocusing their future investments towards a more diverse array of lower carbon energy sources, and at the same time rebranding themselves as "energy companies", versus the fossil energy development model they were founded on. One of those same companies co-hosted the solar tour many of you participated in yesterday. It is likely this trend will continue due to the drivers I mentioned previously and spread to the mid-sized oil and gas companies here in the state and beyond.

Currently in Pennsylvania, there are eight (8) operating utility scale solar facilities, half of which are here in Franklin County. The production from three of those solar facilities is currently providing the electrical power needs of Penn State University, through a negotiated power purchase agreement (PPA), and have been online in some capacity since late 2019. Analysis of applications of new grid scale solar projects in the PJM queue, would indicate there are now over 400 new projects proposed, most of them in the last two years. In early 2019, there were only 40 of these projects receiving consideration for inclusion in the PJM queue. And as you are aware, the Commonwealth also has an ambitious plan to cover approximately 50% of its electrical power needs through utility scale solar, most of it to be located in the core central counties of PA. It should be noted that proposed projects placed into the PJM queue are not necessarily projects which will be built due to a variety of reasons such as cost, permitting, leasing issues, electrical infrastructure capacity, and others. Industry sources anticipate 10 to 20% of projects submitted to the queue will be built in the end. But as project proposals are dropped, new ones are added. The state is looking at a solar target of 80,000 surface acres by 2030.

As our Penn State energy team has been providing extensive educational outreach on solar across the state, there have been several solar-related issues which have been repeatedly surfacing. And although we have had questions on environmental concerns, glare, noise, road access, and wildlife, by far most of the issues which have surfaced have been related to transitioning land for solar energy, both at the front and back end of the projects. This has manifested itself in discussions on writing and implementing new county and municipal ordinances for siting solar, decommissioning bonds, and new electrical infrastructure needs such as transmission. There are also a range of questions on redevelopment of brownfields vs. new greenfield locations, impacts to farmland, options with agrivoltaics, aesthetics, and economic impacts to rural communities due to the transitions taking place. Newly emerging issues are now on the leading edge of the public discussion, such as green hydrogen production and battery storage, which could be co-located with larger solar arrays, and be an additional land use consideration going forward.

Land in the Commonwealth has been transitioning to other uses such as residential development, industrial parks, new roadways, and commercial warehousing for decades. And much of that impact has been on agricultural land over time. The pace of change occurring now with solar is appearing to be more rapid, with some similarities to the Marcellus wave which went through the state. It is leading more people to ask for assistance in understanding the implications and develop strategies at the local level to maximize the opportunities and minimize the challenges. Following my comments, you will hear about some of the research which one of my colleagues is currently conducting on solar ordinances. This type of work is proving to be an asset to the widening public discussion on solar. Larger solar companies have also ramped up their own outreach to illustrate how they attempt to minimize landscape-related impacts. But as we are on the early edge of utility scale solar development in PA, there are numerous issues which could be further researched to assist largely rural communities across the Commonwealth as they make long term decisions on these new land transitions. And as a final note, DOE recently indicated that with the large, planned expansion of renewables across the nation, the most anticipated challenge will be the decision-making at the local and state levels on siting and regulation.

Thank you for your time. I will be glad to answer any questions.



Center for Rural Pennsylvania

Solar Development Trends and Policy in the Commonwealth

Public Hearing / October 1 / Shippensburg University

Prepared Remarks of Prof. Mohamed Rali Badissy for Panel on "Pennsylvania Policy Approaches to Solar Development"

Thank you for the opportunity to speak with you as part of this important forum organized by the Center for Rural Pennsylvania and a special thanks to Director Kopko for his untiring efforts to host these important dialogues. Thank you as well to Chairman Yaw, Vice Chairman Pashinski, and all our distinguished guests for lending your support to this gathering and for your willingness to engage with our remarks today.

My name is Mohamed Rali Badissy, and I have the pleasure of coming before you today in my capacity as an Assistant Professor of Law at Penn State Dickinson Law. My primary area of research is the interaction between public regulation and private investment in energy projects. Prior to joining Dickinson Law, I spent more than a decade advising governments around the world on how to drive investment into energy projects ranging from large coal plants in Eastern Europe to microgrids in Honduras. Now, as part of Penn State's mission as a land-grant university to serve the people of this commonwealth, I have the privilege of advising local government on energy policies as Pennsylvania seeks to build on its legacy as the greatest energy exporting state in the union.

My primary goal today is to share observations from a recently concluded research project at Penn State Dickinson Law which reviewed each of the Commonwealth's more than 2500+ local zoning ordinances to determine what guidance is provided for the development of solar energy projects. We started this project in response to requests through the Penn State Extension program from local governments seeking guidance on solar ordinances received by and, I should note that this research was conducted in partnership with Tom's team at MCOR and has received generous support from Penn State's Center for Energy Law & Policy

The most important finding of our research is that only one in twenty local zoning codes currently provide specific guidance for utility scale solar projects. More precisely, we found that 87% of zoning codes in the Commonwealth provide no guidance to the development of solar energy facilities, whether they be on your roof or hundreds of acres wide. The remaining 13% primarily address solar energy systems for self-generation. Of that 13%, only half, or 5% of all zoning codes, have adopted guidance for utility-scale solar energy projects. This lack of guidance on utility scale solar projects is particularly significant since Pennsylvania has experienced a ten-fold increase in grid-scale solar capacity over the past decade, with an even faster pace of project development expected during the next decade.

The uncertainty around permitting of utility-scale projects increases the cost of solar projects since it requires hiring lawyers like myself to work through the regulatory process, extends project development timelines, and, most importantly, makes it difficult to develop projects in a consistent matter that address community, landowner, and developer concerns. These soft costs have begun to play a greater role in solar project development since fixed costs, such as technology and engineering, continue to fall. Most importantly, by some estimates the cost of developing a solar energy system in a predictable regulatory environment vs an uncertain one can be as much as 10%. As a result, the ability of local governments to enact clear guidance for utility-scale projects has a direct and growing impact on the energy costs that show up in our utility bills every month.

While we plan on publishing the full results of our research soon, I thought it would be helpful to preview our findings by sharing some specific examples of critical language from local zoning ordinances to help inform our discussion today. At the outset, I should note that much of the language is solar ordinances is routine and simply applies the existing setback, height, and other general zoning limits to solar projects as similar forms of land-use. Beyond this standard language however, there is significant variation that can result in radically different regulatory regimes.

First, the definition of what constitutes a utility-scale projects is becoming increasingly unworkable. Some zoning codes define utility-scale as being any project where the primary use of the generated electricity is to sell to off-site customers, which is so broad that it would include dedicated solar facilities meant to serve a local school district, industrial park or the community solar projects proposed in SB472. On the other end of the spectrum, the accessory systems that typically face a lower level of regulation are becoming larger, with the possibility that solar installations on the roofs of barns, warehouses and apartment buildings will become utility-like as they produce significantly more energy than can be consumed on-site.

Next, lot restrictions also vary considerably. Some jurisdictions limit utility scale projects to lots that have a minimum size, such as 100 acres. When one considers that the average farm size in Pennsylvania is roughly 125 acres, this means that the landowners who fall below that average are being left out of the solar boom since developers are unable to use their traditional strategy of aggregating smaller lots for a project and must instead lease land from the more limited pool of large landowners. Lot coverage limits can have a similar distortion effect, such as when an ordinance prohibits more than 10 acres of any given lot to be covered by a utility scale solar energy system.

One of the most interest, and recent, trends in solar ordinances is the attempt to direct development of solar projects not by zoning districts but by land characteristics. We have seen examples that distinguish eligible land based on soil quality, existing structures and/or adjacent land-uses. The viability of these zoning strategies is uncertain, either in terms of their ability to be managed effectively or to survive court scrutiny. This is particularly concerning since local officials often borrow from each other’s experience and these new zoning strategies may become widely adopted despite being largely untested.

Finally, given the relatively new nature of photovoltaic solar energy systems, existing solar ordinances have struggled to establish clear design and operations standards. When it comes to screening of solar installations for the benefit of neighbors, some ordinances are hyperspecific even down to the type of foliage to be used, while others provide little to no guidance. Similarly, with glare mitigation, many ordinances require this issue to be addressed by project developers but lack guidance on either the methodology or the mitigation to be used. One of the most common concerns we hear about from local officials, decommissioning costs, are also difficult to establish since the cost of solar panel recycling are still evolving. With all these standards, the emerging best practice is to obligate developers to operate under the best information available today and evolve those standards as the industry matures. This flexible approach requires clear guidance at the ordinance/regulatory level to avoid disputes or unintended consequences.

I hope that this brief overview of our survey the state's solar ordinances helps to demonstrate how significant the challenge is to bring predictability to this fast-growing sector of our already complex local energy economy. If this much inconsistency can be observed in just the 5% of zoning codes that have adopted utility-scale solar ordinances thus far, one can only imagine how much more fractured the regulatory space could be as more and more local governments seek to regulate this activity. The cost to municipalities of regulating large solar projects, both in terms of time and human resources, will also be more significant in a fractured regulatory environment since local officials will not be able to rely on common practices. Combined with the fact that utility-scale projects are primarily developed in rural areas that have limited experience with hosting large infrastructure projects, this regulatory burden is a real threat to already strained local governments. This challenge for local governments is even more intimidating when one considers the increasing complexity of the solar energy systems, which today are focused on panels, but tomorrow will be integrated with any number of related technologies such as batteries, water treatment, and microgrids.

If we are serious about enabling an energy future for Pennsylvanians that it is sustainable and affordable, we should be just as concerned with government capacity as we are with solar capacity. This is why my research team at Dickinson Law and many other experts across Penn State are focused on supporting our communities through education and outreach during this historic energy transition and why it has been such an honor to share our experience with you here today.

Thank you again for this opportunity, and I welcome any questions or comments.

The Center for Rural Pennsylvania
Solar Development in Rural Pennsylvania
PA Department of Agriculture
October 1, 2021

The Pennsylvania Department of Agriculture appreciates this opportunity to speak to the Center for Rural Pennsylvania on utility scale solar and farmland.

In discussions with our colleagues in government and our stakeholders, it is clear that solar energy production can and does play a positive role in production agriculture. While sometimes in conflict, often there is land use compatibility between solar energy production and production agriculture. As with other industries, solar seems to favor flat land due to the low cost of development. Unfortunately, these lands often have the best soils for producing food. Competing land uses are not new to the agricultural landscape.

We take seriously the ways in which our land is used. We are also grateful for the legislative support that has allowed us to continue the important work of preserving farmland. Pennsylvania leads the United States in farmland preservation with 5,928 farms and 601,647 acres permanently protected through permanent agricultural conservation easements. This land serves to increase food security, protect our agricultural heritage, and support adjacent natural resources. As in the past, there continue to be competing land uses that threaten future and existing farmland. The most recent "Farms Under Threat: State of the State's" report from the American Farmland Trust notes there continue to be major risks to farmland across the commonwealth, particularly low-density residential development, generational transitions, and climate change. Fortunately, compared to all other states, the American Farmland Trust ranks Pennsylvania ranks 4th in policy response to farmland protection.

Over 1,000 of Pennsylvania's 1,400 townships have created Agricultural Security Areas, or ASAs under Act 43 of 1988, expressing a desire to retain land use for primarily agricultural purposes. Being in an ASA is a condition to participating in the Farmland Preservation program. Despite being a leader in farmland protection, we must continue to reevaluate new land uses as they come about. Utility scale solar is one such land use type. Solar differs from other land use types in that it has no emissions, produces no sound, and is not intended to be a permanent structure. The Department does not have a mechanism in statute through which to dictate where utility scale solar can be deployed. The only measures currently in place under the Department are the restriction of utility scale solar on land enrolled in farmland preservation and the Clean and Green preferential tax assessment program. All other considerations and limitations would fall to the local zoning codes.

The Department recommends that careful consideration take place when siting a utility scale solar installation on or near agricultural lands. Specifically, we recommend that prime farmland soil remains available for agricultural production and that placement of solar installations instead take place on rooftops, impervious surfaces or on less productive soils.

That said, there are many examples of solar and agriculture taking place simultaneously. In the cases of pastured livestock, apiaries, some specialty crops, and floriculture; solar can provide a multitude of benefits for the farmer. Just as many Pennsylvania farms have diversified their agriculture production to become more resilient, properly cited solar installations can serve as a further economic support. The fact that solar can be removed enables a farm to return to full agricultural production, something that may not be possible under other land use types, such as residential development, warehousing, and or other energy development.

In closing, farmland has always been and continues to be a critical part of Pennsylvania's economy and heritage. The commonwealth's agricultural communities face pressures from other land uses and will require careful attention now and into the future. Fortunately, we are one of just a few states that have tools to address these concerns. Utility scale solar presents us with something new to consider in our conversations on farmland protection. There are practical ways for utility scale solar to be responsibly deployed. Utility scale solar is not absent of risk, but provides an opportunity for farmers to diversify their portfolios while also ensuring more permanent forms of development do not compromise our agricultural land. In addition, the deployment of solar aids in the commonwealth's mission to address climate change, which has serious implications for the agricultural community as our state becomes warmer and wetter. The Pennsylvania Department of Agriculture will continue to support the agricultural community and work closely with our legislature to ensure that farms are conserved and sustainable.

We would be happy to address any questions the Center Board may have.

Thank you.

Center for Rural Pennsylvania

Leasing and the Economic Impact of Utility-Scale Solar in Pennsylvania

October 1, 2021

Daniel Brockett

Penn State Extension

Thank you for the invitation to offer remarks on the potential economic impact of solar development in Pennsylvania. My name is Dan Brockett, and I work for Penn State Extension. I have been working with energy and agriculture over the past few decades.

In 2019, we in Extension started to get calls and emails from farmers and landowners regarding solar leasing. These utility-scale contracts have included an option to lease or sometimes purchase that is typically 2-5 years in length, along with a lease contract that will be exercised if and when the developer chooses to do so. The lease contracts have varied from 20 years up to 40 years when including extensions. We have also seen a small percentage of these contracts that are purchase options rather than lease options. With the length of these contracts, its important for landowners, developers, and communities to get this right.

We roughly estimate that over 5,000 landowners have been approached to lease or sell their properties for solar development, and we believe that many more will be contacted. We don't expect these projects to locate everywhere in the state; at this point, all of these properties that we are aware of have been located near high-voltage power lines and close to a substation.

Lease income is expected to be a large economic impact from utility-scale solar development with total payments potentially exceeding $80 million per year spread across landowners in 54 Pennsylvania counties. The lease amounts that we have seen offered to landowners have varied significantly from $300 per acre per year to $3,000 per acre. All of the offers we have seen so far have included a rent escalator. A rent escalator has commonly been an annual increase in rent between 1.5 and 2.5 percent. The most common lease offers we have seen, are between $1,000 to $1,200 per acre per year. Purchase offers are harder to track since there have been few, but those we are aware of pay above local fair market values.

Comparing the economic value to the farmer, the price paid for the lease will most often exceed the profit per acre from corn and soybeans and will far exceed profit from hay and pasture. It is also a predictable income stream for farmers and landowners. Farms will have to consider whether they have other viable options to purchase or rent land or purchase additional feedstock if they wish to remain in agricultural production.

Other local economic value: 1) Increase in property taxes. Solar lease agreements tend to put the burden on developers to pay any increase in property taxes resulting from solar development. Properties that are kicked out of Clean and Green preferential tax treatment (as a result of solar development) will pay up to seven years of back taxes and a simple 6 percent interest. This additional tax revenue would be also paid by the developer, but moving forward, the landowner would pay fair market value on property not under solar lease unless they re-enroll this portion of the property in Clean and Green. 2) Annual maintenance (mostly maintaining vegetation) is expected to be mostly local. This is estimated at $300-$550 per acre per year. 3) Construction of utility-scale solar will have a local economic impact but it will likely be short-lived since panels are generally manufactured elsewhere.

The use of farmland for solar development is troubling in some communities who value agriculture and open spaces. Agricultural land may be easier and less expensive for solar developers to engineer and construct solar arrays (rocks, roots, slope, well-drained soils). Solar developers may also face fewer regulation barriers on farmland (brownfields, wetlands, E&S permits). Solar development would be relatively small in comparison to other land uses that tend to use farmland, like residential and commercial development. However, communities and public policy makers may wish to preserve farmland by providing support for Farmland Preservation.

All of the considerations listed above are dependent on solar development occurring. Right now, there are many proposed developments in Pennsylvania, but few have been built. Like most energy projects, the amount of solar development will depend on a combination of economics and public acceptance.

Written Testimony For:

Solar Development in Rural Pennsylvania

October 1, 2021

Shippensburg University of Pennsylvania

Submitted By:

Paul Mason

My name is Paul Mason. I am the fourth generation on my family's dairy farm. We have about 500 milking cows and raise an additional 500 youngstock. We farm just over 700 acres: half in Pennsylvania, half in Maryland. All of the acres are used to feed and take care of our cows. Dairying is an inherently sustainable and cyclical business model. We grow crops to feed the cows, take the waste from those cows, and apply it to fields to provide nutrients for the next crop and then let the cycle continue every year. Everything we do is about long-term sustainability; not about short-term payout and gratification. In this way I believe farming and solar go hand in hand. In March of 2019 we entered into an optional lease agreement for a community solar project for some land we own in Maryland. In November of 2020 that solar array began supplying power into the grid. We do not own the array we simply have a long-term lease of the ground with the solar company. They have and will continue to manage everything related to the development, installation, operation, maintenance and potential removal of the array.

I would like to use this opportunity to share with you the journey of our farm diversifying some of our land into commercial solar production. I will attempt to focus on mainly sharing why we pursued solar. While I think every individual situation is unique, it is important to hear as many of those unique situations as possible to be able to piece together the big picture that is necessary when discussing policy, regulation or support of an industry.

As a dairy farm in southeastern Pennsylvania, we are always short on land and paying too much for the land we do get the opportunity to farm. So as solicitations to put solar panels on our ground would arrive in the mail they would promptly go into a pile and then eventually be discarded. However, once Maryland implemented its community solar program some of these solicitations had figures that warranted further investigation. As the next generation up, it was my job to navigate the solar market possibilities. What I discovered was the possibility of a very synergistic endeavor for our farming operation and a solar field.

My experiences are based on the premise of a community solar program. I cannot speak as much to the current solar market in Pennsylvania that does currently not have community solar options. For me the size of the array was one of the most critical hurdles. Our array is less than 7 acres and is still a sustainable commercial production site. The small size allowed for me to not sacrifice many of my precious acres I need to support my cows. It also allowed for optimizing the location. The array sits on a part of the field that needed to be managed more intensively to achieve a successful row crop due to how water would flow and then lie. Furthermore, conservation work, soil health, and water management are all things that are critically important to me as a farmer. So, the non-intrusive nature of the construction of my solar array means a good deal to me. I view myself as a steward of the land that I hope to be able to pass down to the next generation better than how it was passed on to me. This is all why having a construction process that does not disturb the ground matters. When the project reaches the end of its lifecycle, the posts that hold the solar panels can simply be pulled up, and it is no different than if I had installed a fence for my cows.

Once we had overcome the idea of taking some ground out of production for our dairy herd the next step was the philosophical idea of having solar panels. As I already alluded to previously, the sustainable nature of dairy farming gave us a ideological framework to be supportive of a renewable energy like solar. The only challenge on a philosophical level for us was the question of what energy technology is yet to be invented that could possibly make solar obsolete. However, every venture has risk and we decided if our risk in this venture was a new technology that exists in any business so it was one to be aware of but not one to prevent us from proceeding.

The third major consideration was economics. Diversification is one of the best risk management tools for farmers. And I believe there is a reason it is so common. It works. We always deal with the risks of unpredictable weather, which is difficult to manage, and moving commodity prices. So, the value of being able to diversify into the energy world with a known fixed return, zero capital expense and zero operational cost is about as good as it gets. There is no current measurable added risk to diversifying by leasing ground to a community solar company.

I do not have the most experience with solar and I am certainly not an expert in any of the technical elements of the industry. I am a famer who cares about his land and wants to leave my corner of the world hopefully better than I found it. Diversifying a small portion of our farm into solar I think is one more step in the right direction towards that goal.

September 24, 2021

MAREC Action Testimony
Center for Rural Pennsylvania's Hearing on Solar Development in Rural Communities

Thank you for the opportunity to provide written testimony concerning the development of utility-scale solar in rural Pennsylvania – specifically on the issue of solar farm decommissioning and the use of salvage value in that context. I am testifying on behalf of MAREC Action, a non-profit organization representing over 30 businesses that develop and manufacture utility-scale solar and wind energy projects. With stable, pro-growth, responsible policies in place, our industry sees a major opportunity to continue investing in rural Pennsylvania. Many of our members already do business in Pennsylvania and employ Pennsylvania residents. According to the Solar Energy Industries Association, Pennsylvania's solar industry represents more than $2.3 billion in private investment to-date.[1]

The renewable energy industry is committed to responsible decommissioning of our projects. Unlike utilities, independent developers of solar projects cannot employ eminent domain to develop a project. MAREC Action members rely on the support of landowners and broader community social license to operate—meaning the need for continual approval through various stages of development. Renewable energy companies that disregard their host communities face increasing opposition to their projects and significant challenges to new business in the long run.

That's one of the reasons, along with reduction to regulatory risk for project financing, the renewable energy industry supports reasonable decommissioning regulations—including requirements for financial assurance that decommissioning will be completed without imposing costs on landowners or local government. At a high level, we consider decommissioning regulations to be workable if they:

- Establish clear guidelines for submission of decommissioning plans (including model decommissioning agreements) covering reasonable project removal and restoration of land to pre-construction conditions;
- Set the financial assurance requirement at the true value of decommissioning minus salvage value (as determined by a third-party engineer);
- Maximize flexibility in acceptable forms of financial assurance;
- Allow for landowners and developers to arrive at alternative decommissioning arrangements, and;
- Grandfather any projects permitted prior to the effective date of legislation.

[1] https://www.seia.org/state-solar-policy/pennsylvania-solar

Drafting successful decommissioning regulations requires balancing meaningful protection for landowners with regulatory costs faced by developers. Clear decommissioning guidelines, crediting salvage value toward financial assurance requirements, and flexibly in acceptable forms of assurance all contribute to lower cost and risk for developers without sacrificing strong protections for landowners that guarantee a project will be decommissioned and the site remediated to conditions that existed immediately prior to project construction. Getting the balance of these factors wrong could put Pennsylvania at a disadvantaged with other states that are competing for new solar investments.

Factoring salvage value into financial assurance

Many states include salvage value in financial assurance calculations as a means of reducing costs related to posting financial assurance, and salvage value has become a topic of significant discussion in the Pennsylvania State Senate. Subtracting estimated salvage value from decommissioning financial assurance requirements substantially reduces opportunity costs and administrative costs for developers, which ultimately passes through to landowners in better lease payments and consumers in terms of lower electricity rates.

To give a very straightforward (fictional) example, assume the total cost to decommission a fictional solar project is $1M and the estimated salvage value is $400k as determined by a third-party engineer. The project owner would only need to post $600k in financial assurance, with a contingency in place that grants salvage rights to the firm ultimately tasked with decommissioning the project. In this example, the $600,000 decommissioning cost would need to be secured by a financial instrument, whether a bond, letter of credit or parent company guarantee. A substantial portion of a real project's decommissioning cost can be recovered through salvage of valuable raw materials and reusable equipment. Salvage value and the cost of decommissioning can be reviewed and updated periodically to help ensure that the cost of decommissioning keeps pace with changing costs to decommission a project. The financial assurance instrument would be updated to reflect the updated cost estimate.

Solar photovoltaic (PV) panels typically consist of glass, aluminum, copper, silver and semiconductor materials that can be successfully recovered and reused. By weight, more than 80 percent of a typical PV panel is glass and aluminum. Cells are most frequently made of silicon, one of the most common minerals in the earth, with small added amounts of boron (which people take as medicine) and phosphorus (critical for human and plant growth).

PV modules can also be reused or refurbished to have a 'second life' of generating electricity for customers that cannot afford new panels. The other components of solar PV systems can also be repurposed or disposed of responsibly either at a landfill or through recycling programs. Inverters can be recycled as e-waste and racking equipment can be re-utilized with newer technology or recycled like other metals.

What happens if a solar project is abandoned?

The abandonment of a viable solar project is a highly unlikely scenario, but it is reasonable to ask what happens if a project owner were to abandon the project prematurely with these flexible, cost-minimizing elements of decommissioning regulations in place.

First, it is important to recognize that individual renewable energy projects are structured as Limited Liability Companies (LLCs) to contain risks for the parent company and third-party investors. This also means that the success of an individual renewable energy project is not tied directly to the success of a parent company.

Construction on a solar project only begins after financing has been secured. Before an investor would consider a financial commitment necessary to fund construction, the investor will want to see several critical elements in place to ensure viability. Those elements include signed lease agreements for tracts of flat and sunny land, proximity to electric transmission lines with available capacity, highly sought-after grid interconnection agreements, long-term power purchase agreements with credit-worthy buyers, and a variety of state and federal permits, among other considerations. Each of those steps must be overcome before financing would be committed to start major construction on a solar project.

In the extremely unlikely event that a parent company were to become insolvent within the early years of a solar project, the value of the all the development work that went into making that project shovel ready—state and federal permits, land lease agreements, and interconnection agreements—would make the project a profitable option for turn-key acquisition by some other solar operator.

While it is impossible to completely eliminate risk for a landowner entering into a lease agreement for solar, the same can be said for any other contractual agreement between two parties. We believe reasonable decommissioning requirements, including the various factors explained above, would provide excellent protection for Pennsylvania landowners while enabling the continued growth of solar energy in the state.

Decommissioning regulations in other states

A 2020 study by the North Carolina Department of Environmental Protection[2] found that one-third of the states have adopted decommissioning standards, half of which address financial assurance. Recent examples of decommissioning policies requiring financial assurance can be found in Texas and West Virginia, where conservative legislatures passed decommissioning bills that factor salvage value into the net cost to decommission.

Texas Senate Bill 760[3], passed in June 2021, requires developers to provide evidence of financial assurance—in excess of salvage value—that is at least equal to the cost of removing a solar facility and restoring the property. An updated assessment of decommissioning cost and salvage must be delivered at the 10th anniversary of the commercial operations date and every 5 years thereafter.

West Virginia Senate Bill 492[4], passed in April 2021, requires the state's Department of Environmental Protection to consider a decommissioning report performed by a third-party engineer and then assess financial assurance value based upon the total disturbed acreage of land upon which the wind generation or solar generation facility is operated, less salvage value. The amount of the financial assurance cannot exceed total projected future cost of decommissioning, less salvage value.

[2] https://farmlaw.ces.ncsu.edu/2021/01/solar-energy-nc-department-of-environmental-quality-releases-hb-329-decommission-study/

[3] https://legiscan.com/TX/text/SB760/id/2406298/Texas-2021-SB760-Enrolled.html

[4] https://www.wvlegislature.gov/Bill_Status/bills_text.cfm?billdoc=SB492%20SUB1%20ENR.htm&yr=2021&sesstype=RS&billtype=B&houseorig=S&i=492

Solar energy's community benefits

One major aspect to any utility-scale solar energy project are the benefits that the project brings to the local community. In addition to the before-mentioned responsible growth through appropriate decommissioning procedures, the benefits of solar energy to the local community should be considered. While we are certainly not advocating that the benefit of such development is the overriding factors for development, we do believe that it is certainly part of the picture that communities should take into account.

Landowner choice is certainly a critical aspect of this process. There are situations where landowners, who are often farmers, need to diversify their business models in order to maintain their farms due to economic hardship. Pennsylvania lost over 6,100 farms over a five-year period.[5] Leasing a portion of their farms for solar projects for the 20 to 30-year average lifespan of a solar project, is a means for the farmer to ensure stable and higher levels of revenue, so that the farm can stay in business. This leasing arrangement results in contiguous tracts of flat land being held static for the decades-long life of a solar project. Farmland under a solar lease is protected from other development pressures, such as residential or commercial development, that would acquire and irreversibly change the character of the land. At the end of the lease, a properly decommissioned solar facilities can be restored to productive and safe agricultural use.

It is a common best practice among MAREC Action's members (and the solar industry in general) to minimize disruption of the topsoil during development. A typical solar project will leave topsoil in place and plant perennial groundcover under solar panels and across the vast majority of the project site. Most of a solar project footprint remains permeable to water, aside from access roads and concrete pads under inverters and transformers. Depending on pre-existing site conditions, soil quality and water runoff absorption can be improved through solar development due to the static planning of groundcover species with deep root systems.

Other benefits that accrue due to solar development include:

- The creation of jobs. Currently, there are approximately 8,000[6] (4,310 coming from solar[7]) jobs that have been created by the clean power industry. Solar projects in the pipeline for Pennsylvania would create thousands more jobs;
- Total solar investment in Pennsylvania has been about $2.3 billion to date, which requires the partnership with local businesses during the developmental process;
- A large infusion of annual local tax payments to help fund schools, emergency services and local infrastructure. Solar project owners are often some of the highest paying taxpayers in rural communities: and
- Finally, as indicated, millions of dollars per year will go to farmers and other landowners for leases on the property that is used for a solar project.

[5] https://www.dailyitem.com/news/pennsylvania-loses-6-156-farms-over-5-year-stretch/article_90d87036-64eb-11e9-8377-7f803f0fec61.html
[6] https://cleanpower.org/wp-content/uploads/2021/08/Pennsylvania_clean_energy_factsheet.pdf
[7] https://www.seia.org/state-solar-policy/pennsylvania-solar

We want to again express our appreciation for this opportunity to testify in writing and look forward to directly addressing the Center's Board on October 1, 2021.

Respectfully Submitted,

Bruce H. Burcat, Executive Director
MAREC Action
bburcat@marec.us
302-331-4639

Testimony of Scott Elias, Senior Manager of Mid-Atlantic State Affairs, Solar Energy Industries Association (SEIA)

To the

Center for Rural Pennsylvania
Hearing on solar development in rural areas
Oct 1, 2021

Introductions

Chairman Yaw and Pashinski, members of the Center for Rural Pennsylvania, thank you for having me here today and for your interest in solar development in rural communities.

I am Scott Elias, Senior Manager of Mid-Atlantic State Affairs for the Solar Energy Industries Association (SEIA). SEIA is the national trade group for America's solar energy industry. SEIA works with its 1,000 member companies and other strategic partners to fight for policies that create jobs in every community and shape fair market rules that promote competition and the growth of reliable, low-cost solar power. SEIA has more than 30 member companies located in Pennsylvania with many more national firms also conducting business in the state.

As solar continues to expand into new markets, including rural communities in Pennsylvania, the solar industry is actively working to minimize any impacts to agricultural activity, while advancing dual-use options where appropriate and providing benefits back to farming communities. Today I am talking to you about how solar development is compatible with agricultural land in Pennsylvania and share insights learned from our positive experience working with the New York State Energy Research and Development Authority, or NYSERDA on solar development in rural areas in New York.

Specifically, I am going to touch upon solar recycling, decommissioning, bonding issues, and other matters to consider at the conclusion of a solar project's lifecycle and how New York's thoughtful approach to these matters has facilitated a top ten market for solar development in the United States that employs over 10,000 jobs and has attracted over $7 billion dollars of private investment within the state. It is my hope that if Pennsylvania adopts a similar thoughtful approach, Pennsylvania can facilitate a robust solar industry that counteracts the ongoing trend of family farms being lost due to economic hardships and spurs economic development in rural areas across the Commonwealth.

Solar is an Economic Opportunity for Farmers

I'd like to begin by noting that solar on agricultural land provides an economic opportunity for the landowner, the community, and to the entire Commonwealth of Pennsylvania. As family farms are increasingly squeezed to make ends meet, farmers all over the country have found that solar projects offer a new revenue stream that helps support their bottom line. Increasingly, farmers can rely on solar lease payments as a steady revenue stream to help mitigate market volatility, droughts and other threats to their livelihoods. This can help family farms stay in the family and counteract the ongoing trend of farms being lost due to economic hardships.

Moreover, solar can help regenerate farmland, improving its use for agriculture in the future. Solar development does not involve large-scale removal of topsoil, allowing the land to return to agricultural production at the end of a project's life. This is not the case with other forms of development such as residential and commercial construction that permanently remove topsoil.

Solar and agriculture not only exist side-by-side, but increasingly are found together. Indeed, that's one of the key reasons the Department of Energy has put together a *Farmer's Guide to Going Solar* resource that demonstrates that responsible solar development can improve soil health, reduce erosion, sequester emissions, and provide even lower-cost energy to local communities.

I will now focus the remainder of my comments on responsible end-of-life management practices and lessons learned from New York, which can inform common sense policies and best practices Pennsylvania can adopt to ensure clean energy solutions are a sustainable component of the energy economy for future generations.

Best Practices at the End of the Photovoltaic System Performance Period

At the end of the expected performance period of a PV plant, there are several options. If a system is operational and has not suffered extensive damage, it might be possible to continue operations past the original planned performance period by extending the PPA, associated land lease, and additional contractual requirements. Other options include refurbishing a system, repowering the system with new PV modules and inverters, or decommissioning and removing a system from the site.

While many SEIA member module manufacturers already operate take-back and recycling programs for their products, I would like to point out that solar panel recycling and disposal is not yet a major consideration in New York State or the broader United States, as most installations are newly operational and have a minimum 25-year expected useful life. PV modules are fundamentally not like e-waste, which has a much more limited useful lifetime of 3-7 years depending upon the product. Solar modules and other system equipment are durable products, more akin to construction materials and HVAC equipment than iPhones or tablets. Solar panels are typically warranted for construction for 10-12+ years and for performance for 25 or more years. As a result, currently there are no regulations requiring the recycling of solar panels in New York State.

Solar panels are classified as "general waste," which means that they can technically be placed in a landfill. While it is not encouraged by industry or researchers like the National Renewable Energy Laboratory (NREL), a 2020 study NREL led showed that PV modules disposed in a landfill pose very limited risks to human health, even using the most conservative assumptions, and at an order of magnitude less than limits set by Federal law.[1] This is because today's solar installations pose little to no risk to human or environmental health at any point in their lifecycle.

---

[1] *Human Health Risk Assessment Methods for PV Part 3: Module Disposal Risks*, Sinha, Heath, Wade and Komoto, IEA PVPS Task 12: PV Sustainability Report IEA-PVPS T12-16:2020, May 2020, ISBN 978-3-906042-96-1

Claims that PV modules release hazardous chemicals that contaminate our soil and waste stream have been disproven. Indeed, PV modules are constructed to last over 25 years, are non-hazardous, and contain only trace amounts of heavy metals enclosed in plastic and glass, similar to many other consumer goods. Put simply, any materials-of-concern are not bio-available for air or water exposure.

However, it is still important to plan for the disposal of solar systems at the end of their useful life. SEIA's National Recycling Program is preparing now for larger volumes of waste to come in future years. Some solar energy system components, such as metal racks, steel posts and inverters, can readily be reused or recycled. SEIA's PV Recycling Working Group has been actively seeking, developing and elevating the market visibility of solar recycling partners across the U.S. since 2016 and one of our partners has a drop-off location within the Commonwealth. Fortunately, a nascent industry is turning this perceived end-of-life liability into a business opportunity, with new companies specializing in services such as resale of used PV modules and parts, decommissioning, and recycling.

The Solar Industry Supports Smart Decommissioning Policy

As Pennsylvania increasingly becomes a location of interest for solar development and landowners increasingly negotiate land leases, it is important to understand the options and realities for decommissioning solar panel systems and site restoration.

Decommissioning refers to removing the facility from active service and rendering it to a safe and final state, which involves removing solar equipment and restoring the land to its original condition or adapting it to a new use, based on the preference of the landowner. Irrespective of state requirements, industry best practices direct the inclusion of decommissioning provisions within solar lease agreements to ensure that solar systems are decommissioned safely and responsibly and do not place an undue burden on landowners or the community.

The New York State Energy Research and Development Authority, or NYSERDA, has produced a Solar Guidebook that contains information, tools, and step-by-step instructions to support local governments managing solar energy development in their communities.[2] There are a variety of chapters in this guidebook that can serve as a resource for the Commonwealth, but I'll highlight a chapter that provides information for local governments and landowners on the decommissioning of large-scale solar panel systems through the topics of decommissioning plans and costs and financial and non-financial mechanisms in land-lease agreements.[3]

It is also worth noting that the issue of decommissioning or bonding is usually brought up to address a most unlikely scenario - an abandoned solar project. In New York, once a local government determines a solar panel system is abandoned and has provided thirty (30) days prior written notice to the owner it can take enforcement actions, including imposing civil penalties/fines, and removing the system and imposing a lien on the property to recover associated costs. For example, the Town of Geneva defines a solar panel system as abandoned if construction has not started within 18 months of site plan approval, or if the completed system has been nonoperational for more than one year.

---

[2] See NYSERDA's New York State Solar Guidebook, https://www.nyserda.ny.gov/-/media/NYSun/files/solar-guidebook.pdf

[3] See NYSERDA's New York State Solar Guidebook chapter on *Decommissioning Solar Panel Systems,* https://www.nyserda.ny.gov/-/media/NYSun/files/Decommissioning-Solar-Systems.pdf

While New York does not have any state-laws mandating solar decommissioning bonds, in 2020 New York lawmakers authorized the creation of an Office of Renewable Energy Siting (ORES) in 2020 in an effort to speed the development of large-scale clean energy resources. By becoming the first state to establish a renewables siting office, the State aimed to improve and streamline the process for permitting large-scale renewable energy projects across the state, including ensuring that renewables projects larger than 25 megawatts (MWs) can receive approval within a year as opposed to the previous process, which could take up several years.

Earlier this year, ORES promulgated rules governing how it will issue permits for major renewable energy projects.[4] Amongst other things, these new rules require that these 25 MW and larger projects contain a decommissioning and site restoration plan, along with a gross and net decommissioning and site restoration estimate. The net decommissioning and site restoration estimate is equal to the gross decommissioning and site restoration estimate (which is the overall decommissioning and site restoration estimate plus a 15 % contingency cost) less the total projected salvage value of facility components, though reference to salvage value data must also be included in the Decommissioning and Site Restoration Plan submitted to the Office.

These decommissioning plans outline in detail steps to remove the system, dispose of or recycle its components, and restore the land to its original state. Additionally, the estimated amount of financial assurance included within these plans are typically determined by a licensed professional engineer, preferably with solar development experience, that is skilled at estimating decommissioning and site restoration costs, which vary depending upon project size, location, and complexity.

As a whole, the solar industry is comfortable with New York's approach for projects 25 MW and above, which substantially mitigates risk of project abandonment without placing an undue burden on the industry.

Smart Decommissioning Policy Enables Flexibility in Financial Assurance

Landowners and local governments can ensure appropriate decommissioning and reclamation by using financial and regulatory mechanisms. However, these mechanisms come with tradeoffs. NYSERDA's New York State Solar Guidebook for Local Governments on Decommissioning notes that including decommissioning costs in the upfront price of solar projects increases overall project costs, which could discourage solar development and thus the ability for landowners to receive a new source of revenue via stable lease payments. That is why decommissioning plans may phase in the financial assurance instead of requiring it all upfront, or enable use of letters of credit.

SEIA strongly believes that that there should be flexibility in financial assurance and NYSERDA's guidebook notes different mechanisms to achieve the same outcome of ensuring the availability of funds for decommissioning a solar system.

---

[4] See Chapter XVIII, Title 19 of NYCRR Part 900, pg 69, 108, 129
https://ores.ny.gov/system/files/documents/2021/03/chapter-xviii-title-19-of-nycrr-part-900-subparts-900-1-through-900-15.pdf

Some solar developers will prefer to establish a cash account or trust fund for decommissioning purposes where the developer makes a series of payments during the project's lifecycle until the fund reaches the estimated cost of decommissioning. Other developers prefer financial assurance in the form of bonds to guarantee the availability of funds for system removal. In this case, the bond amount equals the decommissioning and reclamation costs for the entire system and the bond must remain valid until the decommissioning obligations have been met. Therefore, the bond must be renewed or replaced if necessary to account for any changes in the total decommissioning cost.

Another mechanism that is used to provide financial assurance is a letter of credit. A letter of credit is a document issued by a bank that assures landowners a payment up to a specified amount, given that certain conditions have been met. In the case that the project developer fails to remove the system, the landowner, or a specific town, city, or county can claim the specified amount to cover decommissioning costs. As NYSERDA's guidebook notes, a letter of credit should clearly state the conditions for payment, supporting documentation landowners must provide, and an expiration date. The document must also be continuously renewed or replaced to remain effective until obligations under the decommissioning plan are met.

For example, New York's Office of Renewable Energy Siting's regulations for projects 25 MW or larger requires that the financial security for decommissioning and site restoration activities be in the form of a letter of credit (LOC) unless otherwise approved by the Office and be provided after one year of facility operation and updated every fifth year thereafter.

Again, the solar industry is comfortable with New York's approach for projects 25 MW and above, which ensures that neither the county nor the landowners pay the costs associated with decommissioning a solar project.

Additional New York Resources

I should also note that The New York State Model Solar Energy Law provides model language for abandonment and decommissioning provisions, and that there are also nonfinancial mechanisms to ensure decommissioning.

For example, local governments can include in their zoning code an abandonment and removal clause for solar panel systems, which effectively become zoning enforcement matters where project owners can be mandated to remove the equipment via the imposition of civil penalties and fines, and/or by imposing a lien on the property to recover the associated costs. To be most effective, these regulations should be very specific about the length of time that constitutes abandonment.

Additionally, a local government may also mandate through its zoning code that a decommissioning plan be submitted by the solar developer as part of a site plan or special permit application.

I've mentioned the New York Solar Guidebook for Local Governments a few times, and do think that instead of re-inventing the wheel, the Commonwealth can learn from the resources NYSERDA has already created. Indeed, the Guidebook includes a Model Solar Energy Local Law and a Municipal Solar procurement toolkit, which includes step-by-step instructions on how municipalities can lease underutilized land, such as landfills and brownfields, for solar development. In addition, it provides a Request for Proposals (RFP) template, Lease Agreement template, and a Model Law for Counties. It also clarifies how solar can be developed on farmland in a way that maintains the current economic benefits to the community and preserves prime farmland.[5] Indeed, there is an entire chapter dedicated to solar installations in agricultural districts that discusses agricultural assessments, farm-related solar projects, and laws and penalties as they relate to solar development in agricultural districts.[6]

Conclusion

I'll end by noting that the solar industry is committed to responsible land use and acting as good stewards of the sites our systems occupy. We support the industry best practice of including decommissioning provisions within landowner/development agreements to provide assurances that solar systems will be decommissioned safely and responsibly and won't place an undue burden on landowners or other community stakeholders. Therefore, we have been working with Senator Yaw's office and other stakeholders, like the Farm Bureau to develop smarter bonding/decommissioning legislation that addresses Pennsylvania's needs. In summary, the solar industry shares an interest in building and preserving strong agricultural communities in Pennsylvania and we look forward to partnering with you to advance smart, pro-active policies that produce the desired results for both an industry eager to develop and invest within Pennsylvania and the communities and citizens of the Commonwealth that stand to benefit from more solar deployment.

Thank you for your time and attention. Should you have any questions regarding these matters, you can reach me at the contact information below.

Sincerely,

Scott Elias
Senior Manager of State Affairs, Mid-Atlantic
Solar Energy Industries Association
selias@seia.org

[5] See NYSERDA's New York State Solar Guidebook chapter on *Using Special Use Permits and Site Plan Regulations to Allow Large-Scale Solar Installations While Protecting Farmland via* https://www.nyserda.ny.gov/-/media/NYSun/files/special-use-permits-site-plan-regulations.pdf

[6] See NYSERDA's New York State Solar Guidebook chapter on *Understanding Solar Installations in Agricultural Districts via* https://www.nyserda.ny.gov/-/media/NYSun/files/understanding-solar-installations-in-ag-fs.pdf

Decommissioning Solar Panel Systems

Information for local governments and landowners on the decommissioning of large-scale solar panel systems.

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

Solar Guidebook for Local Governments
NYSERDA 17 Columbia Circle Albany, NY 12203

Section Contents

Overview

We provide information for local governments and landowners on the decommissioning of large-scale solar panel systems through the topics of decommissioning plans and costs and financial and non-financial mechanisms in land-lease agreements.

As local governments develop solar regulations and landowners negotiate land leases, it is important to understand the options for decommissioning solar panel systems and restoring project sites to their original status.

From a land use perspective, solar panel systems are generally considered large-scale when they constitute the primary use of the land and can range from less than one acre in urban areas to 10 or more acres in rural areas. Depending on where they are sited, large-scale solar projects can have habitat, farmland, and aesthetic impacts. As a result, large-scale systems must often adhere to specific development standards.

1. Abandonment and Decommissioning

Abandonment occurs when a solar array is inactive for a certain period of time.

- Abandonment requires that solar panel systems be removed after a specified period of time if they are no longer in use. Local governments establish timeframes for the removal of abandoned systems based on aesthetics, system size and complexity, and location. For example, the Town of Geneva, NY, defines a solar panel system as abandoned if construction has not started within 18 months of site plan approval, or if the completed system has been nonoperational for more than one year.[22]
- Once a local government determines a solar panel system is abandoned and has provided thirty (30) days prior written notice to the owner it can take enforcement actions, including imposing civil penalties/fines, and removing the system and imposing a lien on the property to recover associated costs.

Decommissioning is the process for removing an abandoned solar panel system and remediating the land.

- When describing requirements for decommissioning sites, it is possible to specifically require the removal of infrastructure, disposal of any components, and the stabilization and re-vegetation of the site.

1.1 Decommissioning Plans

Local governments may require having a plan in place to remove solar panel systems at the end of their lifecycle, which is typically 20-40 years. A decommissioning plan outlines required steps to remove the system, dispose of or recycle its components, and restore the land to its original state. Plans may also include an estimated cost schedule and a form of decommissioning security (see Table 1).

[22] Town of Geneva, N.Y. CODE § 130-4(D)(5) (2016):

1.2 Estimated Cost of Decommissioning

Given the potential costs of decommissioning and land reclamation, it is reasonable for landowners and local governments to proactively consider system removal guarantees. A licensed professional engineer, preferably with solar development experience, can estimate decommissioning costs, which vary across the United States. Decommissioning costs will vary depending upon project size, location, and complexity. Table 1 provides an estimate of potential decommissioning costs for a ground-mounted 2-MW solar panel system. Figures are based on estimates from the Massachusetts solar market. Decommissioning costs for a New York solar installation may differ. Some materials from solar installations may be recycled, reused, or even sold resulting in no costs or compensation. Consider allowing a periodic reevaluation of decommissioning costs during the project's lifetime by a licensed professional engineer, as costs could decrease, and the required payment should be reduced accordingly.

Table 1: Sample list of decommissioning tasks and estimated costs

Tasks	Estimated Cost ($)
Remove Rack Wiring	$2,459
Remove Panels	$2,450
Dismantle Racks	$12,350
Remove Electrical Equipment	$1,850
Breakup and Remove Concrete Pads or Ballasts	$1,500
Remove Racks	$7,800
Remove Cable	$6,500
Remove Ground Screws and Power Poles	$13,850
Remove Fence	$4,950
Grading	$4,000
Seed Disturbed Areas	$250
Truck to Recycling Center	$2,250
Current Total	**$60,200**
Total After 20 Years (2.5% inflation rate)	**$98,900**

2. Ensuring Decommissioning

Landowners and local governments can ensure appropriate decommissioning and reclamation by using financial and regulatory mechanisms. However, these mechanisms come with tradeoffs. Including decommissioning costs in the upfront price of solar projects increases overall project costs, which could discourage solar development. As a result, solar developers are sometimes hesitant to provide or require financial surety for decommissioning costs.

It is also important to note that many local governments choose to require a financial mechanism for decommissioning. Although similar to telecommunications installations, there is no specific authority to do so as part of a land use approval for solar projects (see Table 2). Therefore, a local government should consult their municipal attorney when evaluating financial mechanisms.

The various financial and regulatory mechanisms to decommission projects are detailed below.

Table 2: Relevant Provisions of General City, Town, and Village Laws Relating to Municipal Authority to Require Conditions, Waivers, and Financial Mechanisms

Site Plan Review	General City Law	Town Law	Village
Conditions	27-a (4)	274-a (4)	7-725-a (4)
Waivers	27-a (5)	274-a (5)	7-725-a (5)
Performance bond or other security	27-a (7)	274-a (7)	7-725-a (7)
Subdivision	**General City Law**	**Town Law**	**Village Law**
Waivers	33 (7)	277 (7)	7-730 (7)
Performance bond or other security	33 (8)	277 (9)	7-730 (9)
Special	**General City Law**	**Town Law**	**Village Law**
Conditions	27-b (4)	274-b (4)	7-725-b (4)
Waivers	27-b (5)	274-b (5)	7-725-b (5

Source: Referenced citations may be viewed using the NYS Laws of New York Online

Excerpts from these statutes are also contained within the "Guide to Planning and Zoning Laws of New York State," New York State Division of Local Governments Services, June 2011: https://www.dos.ny.gov/lg/publications/Guide_to_planning_and_zoning_laws.pdf

2.1 Financial mechanisms

Decommissioning Provisions in Land-Lease Agreements. If a decommission plan is required, public or private landowners should make sure a decommissioning clause is included in the land-lease agreement. This clause may depend on the decommissioning preferences of the landowner and the developer. The clause could require the solar project developer to remove all equipment and restore the land to its original condition after the end of the contract, or after generation drops below a certain level, or it could offer an option for the landowner to buy-out and continue to use the equipment to generate electricity. The decommissioning clause should also address abandonment and the possible failure of the developer to comply with the decommissioning plan. This clause could allow for the landowner to pay for removal of the system or pass the costs to the developer.

Decommissioning Trusts or Escrow Accounts. Solar developers can establish a cash account or trust fund for decommissioning purposes. The developer makes a series of payments during the project's lifecycle until the fund reaches the estimated cost of decommissioning. Landowners or third-party financial institutions can manage these accounts. Terms on individual payment amounts and frequency can be included in the land lease.

Removal or Surety Bonds. Solar developers can provide decommissioning security in the form of bonds to guarantee the availability of funds for system removal. The bond amount equals the decommissioning and reclamation costs for the entire system. The bond must remain valid until the decommissioning obligations have been met. Therefore, the bond must be renewed or replaced if necessary to account for any changes in the total decommissioning cost.

Letters of credit. A letter of credit is a document issued by a bank that assures landowners a payment up to a specified amount, given that certain conditions have been met. In the case that the project developer fails to remove the system, the landowner can claim the specified amount to cover decommissioning costs. A letter of credit should clearly state the conditions for payment, supporting documentation landowners must provide, and an expiration date. The document must be continuously renewed or replaced to remain effective until obligations under the decommissioning plan are met.

2.2 Nonfinancial mechanisms

Local governments can establish nonfinancial decommissioning requirements as part of the law. Provisions for decommissioning large-scale solar panel systems are similar to those regulating telecommunications installations, such as cellular towers and antennas. The following options may be used separately or together.

- **Abandonment and Removal Clause.** Local governments can include in their zoning code an abandonment and removal clause for solar panel systems. These cases effectively become zoning enforcement matters where project owners can be mandated to remove the equipment via the imposition of civil penalties and fines, and/or by imposing a lien on the property to recover the associated costs. To be most effective, these regulations should be very specific about the length of time that constitutes abandonment. Establishing a timeframe for the removal of a solar panel system can be based on system aesthetics, size, location, and complexity. Local governments should include a high degree of specificity when defining "removal" to avoid ambiguity and potential conflicts
- **Special Permit Application.** A local government may also mandate through its zoning code that a decommissioning plan be submitted by the solar developer as part of a site plan or special permit application. Having such a plan in place allows the local government, in cases of noncompliance, to place a lien on the property to pay for the costs of removal and remediation.
- **Temporary Variance/Special Permit Process.** As an alternative to requiring a financial mechanism as part of a land use approval, local governments could employ a temporary variance/special permit process (effectively a re- licensing system). Under this system, the locality would issue a special permit or variance for the facility for a term of 20 or more years; once expired (and if not renewed), the site would no longer be in compliance with local zoning, and the locality could then use their regular zoning enforcement authority to require the removal of the facility.

2.3 Examples of abandonment and decommissioning provisions

The New York State Model Solar Energy Law provides model language for abandonment and decommissioning provisions in the Model Law section of this Guidebook.

The following provide further examples that are intended to be illustrative and do not confer an endorsement of content:

- Town of Geneva, N.Y., § 130-4(D): ecode360 .com/28823382
- Town of Olean, N.Y., § 10.25.5: https://www.cityofolean.org/council/minutes/ccmin2015-04-14.pdf

2.4 Checklist for Decommissioning Plans

The following items are often addressed in decommissioning plans requirements:

- Defined conditions upon which decommissioning will be initiated (i.e., end of land lease, no operation for 12 months, prior written notice to facility owner, etc.).
- Removal of all nonutility owned equipment, conduit, structures, fencing, roads, and foundations.
- Restoration of property to condition prior to solar development.
- The timeframe for completion of decommissioning activities.
- Description of any agreement (e.g., lease) with landowner regarding decommissioning.
- The party responsible for decommissioning.
- Plans for updating the decommissioning plan.
- Before final electrical inspection, provide evidence that the decommissioning plan was recorded with the Register of Deeds.

Questions?

If you have any questions regarding the decommissioning of solar panels, please email questions to cleanenergyhelp@nyserda.ny.gov or request free technical assistance at nyserda.ny.gov/SolarGuidebook. The NYSERDA team looks forward to partnering with communities across the state to help them meet their solar energy goals.

Model Solar Ordinance

for Indiana local governments

Photo credit: Great Plains Institute

Prepared by Great Plains Institute with support from Sunshot and the Energy Foundation

INDIANA UNIVERSITY ENVIRONMENTAL RESILIENCE INSTITUTE

GREAT PLAINS INSTITUTE | Better Energy. Better World.

Last Updated December 2020

Model Solar Ordinance – Indiana

Introduction

> ***Model Solar Energy Standards***
>
> *This ordinance is based on the model solar energy ordinance originally created for the Department of Energy's Phase I Rooftop Solar Challenge program in Minnesota, and updated for the three- state Grow Solar initiative, funded by Rooftop Solar Challenge Phase 2.*

Indiana has high-quality and cost-effective solar energy resources – as good as many states to the south and consistently available across the entire state. As solar energy system components have become more efficient and less costly, an increasing number of solar energy systems have been installed in Indiana. Market opportunities for solar development have dramatically increased in Indiana over the last five years, such that communities must now address solar installations as land use and development issues. Solar energy components continue to improve in efficiency and decline in price; large-scale solar energy is expected to become the least expensive form of electric energy generation within a few years, surpassing wind energy and natural gas in the levelized cost of energy.

However, solar energy is much more than just low-cost energy generation. Households and businesses seeking to reduce their carbon footprint see solar energy as a strong complement to energy efficiency. Agricultural producers see solar energy as an economic hedge against price volatility in commodity crops. Utilities see solar's declining cost, high reliability, and free fuel as a means to put downward pressure on electric rates. Corporate, institutional, and municipal buyers are actively acquiring carbon-free solar generation to meet climate and clean energy goals. And innovative solar site designs are creating and capturing habitat and water quality co-benefits by using solar with habitat-friendly ground cover to restore ecosystem functions. Innovative solar site designs can also create and capture biodiversity and water quality benefit with vegetation plans that include perennial ground cover to enhance ecosystem functions that have been lost over the decades.

Solar Energy Issues

Local governments in Indiana are seeing increasing interest from property owners in solar energy installations and are having to address a variety of solar land uses in their development regulations. Given the continuing cost reductions and growing value of clean energy, solar development will increasingly be a local development opportunity, from the rooftop to the large-scale solar farm. Three primary issues tie solar energy to development regulations:

1. *Land use conflicts and synergies.* Solar energy systems have few nuisances. Nevertheless, solar development can compete for land with other development options, and visual impacts and perceived safety concerns sometimes create opposition to solar installations. Good design and attention to aesthetics can address most concerns for rooftop or accessory use systems, including historic and design standards. Good site placement and design standards for large- and community-scale solar can similarly resolve conflicts and create co-benefits from solar development such as restoring habitat, diversifying agricultural businesses, and improving surface and ground waters.

2. *Protecting access to solar resources.* Solar resources are a valuable component of property ownership. Development regulations can inadvertently limit a property owner's ability to access their solar resource. Communities should consider how to protect and develop solar resources in zoning, subdivision, and other development regulations or standards.

3. *Encouraging appropriate solar development.* Local governments can go beyond simply removing regulatory barriers and encourage solar development that provides economic development, climate protection, and natural resources co-benefits. Local governments have a variety of tools to encourage appropriately sited and designed solar development to meet local goals.

Components of a Solar Standards Ordinance

Solar energy standards should:

1. *Enable solar installations by-right for property-owners*. Create a clear regulatory path (an as-of-right installation) to solar development for accessory uses and – if appropriate – for principal uses such as large-scale solar and ground-mounted community shared solar installations.
2. *Create a clear pathway for principal solar uses*. Define where community- and large-solar energy land uses are appropriate as a principal or primary use, set development standards and procedures to guide development, and capture co-benefit opportunities for water quality, habitat, and agriculture.
3. *Limit regulatory barriers to developing solar resources*. Ensure that access to solar resources is not unduly limited by height, setback, or coverage standards, recognizing the distinct design and function of solar technologies and land uses for both accessory and principal uses.
4. *Define appropriate aesthetic standards*. Retain an as-of-right installation pathway for accessory uses while balancing design concerns in urban neighborhoods and historic districts. Set reasonable aesthetic standards for solar principal uses that are consistent with other principal uses that have visual impacts.
5. *Address cross-property solar access issues*. Consider options for protecting access across property lines in the subdivision process and in zoning districts that allow taller buildings on smaller (urban density) lots.
6. *Promote "solar-ready" design.* Every building that has a solar resource should be built to seamlessly use it. Encourage builders to use solar-ready subdivision and building design.
7. *Include solar in regulatory incentives.* Encourage desired solar development by including it in regulatory incentives: density bonuses, parking standards, flexible zoning standards, financing/ grant programs, and promotional efforts.

Different Community Types and Settings

The model ordinance language addresses land use concerns for both urban and rural areas, and thus not all the provisions may be appropriate for every community. Issues of solar access and nuisances associated with small or accessory use solar energy systems are of less consequence in rural areas, where lot sizes are almost always greater than one acre. Large-scale and community-scale solar (principal solar land uses) are much more likely to be proposed in rural areas rather than developed cities. However, urban areas should consider where community-or large-scale solar can add value to the community and enable economic development of a valuable local resource. Rural communities should address rooftop and accessory ground-mounted development, although the standards used in this model are designed more for the urban circumstances.

This ordinance includes language addressing solar energy as an accessory use to the principal residential or commercial use in an urban area, and language for principal solar uses more typically seen in rural communities. Communities should address both types of solar development.

Solar development is not one thing

Communities would not apply the same development and land use standards to an industrial facility and a single-family home, merely because both are buildings. Community and large-scale solar development is a completely different land use than rooftop or backyard solar. Standards that are appropriate for large-scale solar may well be wholly inappropriate for rooftop solar and may unnecessarily restrict or stymie solar development opportunities of homes and business owners.

How to Use this Model Ordinance

This Model Ordinance is based on research and best practices identified through working with over 100 Midwestern communities over the last ten years as solar energy markets evolved and expanded.   The standards included in this model reflect the real-world controversies and opportunities the communities faced as the solar energy market grew. The portfolio of standards included in the model is intended to provide a reference for how communities can address those controversies and opportunities to make solar development more predictable, solar land use regulation more transparent, and regulatory standards more consistent across jurisdictions within the same solar market.

The model has been tailored to reflect Indiana-specific enabling statutes, ordinance practices, and community priorities currently seen in the state, with input from local planning, solar industry, and other experts. Because Indiana communities' ordinances, comprehensive plans and other local planning documents naturally vary, not all provisions included in the Model Ordinance will be suitable for each individual community. Moreover, as this is a "best practices" document, communities may decide not to include one or more suggested provisions. A community may also be aware of elements not included in this Model Ordinance that they wish to include. These sorts of adjustments are to be expected.

Appendix A includes links to solar ordinances already adopted by Indiana communities. The authors have not reviewed these existing ordinances against the language provided in this Model Ordinance, but provide them for users' convenience.

Model Ordinance

I. Scope – This article applies to all solar energy installations in Model Community.

II. Purpose – Model Community has adopted this regulation for the following purposes:

A. Comprehensive Plan Goals – Model Community has goals in its Comprehensive Plan, including preserving the health, safety, and welfare of the community by promoting the safe, effective, and efficient use of solar energy systems. The solar energy standards specifically implement the following goals from the Comprehensive Plan:

1. **Goal** – Encourage the use of local renewable energy resources, including appropriate applications for wind, solar, and biomass energy and energy storage.
2. **Goal** – Promote sustainable building design and management practices to serve current and future generations.
3. **Goal** – Assist local businesses to lower financial and regulatory risks and improve their economic, community, and environmental sustainability.
4. **Goal** – Efficiently invest in and manage public infrastructure systems to support development and growth.

B. Infrastructure – Distributed solar photovoltaic systems will enhance the reliability and power quality of the power grid and make more efficient use of Model Community's electric distribution infrastructure.

C. Local Resource – Solar energy is an underused local energy resource and encouraging its use will diversify the community's energy supply portfolio and reduce exposure to fiscal risks associated with fossil fuels.

D. Consistency with Greenhouse Gas Reduction Plans – Model Community has developed recommendations for greenhouse gas reductions, a purpose served by encouraging local solar development.

E. Improve Competitive Markets – Solar energy systems offer additional energy choices to consumers and will improve competition in the electricity and natural gas supply markets.

Comprehensive Plan Goals

Tying the solar energy ordinance to Comprehensive Plan goals is particularly important for helping users (both Planning Commission and community members) understand why the community is developing and administering regulation.

The language here provides examples of different types of Comprehensive Plan goals, and other policy goals that the community may have that are served by enabling and encouraging solar development. The community should substitute its policy goals for these examples.

The Comprehensive Plan may not include goals that specifically address or would be enhanced by solar development (such as climate protection or local resource economic goals). While lack of a policy goal should not delay adoption of a solar ordinance, the community may wish to consider creating a local energy plan or similar policy document that provides guidance regarding solar development.

Climate Protection Strategies

Some local governments in Indiana have adopted climate resolutions, committed to national climate goals, or have otherwise identified greenhouse gas reduction or energy independence targets. Introductory language in solar ordinances can list those commitments. An increasing number of Hoosier local governments are using and promoting solar installations to meet their energy and greenhouse gas reduction goals, but there are many reasons other than climate-related goals for a community to prepare for solar developments.

III. Definitions

Agrivoltaics – A solar energy system co-located on the same parcel of land as agricultural production, including crop production, grazing, apiaries, or other agricultural products or services.

Building-integrated Solar Energy Systems – A solar energy system that is an integral part of a principal or accessory building, rather than a separate mechanical device, replacing or substituting for an architectural or structural component of the building. Building-integrated systems include, but are not limited to, photovoltaic or hot water solar energy systems that are contained within roofing materials, windows, skylights, and awnings.

Community-Scale Solar Energy System – A commercial solar energy system that converts sunlight into electricity for the primary purpose of serving electric demands off-site from the facility, either retail or wholesale. Community-scale systems are principal uses and projects typically cover less than 10 acres.

Community Shared Solar – A solar energy system that provides retail electric power (or a financial proxy for retail power) to multiple community members or businesses residing or located off-site from the location of the solar energy system.

Grid-tied Solar Energy System– A photovoltaic solar energy system that is connected to an electric circuit served by an electric utility company.

Ground-Mounted – A solar energy system mounted on a rack or pole that rests or is attached to the ground. Ground-mounted systems can be either accessory or principal uses.

Large-Scale Solar Energy System – A commercial solar energy system that converts sunlight into electricity for the primary purpose of wholesale sales of generated electricity. A large-scale solar energy system will have a project size greater than 10 acres and is the principal land use for the parcel(s) on which it is located. It can include collection and feeder lines, substations, ancillary buildings, solar monitoring stations and accessory equipment or structures thereto, that capture and convert solar energy into electrical energy, primarily for use in locations other than where it is generated.

Off-grid Solar Energy System – A photovoltaic solar energy system in which the circuits energized by the solar energy system are not electrically connected in any way to electric circuits that are served by an electric utility company.

Passive Solar Energy System – A solar energy system that captures solar light or heat without transforming it to another form of energy or transferring the energy via a heat exchanger.

Photovoltaic System – A solar energy system that converts solar energy directly into electricity.

Pollinator-Friendly Solar Energy – A community- or large-scale solar energy system that meets the requirements of the 2020 Indiana

Solar Definitions

Not all of these terms are used in this model ordinance, nor is this a complete list of solar definitions. As a community develops its own development standards for solar technology, many of the concepts defined here may be helpful in meeting local goals. For instance, solar daylighting devices may change the exterior appearance of the building, and the community may choose to distinguish between these devices and other architectural changes.

Differentiating Solar Uses by Size

Community-scale and large-scale systems are defined here as occupying less than 10 acres and greater than 10 acres, respectively. Some communities use a lower number (five acres) and some a higher number (up to 50 acres). An ex-urban city would likely use a lower number and a rural county could use a higher number. Community-scale is generally a size that can fit into the land use fabric of the community without assembly of separate parcels. Some communities have chosen not to distinguish between community- and large-scale, and instead use a single large-scale designation.

Pollinator Friendly Standards

As pollinator-friendly landscaping becomes more common for solar energy systems, organizations are publishing standards, checklists, and scorecards to help developers and local governments so they will not have to independently research the kinds of plants that are appropriate and so that landscaping described as "pollinator-friendly" can be assured to meet an independently established standard. In Indiana, examples include Purdue University's 2020 Indiana Solar Site Pollinator Habitat Planning Scorecard and the Michiana Area Council of Governments' (MACOG) Technical Guide: Establishment and Maintenance of Pollinator-Friendly Solar Projects. Porter County, Indiana has adopted pollinator-friendly language in its solar ordinance that also provides a useful guide. Using a standard establishes a common foundation for what constitutes a pollinator-friendly installation and saves the local government the dilemma of devising and policing a habitat standard.

Solar Site Pollinator Habitat Planning Scorecard developed by Purdue University or another pollinator-friendly checklist developed by a third-party as a solar-pollinator standard designed for Midwestern eco-systems, soils, and habitat.

Renewable Energy Easement, Solar Energy Easement – An easement that limits the height or location, or both, of permissible development on the burdened land in terms of a structure or vegetation, or both, for the purpose of providing access for the benefited land to wind or sunlight passing over the burdened land.

Roof-Mounted – A solar energy system mounted on a rack that is fastened to or ballasted on a structure roof. Roof-mounted systems are accessory to the principal use.

Roof Pitch – The final exterior slope of a roof calculated by the rise over the run, typically but not exclusively expressed in twelfths such as 3/12, 9/12, 12/12.

Solar Access – Unobstructed access to direct sunlight on a lot or building through the entire year, including access across adjacent parcel air rights, for the purpose of capturing direct sunlight to operate a solar energy system.

Solar Carport – A solar energy system of any size that is installed on a carport structure that is accessory to a parking area, and which may include electric vehicle supply equipment or energy storage facilities.

Solar Collector – A device, structure or a part of a device or structure for which the primary purpose is to transform solar radiant energy into thermal, mechanical, chemical, or electrical energy. The collector does not include frames, supports, or mounting hardware.

Solar Daylighting – Capturing and directing the visible light spectrum for use in illuminating interior building spaces in lieu of artificial lighting, usually by adding a device or design element to the building envelope.

Solar Energy – Radiant energy received from the sun that can be collected in the form of heat or light by a solar collector.

Solar Energy System – A device, array of devices, or structural design feature, the purpose of which is to provide for generation or storage of electricity from sunlight, or the collection, storage, and distribution of solar energy for space heating or cooling, daylight for interior lighting, or water heating.

Solar Hot Air System – (also referred to as Solar Air Heat or Solar Furnace) A solar energy system that includes a solar collector to provide direct supplemental space heating by heating and re-circulating conditioned building air. The most efficient performance includes a solar collector to preheat air or supplement building space heating, typically using a vertically mounted collector on a south-facing wall.

Solar Hot Water System (also referred to as Solar Thermal)– A system that includes a solar collector and a heat exchanger that heats or preheats water for building heating systems or other hot water needs, including residential domestic hot water and hot water for commercial processes.

Solar Mounting Devices – Racking, frames, or other devices that allow the mounting of a solar collector onto a roof surface or the ground.

Solar Resource – A view of the sun from a specific point on a lot or building that is not obscured by any vegetation, building, or object for a minimum of four hours between the hours of 9:00 AM and 3:00 PM Standard time on all days of the year, and can be measured in annual watts per square meter.

Solar-Ready Design – The design and construction of a building that facilitates and makes feasible the installation of rooftop solar.

Solar Resource

Understanding what defines a "solar resource" is foundational to how land use regulation affects solar development. Solar energy resources are not simply where sunlight falls. A solar resource has minimum spatial and temporal characteristics, and needs to be considered not only today but also into the future. Solar energy equipment cannot function as designed if installed in partial shade, with too few hours of daily or annual direct sunlight, or without southern or near-southern exposure. Many provisions of the model ordinance are predicated on the concept that a solar resource has definable characteristics that are affected by local land use decisions and regulation.

IV. Permitted Accessory Use. Solar energy systems are a permitted accessory use in all zoning districts where structures of any sort are allowed, subject to certain requirements as set forth below. Solar carports and associated electric vehicle charging equipment are a permitted accessory use on surface parking lots in all districts regardless of the existence of another building. Solar energy systems that do not meet the following design standards will require a conditional use permit.

A. **Height** – Solar energy systems must meet the following height requirements:

1. Building or roof-mounted solar energy systems shall not exceed the maximum allowed height in any zoning district. For purposes of height measurement, solar energy systems other than building-integrated systems shall be given an equivalent exception to height standards as building-mounted mechanical devices or equipment.

2. Ground or pole-mounted solar energy systems shall not exceed 15 feet in height when oriented at maximum tilt.

3. Solar carports in non-residential districts shall not exceed 20 feet in height.

B. **Setback** – Solar energy systems must meet the accessory structure setback for the zoning district and principal land use associated with the lot on which the system is located, as allowed below.

1. **Roof or Building-mounted Solar Energy Systems** – The collector surface and mounting devices for roof-mounted solar energy systems shall not extend beyond the exterior perimeter of the building on which the system is mounted or built, unless the collector and mounting system has been explicitly engineered to safely extend beyond the edge, and setback standards are not violated. Exterior piping for solar hot water systems shall be allowed to extend beyond the perimeter of the building on a side yard exposure. Solar collectors mounted on the sides of buildings and serving as awnings are considered to be building-integrated systems and are regulated as awnings.

2. **Ground-mounted Solar Energy Systems** – Ground-mounted solar energy systems may not extend into the side-yard or rear setback when oriented at minimum design tilt, except as otherwise allowed for building mechanical systems.

C. **Visibility** – Solar energy systems in residential districts shall be designed to minimize visual impacts from the public right-of-way, as described in C.1-3, to the extent that doing so does not affect the cost or efficacy of the system, consistent with Indiana Code 36-7-2-8. Visibility standards do not apply to systems in non-residential districts, except for historic building or district review as described in E. below.

1. **Building-integrated Photovoltaic Systems –** Building integrated photovoltaic solar energy systems shall be allowed regardless of whether the system is visible from the public right-of-way, provided the building component in which the system is integrated meets all required setback, land use or performance standards for the district in which the building is located.

Indiana Code Title 36. Local Government § 36-7-2-1

Sec. 8 . . . (b) A unit may not adopt any ordinance which has the effect of prohibiting or of unreasonably restricting the use of solar energy systems other than for the preservation or protection of the public health and safety.

(c) This section does not apply to ordinances which impose reasonable restrictions on solar energy systems. However, it is the policy of this state to promote and encourage the use of solar energy systems and to remove obstacles to their use. Reasonable restrictions on solar energy systems are those restrictions which:

(1) do not significantly increase the cost of the system or significantly decrease its efficiency; or (2) allow for an alternative system of comparable cost and efficiency.

Height - Rooftop System

This ordinance notes exceptions to the height standard when other exceptions are granted in the ordinance. Communities should directly reference the exception language, rather than use the placeholder language here.

Height - Ground or Pole Mounted System

This ordinance sets a 15-foot height limit, which is typical for residential accessory uses. Some communities allow solar to be higher than other accessory uses in order to enable capture of the lot's solar resource when lots and buildings are closer together. An alternative is to balance height with setback, allowing taller systems if set back farther – for instance, an extra foot of height for every extra two feet of setback. In rural (or large lot) areas, solar resources are unlikely to be constrained by trees or buildings on adjacent lots and the lot is likely to have adequate solar resource for a lower (10-15 foot) ground- mounted application.

2. **Aesthetic restrictions** – Roof-mounted or ground-mounted solar energy systems shall not be restricted for aesthetic reasons if the system is not visible from the closest edge of any public right-of-way other than an alley or if the system meets the following standards.

   a. Roof-mounted systems on pitched roofs that are visible from the nearest edge of the front right-of-way shall have the same finished pitch as the roof and be no more than ten inches above the roof.

   b. Roof-mounted systems on flat roofs that are visible from the nearest edge of the front right-of-way shall not be more than five feet above the finished roof and are exempt from any rooftop equipment or mechanical system screening.

3. **Reflectors** – All solar energy systems using a reflector to enhance solar production shall minimize glare from the reflector affecting adjacent or nearby properties.

D. Lot Coverage – Ground-mounted systems shall meet the existing lot coverage restrictions for the zoning district except as defined below.

1. Ground-mounted systems shall be exempt from lot coverage or impervious surface standards if the soil under the collector is maintained in vegetation and not compacted.

2. Ground-mounted systems shall not count toward the maximum number of accessory structures permitted.

3. Solar carports in non-residential districts are exempt from lot coverage limitations.

E. Historic Buildings – Solar energy systems on buildings within designated historic districts or on locally designated historic buildings (exclusive of State or Federal historic designation) must receive approval of the local Historic Preservation Commission, or equivalent, consistent with the standards for solar energy systems on historically designated buildings published by the U.S. Department of the Interior.

F. Plan Approval Required – All solar energy systems requiring a building permit or other permit from Model Community shall provide a site plan for review.

1. **Plan Applications.** Plan applications for solar energy systems shall be accompanied by to-scale horizontal and vertical (elevation) drawings. The drawings must show the location of the system on the building or on the property for a ground-mounted system, including the property lines.

2. **Plan Approvals.** Applications that meet the design requirements of this ordinance shall be granted administrative approval by the zoning official and shall not require Planning Commission review. Plan approval does not indicate compliance with Building Code or Electric Code.

Visibility and Aesthetics

Aesthetic regulation should be tied to design principles rather than targeted at a specific land use. If the community already regulates aesthetics in residential districts, this model language provides guidance for balancing between interests of property owners who want to use their on-site solar resources and neighbors concerned with neighborhood character. Substantial evidence demonstrates that solar installations have no effect on property values of adjacent properties. But where aesthetic regulation is used to protect community character, these standards provide balance between competing goals.

Building-integrated PV

Building-integrated solar energy systems can include solar energy systems built into roofing (existing technology includes both solar shingles and solar roofing tiles), into awnings, skylights, and walls.

Roof-Mounted Solar Energy Systems

This ordinance sets a threshold for pitched roof installations that they not be steeper than the finished roof pitch. Mounted systems steeper than the finished roof pitch change the appearance of the roof, and create additional considerations in regard to the wind and drift load on structural roof components. If the aesthetic impacts are not a concern to the community, the structural issues can be addressed in the building permit.

Roof Coverage and Fire Code

Roof coverage limitations are generally not necessary, as some of the roof is likely to be shaded or otherwise not suitable for solar energy. Coverage is an issue of concern in order to ensure ready roof access in the event of a fire. The new 2018 IRC adopted by Indiana provides guidance for consistency with fire code and roof access. The permitting best practice is to allow for fire marshal variances where appropriate on access pathways.

G. Approved Solar Components – Electric solar energy system components must have an Underwriters Laboratory (UL) or equivalent listing and solar hot water systems must have an Solar Rating & Certification Corporation (SRCC) or equivalent rating.

H. Compliance with Building Code – All solar energy systems shall meet approval of local building code officials, consistent with the State of Indiana Building Code, and solar thermal systems shall comply with HVAC-related requirements of the Energy Code.

I. Compliance with State Electric Code – All photovoltaic systems shall comply with the Indiana State Electric Code.

J. Compliance with State Plumbing Code – Solar thermal systems shall comply with applicable Indiana State Plumbing Code requirements.

K. Utility Notification – It is recommended that the interconnection application be submitted to the utility prior to applying for required permits. Grid-tied solar energy systems shall comply with interconnection requirements of the electric utility. Off-grid systems are exempt from this requirement.

V. Principal Uses. Model Community encourages the development of commercial or utility scale solar energy systems where such systems present few land use conflicts with current and future development patterns. Community and large-scale systems are either conditional or permitted with site plan review, and are excluded elsewhere.

A. **Principal Use General Standards**

1. Site Design

a. Setbacks – Community- and large-scale solar arrays must meet the following setbacks:

1. Property line setback from a non-participating landowner's property line must meet the established setback for buildings or structures in the district in which the system is located, except as otherwise determined in 1.a.6 below.

2. Property line setbacks between separate parcels both of which are participating in the project may be waived upon agreement of the landowner(s).

3. Roadway setback of 50 feet from the ROW of State highways and County and State Aid Highways (CSAHs), and 40 feet for other roads, except as otherwise determined in 1.a.6 below.

4. Housing unit setback of 150 feet from any existing dwelling unit of a non-participating landowner, except as otherwise determined in 1.a.6 below. Participating landowner housing must meet building setbacks or required yards for the district in which the project is located.

Impervious Surface Coverage

Rather than consider the solar panel for a ground-mounted system as a roof, this provision recognizes that the ground under the panel can mitigate stormwater risks if it is kept in vegetation so that rainwater can infiltrate. Any effects are de minimis for a small array if the lot is otherwise within coverage ratios.

Historic Buildings

The standards set forth by the local historic preservation commission should be consistent with the standards for solar energy systems on historically designated buildings published by the U.S. Department of the Interior. If the local historic preservation commission does not have standards, local commissions should refer to the U.S. Department of Interior Standards and guidelines outlined at https://www.nps.gov/tps/sustainability/new-technology/solar-on-historic.htm

Plan Approval

This process is generally part of the process for obtaining a building permit. The standard that the model community typically uses for submittal requirements should be included here. If the community does not issue building permits, it can be tied to a land use permit instead. For rural areas or cities without zoning or building code standards, the plan approval section may be eliminated.

Use Standards

Most communities require a conditional use permit for large-scale solar development. The large size of such developments usually means that site-specific standards and design issues need to be considered. However, some communities have decided that sufficient oversight is provided by the Planning Commission in review of standards, and have chosen to list the use as permitted in appropriate districts. This is a decision to be made by each community in light of its oversight and review standards. To encourage large-scale solar development, list it as a permitted use.

5. Setback distance should be measured from the edge of the solar energy system array, excluding security fencing, screening, or berm.

6. All setbacks can be reduced by 50%, except that unwaived setbacks cannot be less than 30 feet, if the array has a landscape buffer that screens the array at the setback point of measurement.

b. Screening – Community- and large-scale solar energy systems shall be screened from existing residential dwellings.

1. A landscape plan shall be submitted that identifies the type and extent of proposed buffer and screening. Vegetation or another type of buffer can be proposed.

2. Screening shall be consistent with Model Community's screening ordinance or standards typically applied for other land uses requiring screening.

3. Screening shall not be required along highways or roadways, except as provided in 4. below, or along property lines within the same zoning district, except where the adjoining lot has an existing residential use.

4. Model Community may require screening where it determines there is a clear community interest in maintaining a viewshed.

c. Height – Large- and community-scale solar energy systems shall not exceed 20 feet.

Appropriate Setbacks

The community should consider balancing set-back requirements and screening requirements for principal use solar. Since the primary impact to neighbors of large-scale solar is visual, screening becomes less useful as the setbacks get larger (and vice versa).

The setback distances provided here are general examples that should be modified to be consistent with other setbacks already in the ordinance. Property line setbacks are typically not in excess of 50 feet, special setbacks for housing or existing sensitive land uses may be larger. Excessive setbacks that are unique to solar land uses, or that are designed for land uses with health and safety or significant nuisance risks such as industrial uses or animal agriculture, are unjustified given the low level of risk or nuisance posed by the solar array. It is common for a participating landowner to agree to a setback shorter than stated in the established ordinance. In that case, a waiver of the setback should be allowed.

Screening

The community should consider limiting screening of community- or large-scale solar to where there is a visual impact from an existing use, such as adjacent residential districts or uses. Screening standards should be consistent for solar with other land uses that have screening requirements. Solar energy systems may not need to be screened from adjacent lots if those lots are in agricultural use, are non-residential, or have low-intensity commercial use.

d. Ground cover and buffer areas (alternative A) – Community- or large-scale ground-mounted solar energy systems are required to adhere to the following standards. Additional site-specific conditions may apply as required by Model Community.

1. Ground around and under solar panels and in project site buffer areas shall be planted, established, and maintained for the life of the solar project in perennial vegetated ground cover meeting the definition of Pollinator-Friendly Solar Energy in Section III above.

a) All applicants shall submit a completed pollinator-friendly solar scorecard such as the 2020 Indiana Solar Site Pollinator Habitat Planning Scorecard developed by Purdue University, or a similar third-party solar pollinator standard designed for Midwest eco-systems and conditions.

b) When the scorecard results demonstrate the project does not qualify as pollinator-friendly, the applicant shall submit a landscaping plan detailing site conditions that prevent the site from being qualified and alternative means of meeting the water quality and habitat goals of the pollinator-friendly standard.

2. The site shall be planted and maintained to be free of invasive or noxious species, as listed by the Indiana Invasive Species Council. No insecticide use is permitted on the site. This provision does not apply to insecticide use in on-site buildings, in and around electrical boxes, spot control of noxious weeds, or as otherwise may be deemed necessary to protect public health and safety.

3. Projects maintained as pollinator-friendly compliant are exempt from landscaping requirements and post-construction stormwater management controls (as stated in Section V. A.2. below) that may be otherwise required under Model Community's development regulations, unless required due to special conditions by the plan commission or the Board of Zoning Appeals.

Importance of Ground Cover

Establishing and maintaining regionally appropriate ground cover creates important co-benefits for the community and the property owner. Grasses can be harvested for forage and wildflowers and blooming plants can create pollinator and bird habitat. Maintaining the site in vegetation will build soils that can be turned back into agriculture at the end of the solar farm's life.

If appropriately established, these ground cover standards also likely reduce maintenance costs and limit the need for chemical weed management, which also improves water quality outcomes.

Options for Ground Cover Standards

Two options are offered for ground cover standards. Alternative A requires perennial vegetation consistent with local eco-systems that meets the definition of "pollinator-friendly habitat," demonstrated through completion of the Purdue University pollinator scorecard or a similar third-party Midwest relevant checklist. Pollinator-friendly or habitat-friendly ground cover is a solar best practice encouraged or required by communities and some states for solar development throughout the Midwest. The inherent visual and water quality benefits of pollinator habitat can provide a basis to exempt the project from other landscaping and water quality requirements.

Alternative B requires regionally appropriate perennial ground cover. If the developer elects to use pollinator-friendly ground cover and wants to label it as such, the Purdue (or other) scorecard must be used, and other landscaping and water quality requirements are waived.

Other alternatives are also available and can be considered. Some communities may choose to apply a pollinator standard only under certain conditions, such as for mitigating taking farmland out of production. Another alternative is to encourage compliance with a habitat standard but make requirement decisions on a case by case basis in the permit review process.

e. Ground cover and buffer areas (alternative B) – Community- or large-scale ground-mounted solar energy systems are required to adhere to the following standards. Additional site-specific conditions may apply as required by Model Community.

1. Ground around and under solar panels and in project site buffer areas shall be planted, established, and maintained for the life of the solar project in perennial vegetated ground cover.

2. To the maximum extent feasible for site conditions, perennial vegetation ground cover shall be based on a diverse seed mix of native species consistent with guidance specific to the local area provided by

the Soil and Water Conservation District office or the Indiana Native Plant Society.

3. The owner/operator shall demonstrate site maintenance that is intended to remove invasive or noxious species, as listed by the Indiana Invasive Species Council, without harming perennial vegetation.

4. No insecticide use is permitted on the site. This provision does not apply to insecticide use in on-site buildings, in and around electrical boxes, spot control of noxious weeds, or as otherwise may be deemed necessary to protect public health and safety.

5. Plant material must not have been treated with systemic insecticides, particularly neonicontinoids.

6. Community- or large-scale ground-mounted solar energy systems that propose to install, establish, and maintain pollinator-friendly vegetative cover are to demonstrate the quality of their habitat by using guides such as Purdue University 2020 Indiana Solar Site Pollinator Habitat Planning Scorecard, or other third party solar-pollinator scorecards designed for Midwestern eco-systems, soils, and habitat.

7. Projects certified and maintained as pollinator-friendly compliant are exempt from landscaping requirements and post-construction stormwater management controls (as stated in Section V. A.2. below) that may be otherwise required under Model Community's development regulations, unless required due to special conditions by the plan commission or the Board of Zoning Appeals.

f. **Foundations** – A qualified engineer shall certify, prior to application for building permits, that the foundation and design of the solar panel racking and support is within accepted professional standards, given local soil and climate conditions.

g. **Power and communication lines** –

1. Power and communication lines running between banks of solar panels and to nearby electric substations or interconnections with buildings shall be buried underground. Exemptions may be granted by Model Community in instances where shallow bedrock, water courses, or other elements of the natural landscape interfere with the ability to bury lines, or distance makes undergrounding infeasible, at the discretion of the zoning administrator.

2. Power and communication lines between the project and the point of interconnection with the transmission system can be overhead.

h. **Fencing** – Perimeter fencing for the site shall not include barbed wire or woven wire designs and shall preferably use wildlife-friendly fencing standards that include clearance at the bottom. Alternative fencing can be used if the site is incorporating agrivoltaics.

2. **Stormwater and NPDES** – Large- and community-scale solar projects are subject to Model Community's stormwater management and erosion and sediment control provisions and Nonpoint Pollution Discharge Elimination System (NPDES) permit requirements. Solar collectors shall not be considered impervious surfaces if the project complies with ground cover standards, as described in A.1.d and e of this ordinance.

3. **Other standards and codes** – All large- and community-scale solar projects shall be in compliance with all applicable local, state and federal regulatory codes, including the State of Indiana Uniform Building Code, as amended; and the National Electric Code, as amended.

4. **Site Plan Required** – The applicant shall submit a detailed site plan for both existing and proposed conditions, showing locations of all solar arrays, other structures, property lines, rights-of-way, service roads, floodplains, wetlands, and other protected natural resources, topography, electric equipment, and all other characteristics requested by Model Community. The site plan should show all zoning districts and overlay districts.

Site Plan

Solar farm developers should provide a site plan similar to that required by the community for any other development. Refer to your existing ordinance to guide site plan submittal requirements.

5. **Aviation Protection** – For large- and community-scale solar projects located within 500 feet of an airport or within approach zones of an airport, the applicant must complete and provide the results of a glare analysis through a qualitative analysis of potential impact, field test demonstration, or geometric analysis of ocular impact in consultation with the Federal Aviation Administration (FAA) Office of Airports, consistent with the Interim Policy, FAA Review of Solar Energy Projects on Federally Obligated Airports, or most recent version adopted by the FAA.

6. **Agricultural Protection** – Large- and community-scale solar projects must comply with model community's site assessment standards for identifying agricultural soils. Model Community may require mitigation for use of prime soils for solar array placement, including the following:

   a. Demonstrating co-location of agricultural uses (agrivoltaics) on the project site.

   b. Using an interim use or time-limited Conditional Use Permit (CUP) that allows the site to be returned to agriculture at the end of life of the solar installation.

   c. Locating the project in a wellhead protection area for the purpose of removing agricultural uses from high risk recharge areas.

   d. Using pollinator-friendly ground cover, as defined in Section III.

7. **Decommissioning** – A decommissioning plan shall be required to ensure that facilities are properly removed after their useful life.

   a. Decommissioning of the system must occur in the event the project does not produce power for 12 consecutive months. An owner may petition for an extension of this period upon showing of reasonable circumstances that have caused the delay in the start of decommissioning.

   b. The plan shall include provisions for removal of all structures and foundations to a depth of 48", restoration of soil and vegetation and assurances that financial resources will be available to fully decommission the site.

   c. Disposal of structures and/or foundations shall meet the provisions of the Model Community Solid Waste Ordinance.

   d. Model Community may require the posting of a bond, letter of credit, a parent guarantee, or other financial surety to ensure proper decommissioning.

   e. The value of the decommission bond or letter of credit should consider the salvage value of the solar equipment.

Aviation Standards, Glare

This standard was developed for the FAA for solar installations on airport grounds. It can also be used for solar farm and garden development in areas adjacent to airports. This standard is not appropriate for areas where reflected light is not a safety concern.

Agricultural Protection

The agricultural protection section applies only to those communities that have adopted agricultural protection standards in their development regulations that apply to multiple types of development. In those instances, this provision applies those same standards to solar development. The ordinance language is written for a community that requires assessment of soils, but not necessarily protection of those soils. Communities should carefully evaluate to what degree solar development should be subject to the community's agricultural protection standards.

Solar and Prime Soils

Solar farms do not pose the same level or type of risk to agricultural practices or prime farm soil, as does housing or commercial development.

• State stormwater standards require, in most cases, establishment of perennial vegetation over the solar project site by the end of construction. The groundcover at solar farms will protect agricultural soil, build nutrients, prevent erosion, and improve topsoil quality at the site.

• Some forms of agriculture can be co-located with solar development, including grazing, small crop production, and apiaries.

• Solar farms can be easily turned back to agriculture at the end of the solar farm's life (now being estimated to be 35 years).

B. Community-Scale Solar – Model Community permits the development of community-scale solar, subject to the following standards and requirements:

1. **Rooftop shared solar systems permitted** – Rooftop systems are permitted in all districts where buildings are permitted.

2. **Community-scale uses** – Ground-mounted community-scale solar energy systems must cover no more than ten acres (project boundaries), and are a permitted use in industrial and agricultural districts, and permitted with standards or conditional in all other non-residential districts. Ground-mounted solar developments covering more than ten acres shall be considered large-scale solar.

3. **Dimensional standards** - All structures must comply with setback and height standards for the district in which the system is located.

4. **Other standards** - Ground-mounted systems must comply with all required standards for structures in the district in which the system is located.

Drinking Water Protection

In identifying preferred areas or districts for solar principal uses, the community should consider co-benefits of solar energy development. One such potential co-benefit is protection of drinking water supplies. Solar energy development may be intentionally sited within vulnerable portions of public water supply systems as a best management practice to restore and protect perennial groundcover that reduces nitrate contamination of ground water supplies.

Defining Community-Scale Solar

The acreage size for community-scale solar garden written here (10 acres) is the high end of project size for a one-megawatt system, but community-scale could be defined as high as 10 megawatts (100-acre project size). Community-scale solar is the size that can fit in to the landscape.

Community-Scale Solar or Solar Gardens

Community solar systems differ from rooftop or solar farm installations primarily in regards to system ownership and disposition of the electricity generated, rather than land use considerations. There is, however, a somewhat greater community interest in community solar, and thus communities should consider creating a separate land use category.

This language limits the size of the garden to ten acres, which is an installation of no more than one MW of solar capacity. Communities should tailor this size limit to community standards, which may be smaller or larger.

C. **Large-Scale Solar** – Ground-mounted solar energy arrays that are the principal use on the lot are permitted under the following standards:

1. **Conditional use permit** – Large- and community-scale solar projects are conditional uses in agricultural districts, industrial districts, shoreland and floodplain overlay districts, airport safety zones subject to V.A.5. of this ordinance, and in the landfill/brownfield overlay district for sites that have completed remediation.

Large-Scale Solar Conditional Uses

Communities can determine if large -scale solar should require a conditional use or permitted-use permit for the community to consider the site-specific conditions. The districts listed here are examples. Each community needs to consider where large scale solar is suitable in the context of its zoning districts and priorities.

Example Use Table

Use Type	Residential	Mixed Use	Business	Industrial	Agricultural, Rural, Landfill	Shoreland	Floodplain	Special (Conservation, Historic Districts)
Large-scale solar	X	X	X	C/PS	C/PS	C	C	C
Community-scale solar	C	C	C	P	P	PS	PS	PS
Accessory use ground-mounted solar	P	P	P	P	P	P	C	C
Rooftop solar	P	P	P	P	P	P	P	PS

P = Permitted

PS = Permitted Special (additional separate permit or review)

C = Conditional

X = Prohibited

Solar as a Land Use

The above use table shows four types of solar development that are distinct types of land uses (two kinds of accessory uses, two principal uses), and a group of districts or overlays that are commonly used in Indiana.

• Rooftop system are permitted in all districts where buildings are permitted, with recognition that historic districts will have special standards or permits separate from the zoning permits.

• Accessory use ground-mounted systems are conditional where potentially in conflict with the primary district or overlay goal.

• Community-scale solar principal uses are either conditional uses or permitted uses, depending on the community decisions. Permitted uses are where a 10-acre development can be integrated into the landscape, and require special consideration in shoreland and floodplain overlay districts.

• Large-scale solar is prohibited in higher density districts and conditional or permitted with separate permit review in all other districts.

Both community- and large-scale solar is allowed in shoreland and floodplain overlay districts, because the site design standards requiring beneficial habitat ground cover not only ensure a low-impact development but in most cases result in a restoration of eco-system services from the previous (usually agricultural) use.

VI. Renewable Energy Condition for Certain Permits

A. **Condition for Planned Unit Development (PUD) Approval -** Model Community may require on-site renewable energy systems, zero-net-energy (ZNE) or zero-net-carbon (ZNC) building designs, solar-synchronized electric vehicle charging or other clean energy systems as a condition for approval of a PUD permit to mitigate for:

1. Impacts on the performance of the electric distribution system,
2. Increased local emissions of greenhouse gases associated with the proposal,
3. Need for electric vehicle charging infrastructure to offset transportation-related emissions for trips generated by the new development, and
4. Other impacts of the proposed development that are inconsistent with the Model Community Comprehensive Plan.

B. **Condition for Conditional Use Permit** - Model Community may require on-site renewable energy systems or zero net energy construction as a condition for a rezoning or a conditional use permit.

VII. Solar Roof Incentives. Model Community encourages incorporating on-site renewable energy system or zero net energy construction for new construction and redevelopment. Model Community may require on-site renewable energy or zero-net- energy construction when issuing a conditional use permit where the project has access to local energy resources, in order to ensure consistency with Model Community's plan to reduce greenhouse gas emissions.

A. **Density Bonus** - Any application for subdivision of land in the Districts that will allow the development of at least four (4) new lots of record shall be allowed to increase the maximum number of lots by 10% or one lot, whichever is greater, provided all building and wastewater setbacks can be met with the increased density, if the applicant enters into a development agreement guaranteeing at least three (3) kilowatts of PV for each new residence that has a solar resource.

B. **Solar-Ready Buildings** – Model Community encourages builders to use a solar-ready design in buildings. Buildings that submit a completed U.S. EPA Renewable Energy Ready Home Solar Photovoltaic Checklist (or other approved solar- ready standard) and associated documentation will be certified as a Model Community solar ready home, and be eligible for low-cost financing through Model Community's Economic Development Authority. The designation will be included in the home's permit history.

Renewable Energy Conditions, Incentives

The community can use traditional development tools such as conditional use permits, PUDs, or other discretionary permits to encourage private investment in solar energy systems as part of new development or redevelopment. This model ordinance notes these opportunities for consideration by local governments. In most cases, additional ordinance language would need to be tailored to the community's ordinances.

For instance, a provision that PUDs (or other special district or flexible design standard) incorporate solar energy should be incorporated into the community's PUD ordinance rather than being a provision of the solar standards.

Conditional use permits generally include conditions, and those conditions can include renewable energy or zero net energy design, but only if the conditions are clearly given preference in adopted policy or plans providing the Board of Zoning Appeals with clear guidance for approving the conditions. Explicit reference to climate or energy independence goals in the ordinance and explicit preference for such conditions will set a foundation for including such conditions in the permit.

Solar Roof Incentives

This section of the model ordinance includes a series of incentives that can be incorporated into development regulation. Most cities and many counties use incentives to encourage public amenities or preferred design. These same tools and incentives can be used to encourage private investment in solar energy. Communities should use incentives that are already offered, and simply extend that incentive to appropriate solar development.

Some of the incentives noted here are not zoning incentives, but fit more readily into incentive programs offered by the community (such as financing or incentive-based design standards).

C. Solar Access Variance – When a developer requests a variance from Model Community's subdivision solar access standards, the zoning administrator may grant an administrative exception from the solar access standards provided the applicant meets the conditions of 1. and 2. below:

1. **Solar Access Lots Identified** - At least 20% of the lots, or a minimum number of lots to be determined by Model Community.
2. **Covenant Assigned** - Solar access lots are assigned a covenant that homes built upon these lots must include a solar energy system. Photovoltaic systems must be at least three (3) KW in capacity.
3. **Additional Fees Waived** - Model Community may waive any additional fees for filing of the covenant.

Solar-Ready Buildings

New buildings can be built "solar-ready" at very low cost (in some cases the marginal cost is zero). Solar energy installation costs continue to decline in both real and absolute terms, and are already competitive with retail electric costs in many areas. If new buildings have a rooftop solar resource, it is likely that someone will want to put a solar energy system on the building in the future. A solar ready building greatly reduces the installation cost, both in terms of reducing labor costs of retrofits and by "pre-approving" most of the installation relative to building codes.

A community's housing and building stock is a form of infrastructure that, although built by the private sector, remains in the community when the homeowner or business leaves the community. Encouraging solar-ready construction ensures that current and future owners can take economic advantage of their solar resource when doing so makes the most sense for them.

Solar Access Subdivision Design

Some communities will require solar orientation in the subdivision ordinance, such as requiring an east-west street orientation within 20 degrees in order to maximize lot exposure to solar resources. However, many such requirements are difficult to meet due to site constraints or inconsistency with other requirements (such as connectivity with surrounding street networks). Rather than simply grant a variance, the community can add a condition that lots with good solar access actually be developed as solar homes.

Appendix A

The following list contains solar ordinances proposed and adopted in Indiana. This list has not been vetted by the authors of Indiana's Model Solar Ordinance; instead, this list is intended to provide examples of what has already been adopted.

List of Solar Ordinances Adopted by Local Governments in Indiana *Last Updated October 2020*		
Local Government	**Adoption Date**	**Ordinance Link**
City of Goshen	2012; Amended in 2017	Goshen Zoning Ordinance > Solar Energy System Regulations
City of Plymouth	2017; Amended in 2019	City of Plymouth Zoning Ordinance Solar Energy Standards
City of South Bend	2019	South Bend Zoning Ordinance > Solar
Elkhart County	Dec 2014, Effective Feb 2015; Amended Jan 2020	Elkhart County Zoning Ordinance > Solar Panel Array
Fulton County	Unknown	Fulton County Zoning Ordinance > Solar Energy Systems Standard
Henry County	(proposed)	Draft Ordinance as of Oct 2020
Lake County	Sep 2020	Lake County Zoning Ordinance
Marshall County	2017; Amended Jan 2020*	Marshall County Zoning Ordinance > Solar Energy Systems
Porter County	Apr 2020	Porter County Unified Development Ordinance Amendment > Solar Ordinance Chaps. 2, 5 and 10
Posey County	Mar 2020	Posey County Zoning Ordinance > Renewable Energy Generation Systems for Cynthiana, Poseyville, and Mount Vernon
Posey County	Mar 2020	Posey County Zoning Ordinance > Renewable Energy Generation Systems for Unincorporated Areas
Pulaski County	Dec 2019, Effective Jan 2020	Pulaski County Unified Development Ordinance > Wind Energy Convergence and Solar Energy Systems
Randolph County	Jul 2020	Randolph County Solar Energy Systems Siting Regulations
Shelby County	Jul 2018	Shelby County Unified Development Ordinance > Commercial Solar Energy Systems Standards
St. Joseph County	Feb 2020	St. Joseph County Zoning Ordinance > Special Regulations for Renewable Energy Systems
Starke County	Jun 2019	Starke County Solar Energy Ordinance
White County	Jan 2019	White County Zoning Ordinance > Solar Farms and Solar Energy Systems

*under moratorium until 2021 to address decommissioning in the ordinance

SOLSMART

NATIONALLY DISTINGUISHED. **LOCALLY POWERED.**

PROGRAM GUIDE

WWW.SOLSMART.ORG

JANUARY 2021

SolSmart Program Guide:

Recognizing Local Solar Achievements!

Welcome to the SolSmart Program Guide, a comprehensive resource to guide local governments through the SolSmart designation and technical assistance process.

Why SolSmart?

Across the United States, communities are turning to solar energy for clean, reliable, and affordable electricity to power their homes and businesses. Rapidly declining prices for solar technologies have brought vast amounts of solar energy into the mainstream within a few short years. Millions of Americans now rely on solar to power the necessities of modern life.

In addition to keeping the lights on, solar energy provides many environmental, social, and economic benefits. It is a carbon-free electricity source that is an essential part of any strategy to reduce greenhouse gas emissions. An increasing number of communities are now using solar to meet climate change goals or renewable energy targets. At the same time, solar energy is a primary driver for job creation and economic growth. The Solar Foundation's *National Solar Jobs Census* found that solar employs nearly 250,000 American workers as of 2019, and since 2010 the size of the solar workforce has grown by 167 percent.[1]

Those who have taken advantage of the opportunity to install solar panels are finding that solar saves money. Homeowners, businesses, schools, and local governments are using solar energy to drastically reduce their utility costs. Meanwhile, in the face of costly natural disasters that threaten the reliability of the electricity grid, solar can be combined with battery storage to provide backup power and make communities more resilient.

Yet, solar "soft costs" have significant local impacts on the affordability of solar energy systems. "Soft costs" refer to business processes or administrative costs that can increase the time and money it takes to install a solar energy system — costs that are then passed on to customers. These costs arise due to sales and marketing, permitting processes, planning, and zoning considerations, financing, and a wide variety of other factors. Overall, these soft costs represent about 64% of the total cost of a solar energy system.[2]

To address solar soft costs at the local level, the U.S. Department of Energy's Solar Energy Technologies Office (SETO) funds SolSmart, a national designation and technical assistance program. SolSmart recognizes local governments that have taken key steps to address barriers to solar energy and provides no-cost technical assistance to accelerate the development of local solar energy markets.

SolSmart benefits three primary stakeholders at the local level. The first is solar customers that can enjoy a greater return on their investment if soft costs are reduced. Cumbersome local government processes can add up to $2,500 or more to the cost of a homeowner going solar.[3] Second, local governments benefit from the time and money saved by cutting red tape and making processes more efficient. For example, providing more accessible information on permit and inspection processes can decrease the volume of questions from installers and the number of incomplete applications, thereby reducing demands on staff time. Finally, local solar companies benefit from transparent and standardized processes that reduce barriers to entering the market, reduce administrative costs, and improve customer satisfaction.

[1] The Solar Foundation, *National Solar Jobs Census 2019,* February 2020, available at http://www.solarjobscensus.org

[2] U.S. Department of Energy, *Soft Costs Webpage, available at* https://www.energy.gov/eere/solar/soft-costs

[3] Jesse Burkhardt et al., "How Much Do Local Regulations Matter? Exploring the Impact of Permitting and Local Regulatory Processes on PV Prices in the United States," *Electricity Markets & Policy*, September 2014, https://emp.lbl.gov/publications/how-much-do-local-regulations-matter.

As of January 2021, more than 390 communities in 41 states and the District of Columbia have achieved designation as SolSmart Gold, Silver, or Bronze. The program's broad national reach is helping communities in all parts of the country make it faster, easier, and more affordable to go solar. The designation program is led by the International City/County Management Association, while the technical assistance program is led by The Solar Foundation.

SolSmart Designation Criteria

SolSmart uses objective criteria based on established solar energy best practices to measure local government progress toward creating a solar-friendly community. Local governments that complete the necessary requirements are awarded SolSmart Bronze, Silver, or Gold Designation.

There are three levels of SolSmart designation for local governments.
Below are the requirements for each level

Bronze	60 Total Points	3 Pre-requisite Credits
	☐ 20 Points in Permitting & Inspection ☐ 20 Points in Planning & Zoning ☐ 20 Points from any Special Focus category	☐ Complete the Solar Statement (PR-1) ☐ Complete solar permitting checklist (PI-1) ☐ Complete zoning review (PZ-1)
Silver	**100 Total Points**	**3 Pre-requisite Credits**
	☐ Complete bronze designation requirements	☐ Complete permit staff training (PI-2) ☐ Complete inspection staff training (PI-3) ☐ Complete zoning clarification (PZ-4)
Gold	**200 Total Points**	**2 Pre-requisite Credits**
	☐ Complete silver designation requirements	☐ Complete permit turnaround time (PI-4) ☐ Complete solar in zoning (PZ-5)

Special Award: Communities that earn 60% of the available points in a category are eligible for special recognition.

The SolSmart Designation Criteria is organized into 5 categories – 2 Foundation Categories and 3 Special Focus Categories. Below you will find a summary of the 5 categories and the number of credits and available points in each category.

Foundational Categories

Permitting and Inspection		Planning and Zoning	
Credits: 20	Points: 205	Credits: 23	Points: 185

Special Focus Categories

Government Operations		Community Engagement		Market Development	
Credits: 10	Points: 160	Credits: 12	Points: 70	Credits: 10	Points: 155

Permitting and Inspection | 20 Credits | 205 Points

Most local governments have direct oversight of the permitting and inspection policies and procedures within their jurisdiction. Communities that implement permitting best practices provide solar developers and installers with a transparent, efficient, and cost-effective approval process. Well-trained staff and completed permit applications can reduce staff time needed to review permits which allows them to focus on other priorities. Clear inspection procedures ensure compliance with applicable state and local codes while protecting public health and safety. *Many of the credits in the permitting and inspection category can be verified by providing information in a detailed permitting checklist. That publicly available document should be backed up by internal standard operating procedures that ensure a transparent and efficient permitting and inspection process.*

Planning and Zoning | 23 Credits | 185 Points

Local government planning and zoning regulations can help facilitate the rapid expansion of solar energy within a community while ensuring compliance with development standards. Communities can utilize planning and zoning regulations to provide maximum siting options for rooftop and ground-mounted solar energy while preserving community character and historic resources. Incorporating solar energy in local planning documents sets a community's vision for the integration of solar energy with other land uses. Zoning codes should contain language that provides clear and transparent regulations on the development and use of solar energy within the jurisdiction. *Many of the credits in the planning and zoning category can be verified by providing a link to a community's codes, ordinances, and community plans.*

Government Operations | 10 Credits | 160 Points

Local governments can lead the way by installing solar energy on public facilities and land. Communities can engage with their local utility to discuss goals for solar energy, net metering, interconnection, and community solar. These actions are high impact that can directly lead to more megawatts of solar energy on the local grid. *Many of the credits in the government operations category can be verified by providing documents demonstrating installed solar capacity such as news articles about solar installations, dashboards/metrics showing solar production, and contracts that demonstrate solar project construction.*

Community Engagement | 12 Credits | 70 Points

Local governments are an important and trusted source of information for residents, businesses, and solar installers. Posting information on the local government's website, providing public education, and engagement opportunities can help residents and businesses interested in solar energy make informed decisions. *Many of the credits in the community engagement category can be verified on a local government's solar webpage by providing information about a community's solar energy goals and processes in one centralized location.*

Market Development | 10 Credits | 155 Points

Local governments can collaborate and partner with organizations to promote solar development within their jurisdiction. Supporting a community solar program, promoting a solarize group-buy campaign, or partnering with a local financial institution can make solar energy more affordable and accessible for homes and businesses while improving business opportunities for solar installers. *Many of the credits in the market development category can be verified by providing news articles about the local governments role in supporting solar development or by providing official documents that established policies or programs.*

SolSmart Technical Assistance and Designation Process

Any local government, regardless of previous solar experience, is eligible for SolSmart designation.

The first step for any local government interested in pursuing SolSmart designation is to connect with one of our technical assistance providers through a consultation call. During this call, our technical assistance providers (TA provider) will describe the program and process, learn about a community's solar goals, and identify the applicable SolSmart Designation Criteria for the local government. The consultation call and all technical assistance is provided at no-cost because of a grant through the U.S. Department of Energy.

Once the local government decides to pursue SolSmart designation, they need to complete a Solar Statement and return it to a technical assistance provider. The Solar Statement demonstrates the community's commitment to work with the SolSmart team and achieve designation.

The local government then work with the TA provider to conduct a baseline assessment of the community's solar processes. This analysis helps determine how close the community is to designation and identifies what technical assistance pathway will achieve designation. After the baseline assessment, with guidance from the SolSmart team, the local government should complete any pre-requisite credits needed to achieve designation.

The local government may need to complete additional credits to be ready to submit for designation. In this case, the credits should balance recommendations from the SolSmart team and credits of interest to the local government.

Once the necessary credits are completed, the local government is ready to submit for designation review. The TA provider can assist the local government with the submission process through SolSmart's website. The submission is reviewed by the Designation Program Administrator within 10 business days and the local government is notified of their designation by email.

Designation Criteria

Three designation criteria are available to local governments depending on what processes are within their jurisdiction.

Local governments that control permitting, inspection, planning, and zoning use the **Standard Designation Criteria**.

Local governments that do not control permitting, inspection, planning, and/or zoning use the **Modified/County Designation Criteria**. This criteria is appropriate for certain counties that do not have control over one or more of those processes.

Regional organizations are eligible for SolSmart designation. Multi-jurisdictional organizations such as regional councils or councils of government use the **Regional Organization Designation Criteria**.

Local governments are encouraged to celebrate and publicize their designations. The designation email contains a Designation Toolkit with template press release, sample social media, and SolSmart Designation logos. SolSmart will also recognize local governments on the SolSmart website, on social media, and in the SolSmart newsletter.

SolSmart Definitions to Know

SolSmart - A national designation and technical assistance program. SolSmart recognizes local governments that have taken key steps to address barriers to solar energy and provides no-cost technical assistance to accelerate the development of local solar energy markets.

SolSmart Designation Program Administrators – A team of organizations that maintains the SolSmart Criteria, conducts designation reviews, awards designation.

SolSmart Technical Assistance Providers – A team of organizations that provide assistance to local governments pursuing SolSmart designation.

SolSmart Designation Criteria – A standardized collection of best practices that local governments can implement which aim to accelerate the development of local solar markets. SolSmart provides three Designation Criteria – Standard, Modified/County, and Regional Organization.

SolSmart Credit – A specific action that local governments can implement to encourage solar energy development in their community. SolSmart credits may include policies, processes, or programs that implement solar best practices. Each credit has a corresponding point value ranging from 5 to 20.

SolSmart Credit Overview

The SolSmart Designation Criteria is comprised of 75 credits organized into 5 Categories. Each credit is specific action that local governments can implement to encourage solar energy development in their community. Each credit has a corresponding point value ranging from 5 to 20.

Credit Identifier	Credit Points	Program Participation Pre-requisite Credit
PR-1	Req'd	Provide a document that demonstrates your local government's commitment to pursue SolSmart designation.

Credit Identifier	Credit Points	Permitting and Inspection Credits
PI-1	Req'd	Post an online checklist detailing the required permit(s), submittals, and steps of your community's permitting process for small rooftop solar PV. (Required for Bronze)
PI-2	10	Train permitting staff on best practices for permitting solar PV and/or solar and storage systems. Training must have occurred in the past five years. (Required for Silver).
PI-3	10	Train inspection staff on best practices for inspecting solar PV and/or solar and storage systems. Training must have occurred within the past five years. (Required for Silver).
PI-4	20	Post an online statement confirming a three-business day turnaround time for small rooftop solar PV. (Required for Gold)
PI-5	5	Distinguish between solar PV systems qualifying for streamlined and standard permit review.
PI-6	5	Require no more than one permit application form for a small rooftop solar PV system.
PI-7	10	Adopt a standard solar PV permit application form aligned with best practices (e.g. Solar ABCs).
PI-8	20	Provide an online process for solar PV permit submission and approval.
PI-9	20	Exempt or waive fees for residential solar PV permit applications.
PI-10	5	Demonstrate that residential permit fees for solar PV are $500 or less.
PI-11	10	Demonstrate that commercial permit fees for solar PV are based on cost-recovery and capped at a reasonable level so fees do not become a net revenue source. (e.g. fees cover the cost of the staff time required to review and process the permit application).

PI-12	10	Post solar PV inspection requirements online, including the inspection process and what details inspectors will review.
PI-13	10	Require no more than two inspections for small rooftop solar PV.
PI-14	10	Offer inspection appointment times in lieu of appointment windows for solar PV.
PI-15	10	Provide an online process for solar PV inspection scheduling.
PI-16	10	Train fire and safety staff on solar PV and/or solar and storage systems. Training must have occurred in the past five years.
PI-17	10	Train fire and safety staff on specific plans and procedures for responding to an emergency at a large-scale solar PV system within the jurisdiction. (This may include a walk-through of the site, coordinated with the project's owner/operator).
PI-18	10	Share site specific solar PV and/or solar and storage permit data, including addresses, with first responders and their departments. (e.g. through software that allows users to view searchable, filterable data about a specific site and system).
PI-19	10	Post an online checklist detailing the required permit(s), submittals, and steps of your community's energy storage system permitting process.
PI-20	10	Post energy storage system inspection requirements online, including the inspection process and what details inspectors will review.

Credit Identifier	Credit Points	Planning and Zoning Credits
PZ-1	Req'd	Review zoning requirements and identify restrictions that intentionally or unintentionally prohibit solar PV development. Compile findings in a memo. (Required for Bronze). Examples include: height restrictions, set-back requirements, screening requirements, visibility restrictions, etc.
PZ-2	5	Present PZ-1 memo findings to planning commission or relevant body.
PZ-3	5	Draft proposed language for changes to zoning code based on PZ-1 memo and PZ-2 dialogue. Involve planners and/or local zoning experts in the creation of the draft language.
PZ-4	0	Post an online document from the Planning/Zoning Department that states accessory use solar PV is allowed by-right in all major zones. (e.g. via a zoning determination letter). (Required for Silver unless Gold Requirement PZ-5 is achieved. If PZ-5 is achieved, PZ-4 is not necessary.)
PZ-5	20	Codify in the zoning ordinance that accessory use solar PV is explicitly allowed by-right in all major zones. Zoning ordinance language should not include intentional or unintentional barriers to accessory use solar, such as limits to visibility from public rights-of-way, excessive restrictions to system size, glare studies, subjective design reviews, and neighbor consent requirements. (Required for Gold, PZ-4 is optional)
PZ-6	5	Ensure the zoning ordinance exempts rooftop solar PV from certain restrictions on accessory uses (e.g. height limits, rooftop equipment screening requirements, or other restrictions).
PZ-7	5	Ensure the zoning ordinance permits small ground-mounted solar PV as an accessory use in at least one zoning district.
PZ-8	5	Ensure the zoning ordinance exempts small ground-mounted solar PV from certain restrictions on accessory uses (e.g. setbacks, coverage or impervious surface calculations, or other restrictions).
PZ-9	5	Ensure the zoning ordinance establishes a clear regulatory pathway for large-scale solar PV (e.g. through a special use permit or through inclusion among allowed conditional uses).
PZ-10	10	Ensure the zoning ordinance includes a native perennial vegetation and/or habitat-friendly ground cover requirement or standard for large-scale solar PV.
PZ-11	5	Ensure the zoning ordinance enables co-location of solar PV with an agricultural use such as grazing, apiaries, or crops (agrivoltaics).
PZ-12	5	Ensure the zoning ordinance requires a decommissioning plan that outlines the terms and conditions for a large-scale solar PV system's proper removal at the end of its useful life cycle or in the event of cessation of operation. (The decommissioning plan may include steps to remove the system, requirements for disposal and/or recycling of system components, and restoration as needed to allow for return to agriculture or other land use).
PZ-13	5	Ensure the zoning ordinance establishes solar energy zones and/or solar overlays for large-scale solar PV.

PZ-14	10	Require new construction to be solar ready in at least one zoning district by adopting Appendix U (International Code Council), Appendix RB (International Energy Conservation Code), or another mechanism.
PZ-15	20	Codify a solar requirement for new construction and/or retrofits meeting a specific threshold, in at least one zoning district.
PZ-16	10	Provide clear guidance for the installation of solar PV on historic properties and in special overlay districts.
PZ-17	5	Post an online fact sheet that provides an overview of what zoning allows for solar PV under what conditions (e.g. types and sizes of solar systems permitted, the processes required, and other relevant information).
PZ-18	10	Train planning and zoning staff on best practices in planning and zoning for solar PV. Training must have occurred in the past five years.
PZ-19	5	Draft new or updated language and provide a timeline for the inclusion of specific solar PV goals, metrics, and/or strategies into existing and/or future plans.
PZ-20	10	Include specific solar PV goals, metrics, and/or strategies in the most current version of relevant local plans (e.g. energy plan, climate plan, comprehensive plan).
PZ-21	10	Develop a solar PV assessment that identifies all feasible sites for large-scale solar PV development within a jurisdiction.
PZ-22	10	Enable solar rights through a local solar access ordinance.
PZ-23	20	Codify in the zoning ordinance that accessory use energy storage systems are explicitly allowed by-right in all major zones.

Credit Identifier	Credit Points	Government Operations Credits
GO-1	20	Demonstrate coordination between local government inspectors and utility staff to reduce Permission to Operate timeline for solar PV.
GO-2	10	Discuss community goals for solar PV, net metering, community solar, and/or interconnection processes with the local utility and explore areas for future collaboration. Compile summary and next steps in a memo.
GO-3	10	Coordinate with regional organizations and/or local governments to engage utilities on advancing solar policies such as utility procurement of solar PV, green tariffs, and/or interconnection process improvements.
GO-4	10	Conduct feasibility analysis for solar PV on local government facilities and/or local government-controlled land.
GO-5	20	Install solar PV on local government facilities and/or local government-controlled land.
GO-6	20	Install solar PV on local government-controlled brownfields and/or under-utilized properties.
GO-7	20	Install solar PV integrated with other technologies such as combined heat and power or electric vehicle charging on local government facilities and/or local government-controlled land.
GO-8	20	Install solar PV plus storage on local government facilities and/or local government-controlled land.
GO-9	10	Require new local government facilities and/or facility retrofits meeting a specific threshold to be solar ready.
GO-10	20	Procure solar energy for municipal operations through an offsite physical PPA, virtual PPA, green tariff, or similar structure.

Credit Identifier	Credit Points	Community Engagement Credits
CE-1	10	Post a solar landing page on local government's website with information that may include the community's solar goals, educational materials and tools that promote solar, and resources for solar development (e.g. permitting checklist, application forms, zoning regulations, etc.).
CE-2	5	Post online resources about solar installers and/or solar quote platforms for solar PV.
CE-3	5	Post online resources about residential and commercial solar PV financing options and incentives.
CE-4	5	Post online resources about consumer protection and solar PV.
CE-5	5	Post an online summary of state policies related to a property owner's solar access and solar rights, including links to state-level policy.

CE-6	5	Post an online summary of state policies related to Homeowner Associations (HOAs) ability to regulate and/or restrict solar PV, including links to state-level policy.
CE-7	5	Post an online dashboard or summary of the solar PV metrics for your community.
CE-8	5	Post an online solar map for your community.
CE-9	5	Support a solar informational session and/or solar tour explaining solar PV opportunities and policies. Session/Tour must have occurred within the last 5 years.
CE-10	5	Distribute solar job training and career opportunities in coordination with local colleges and/or workforce development organizations.
CE-11	5	Demonstrate local government support for local solar projects through speeches, press releases, opinion articles, etc.
CE-12	10	Discuss solar PV goals and/or strategies for increasing solar PV development within an appropriate committee, commission, taskforce, and/or working group. (e.g. solar is a recurring agenda item during monthly sustainability commission meetings).

Credit Identifier	Credit Points	Market Development Credits
MD-1	20	Demonstrate activity in state regulatory and/or legislative proceedings regarding solar PV.
MD-2	20	Support a community-wide group purchase program (e.g. Solarize). Program must have occurred within the last 5 years.
MD-3	10	Encourage low-to-moderate income (LMI) participation in community-wide group purchase program through program design and/or financing support options.
MD-4	20	Support a community solar program.
MD-5	10	Encourage low-to-moderate income (LMI) participation in a community solar program through program design and/or financing support options.
MD-6	20	Provide residents with Community Choice Aggregation/Energy that includes solar PV as a power generation source.
MD-7	10	Provide a PACE financing program that includes solar PV as an eligible technology.
MD-8	20	Provide local incentives or locally-enabled finance (e.g. a revolving loan fund) for solar PV.
MD-9	5	Provide local incentives for solar PV to low-to-moderate income (LMI) households, Disadvantaged Business Enterprises (DBEs), and/or non-profit organizations that provide community services.
MD-10	20	Partner with financial institutions and/or foundations to offer loans, rebates, grants, or other incentives for solar PV projects. (Financial institutions could include entities such as a local or regional bank, CDFI, or credit union).

Credit Identifier	Credit Points	Innovative Action Credit
IA-1	Varies	The actions identified in the categories above represent many of the most common and impactful efforts communities are taking to make going solar easier and more affordable for residents and businesses. However, we know that communities across the country are developing innovative ways to promote and deploy solar energy. If your community has taken action that was not captured in any of the credits above, please share it with us.

How to Use the SolSmart Program Guide

The following section of the SolSmart program guide contains specific actions, called credits, that local governments and community stakeholders can implement to encourage solar energy development in their community. Each credit has a brief description, recommended verification for designation review, community examples, templates, and/or resources. A SolSmart Scorecard is available to help track progress. Please contact your TA provider for more information.

The following provides an overview of the information that is provided for each SolSmart credit.

Credit Identifier	**Credit Points**	**Credit Language**	☐
Credit Objective and description.			
Recommended Verification: • Suggested options to verify the credit.			
Community Examples: • Examples of how an individual community has completed the credit.			
Templates: • Links to a template(s) that can help complete a credit.			
Resources: • Links to useful websites, reports, guidebooks, etc. that have up-to-date information about the topics addressed by the credit			

Solar Statement

PR-1	**Req'd**	**Provide a document that demonstrates your local government's commitment to pursue SolSmart designation.**	☐
Local governments interested in pursuing SolSmart designation must indicate their commitment to supporting solar development in their community by completing the PR-1 Solar Statement Pre-requisite. The solar statement should be signed by an individual who can speak on behalf of the local government. It is preferred that the statement is signed by a Department executive or an elected official, but it does not need to go through an official approval process. The solar statement demonstrates your community's commitment to pursue SolSmart designation. If possible, please place the solar statement on your local government's letterhead. The solar statement should address the items listed in the bullets below. The statement does not need to be more than one page in length.			
The solar statement should include: • A commitment to participate in the SolSmart designation process • A statement of solar goals, areas of focus or community priorities (e.g. streamlining the permitting process or supporting a non-profit led solar initiative) • Past achievements or programs related to solar PV and/or renewable energy • A commitment to tracking metrics related to solar PV and/or provide a benchmark of available solar metrics (e.g. the number of installed systems, capacity, growth in residential installations, etc.) • A commitment of staff time and resources to improve the local market for solar PV			
Community Examples: • Fitchburg, WI | SolSmart Bronze • Pulaski County, VA | SolSmart Gold			
Templates: • PR-1 SolSmart Solar Statement Template | SolSmart			

Permitting and Inspection

PI-1	Req'd	Post an online checklist detailing the required permit(s), submittals, and steps of your community's permitting process for small rooftop solar PV. (Required for Bronze)	☐

Providing a set of requirements for the local solar permitting process (for both residential and commercial solar) on an easy-to-find local government webpage represents a major step toward overcoming informational barriers. An online solar permit checklist can be a simple way for a community to accelerate permit approval timelines and save staff time by reducing the number of inquiries received from solar installers and requests for additional information associated with incomplete permit applications. Such checklists typically detail all the plans and forms required for approval and system design requirements.

Recommended Verification:

- Provide a link to the online solar PV permitting checklist.

Community Examples:

- Chapel Hill, NC | SolSmart Gold
- Philadelphia, PA | SolSmart Gold

Templates:

- PI-1 SolSmart Solar Permitting Checklist Template | SolSmart
- California Solar Permitting Guidebook (4th Edition) (pg. 22-24)

Resources:

- Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting | Interstate Renewable Energy Council (IREC)
- Simplifying the Solar Permitting Process: Residential Solar Permitting Best Practices Explained | Interstate Renewable Energy Council (IREC)
- Solar PV Construction: Codes, Permitting, and Inspection | SolSmart's Toolkit for Local Governments

PI-2	10	Train permitting staff on best practices for permitting solar PV and/or solar and storage systems. Training must have occurred in the past five years. (Required for Silver)	☐

Regular solar PV training, at least every few years, is a best practice to ensure permit technicians and plan reviewers are up-to-date on new procedures, codes, and products within the solar industry. Trainings increase staff knowledge of solar energy systems and ensures they know the best procedures for permit application review and processing to ensure applications and supporting documents are compliant with building and electrical codes. Increased staff knowledge can improve processing efficiency, thereby reducing demands on staff time and resources. Local governments can require staff to attend full or half-day workshops (either live or online) and provide resources designed to help keep staff informed about advances in solar and storage technologies.

Recommended Verification:

- Provide a memo with details about the permit training including name of training, name of trainer, attendees (name, title, department), date and time, location, agenda, and presentation/slides.

Templates:

- PI-2 SolSmart Solar Permit Training Template Memo | SolSmart

Resources:

- SolSmart Workshop: Best Practices for Solar PV Permitting and Inspection (session 1, permitting I) | SolSmart and Bill Brooks, P.E.
- SolSmart Workshop: Best Practices for Solar PV Permitting and Inspection (session 2, permitting II) | SolSmart and Bill Brooks, P.E.
- SolSmart Workshop: Best Practices for Solar PV Permitting and Inspection (session 3, inspection) | | SolSmart and Bill Brooks, P.E.
- Solar + Storage, A Guide for Local Governments | SolSmart Webinar

PI-3	10	Train inspection staff on best practices for inspecting solar PV and/or solar and storage systems. Training must have occurred within the past five years. (Required for Silver).	☐

Regular solar PV training, at least every few years, is a best practice to ensure field inspectors are up-to-date on new procedures, codes, and products within the solar industry. Trainings increase staff knowledge of solar energy systems and ensures they know the best procedures for field inspections to ensure compliance with applicable state and local building and electrical codes. Increased staff knowledge can improve inspection efficiency, thereby reducing demands on staff time and resources. Local governments can require staff to attend full or half-day workshops (either live or online) and provide resources designed to help keep staff informed about advances in solar and storage technologies.

Recommended Verification:

- Provide a memo with details about the inspection training including name of training, name of trainer, attendees (name, title, department), date and time, location, agenda, and presentation/slides.

Templates:

- PI-3 SolSmart Solar Inspection Training Template Memo | SolSmart

Resources:

- Solar PV Field Inspection Basics - Series | Interstate Renewable Energy Council (IREC)
- SolSmart Workshop: Best Practices for Solar PV Permitting and Inspection (session 1, permitting I) | SolSmart and Bill Brooks, P.E.
- SolSmart Workshop: Best Practices for Solar PV Permitting and Inspection (session 2, permitting II) | SolSmart and Bill Brooks, P.E.
- SolSmart Workshop: Best Practices for Solar PV Permitting and Inspection (session 3, inspection) | SolSmart and Bill Brooks, P.E.
- Solar + Storage, A Guide for Local Governments | SolSmart Webinar

PI-4	20	Post an online statement confirming a three-business day turnaround time for small rooftop solar PV. (Required for Gold)	☐

Implementing a streamlined permitting process for small-scale solar PV systems (≤10-15 kW) along with other efforts increase process efficiency and reduce permit turnaround times can result in significant time and cost savings for staff, solar installers, and solar customers.

Recommended Verification:

- Provide a link to a webpage outlining a permitting pathway for small PV systems of less than three days.

Community Examples:

- Alexandria, VA |SolSmart Gold
- Roseville, MN | SolSmart Gold

Templates:

- PI-1 SolSmart Solar Permitting Checklist Template | SolSmart
- California Solar Permitting Guidebook (4th Edition) (pg. 22-24)

Resources:

- SolSmart Permitting Checklist Guidance | SolSmart
- Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting | Interstate Renewable Energy Council (IREC)
- Simplifying the Solar Permitting Process: Residential Solar Permitting Best Practices Explained | Interstate Renewable Energy Council (IREC)
- Solar PV Construction: Codes, Permitting, and Inspection | SolSmart's Toolkit for Local Governments

PI-5	5	Distinguish between solar PV systems qualifying for streamlined and standard permit review.	☐

Recognizing the relative simplicity and similarities of small-scale solar photovoltaic (PV) systems (≤10-15 kW in size) can allow local jurisdictions to establish processes to expedite review and approval of these systems while maintaining its commitment to ensuring public safety. Establishing a separate, streamlined process for small-scale PV systems based on proven national best practices can reduce the time required to review and approve qualifying applications, saving time and money both for the local government and the solar customer.

Recommended Verification:

- Provide a link to a document or web page outlining a streamlined and standard permit review policy.
- Provide details in an e-mail or other written documentation from a permitting official or staff member describing the policy is also acceptable.

Community Examples:

- Philadelphia, PA | SolSmart Gold
- Putnam County, GA | SolSmart Silver

Templates:

- PI-1 SolSmart Solar Permitting Checklist Template | SolSmart
- Simplified Solar Permitting Process | SolSmart
- Expedited Permit Process for PV Systems | Solar ABCs

Resources:

- Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting | Interstate Renewable Energy Council (IREC)
- Simplifying the Solar Permitting Process: Residential Solar Permitting Best Practices Explained | Interstate Renewable Energy Council (IREC)
- Solar PV Construction: Codes, Permitting, and Inspection | SolSmart's Toolkit for Local Governments

PI-6	5	Require no more than one permit application form for a small rooftop solar PV system.	☐

Since rooftop solar energy systems impact both the structural and electrical aspects of the buildings on which they are installed, many local jurisdictions require both building and electrical permits. However, residential rooftop systems with minimal structural impacts can be safely permitted without a building permit application. Relevant design aspects for systems qualifying for only one application form include (but are not limited to): mounting system features, static and dynamic loads of the system, type of roofing material and waterproofing methods, and compliance with zoning and fire codes.

Recommended Verification:

- Provide a link to the permit application form used for small rooftop solar PV systems.

Community Examples:

- Berkeley, CA | SolSmart Gold
- Fitchburg, WI | SolSmart Bronze

Templates:

- Best Management Practices for Solar Installation Policy | Mid America Regional Council (MARC)
- New York State Unified Solar Permit Application | New York State Energy and Research Development Authority (NYSERDA)

Resources:

- Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting | Interstate Renewable Energy Council (IREC)
- Simplifying the Solar Permitting Process: Residential Solar Permitting Best Practices Explained | Interstate Renewable Energy Council (IREC)
- Solar PV Construction: Codes, Permitting, and Inspection | SolSmart's Toolkit for Local Governments

PI-7	10	Adopt a standard solar PV permit application form aligned with best practices (e.g. Solar ABCs).	☐

While requiring a single application form under existing permitting processes represents an improvement over requiring both a building and electrical permit, it may still be more time consuming to complete, review, and approve permits via a process not specifically designed for solar. Developing a solar-specific permit (or combining building and electrical permits with revisions to collect information unique to solar energy systems) and posting application materials online can save time and money for both those completing the forms (and their customers) and the local government staff reviewing and approving these applications.

Recommended Verification:

- Provide a link to the standard solar PV permit application form.

Community Examples:

- Evanston, IL | SolSmart Gold
- Salt Lake City, UT | SolSmart Bronze

Templates:

- Best Management Practices for Solar Installation Policy | Mid America Regional Council (MARC)
- New York State Unified Solar Permit Application | New York State Energy and Research Development Authority (NYSERDA)
- Simplified Solar Permitting Process | SolSmart

Resources:

- Expedited Permit Process for PV Systems | Solar ABCs
- Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting | Interstate Renewable Energy Council (IREC)

- Simplifying the Solar Permitting Process: Residential Solar Permitting Best Practices Explained | Interstate Renewable Energy Council (IREC)
- Solar PV Construction: Codes, Permitting, and Inspection | SolSmart's Toolkit for Local Governments

PI-8	20	Provide an online process for solar PV permit submission and approval.	☐

Online permit submittal, review, and approval can eliminate solar installer trips to the permitting office and reduce the amount of time permitting staff need to spend entering information from paper application forms into an online database. Online systems can also ensure all required information is submitted prior to any review, saving staff time by ensuring only completed applications are reviewed. Online permit platforms can allow for multiple staff to review materials at the same time and to track progress in the review and approval process.

Recommended Verification:

- Provide a link to the online platform for submission and approval.
- If an email-based online process is used:
  1) Provide details from building official or staff describing the process.
  2) Provide a copy of a sample email with personal and confidential information removed.

Community Examples:

- Madison, WI | SolSmart Gold
- Missoula County, MT | SolSmart Silver

Templates:

- Several software providers have integrated the solar PV permit application process into their online systems.

Resources:

- Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting | Interstate Renewable Energy Council (IREC)
- Simplifying the Solar Permitting Process: Residential Solar Permitting Best Practices Explained | Interstate Renewable Energy Council (IREC)
- Solar PV Construction: Codes, Permitting, and Inspection | SolSmart's Toolkit for Local Governments

PI-9	20	Exempt or waive fees for residential solar PV permit applications.	☐

In addition to state and federal incentives, local governments can also incentivize solar development within their jurisdictions. Exempting or waiving permit fees for solar energy systems can incentivize community members to install solar by lowering the overall cost of the system.

Recommended Verification:

- Provide a link to the permit fee schedule or other officially approved document that shows solar PV permit fees are exempt or waived.

Community Examples:

- Coral Gables, FL | SolSmart Bronze
- Superior, CO | SolSmart Bronze

Resources:

- Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting | Interstate Renewable Energy Council (IREC)
- Simplifying the Solar Permitting Process: Residential Solar Permitting Best Practices Explained | Interstate Renewable Energy Council (IREC)
- Solar PV Construction: Codes, Permitting, and Inspection | SolSmart's Toolkit for Local Governments

PI-10	5	Demonstrate that residential permit fees for solar PV are $500 or less.	☐

Many local governments permit solar systems through existing permitting processes and permit fees for solar are often calculated according to value-based methods typically associated with building permits (where the fee is a certain percentage of the overall project cost). Due to the higher cost of solar installations relative to comparable projects, fees calculated by a value-based method can become expensive and exceed the cost of the staff time required to review and issue the permits. For residential systems, capping solar permit fees under $500 or establishing a flat fee, can ensure permit fees cover staff costs without unnecessarily increasing project costs.

Recommended Verification:

- Provide a link to the permit fee schedule or a document that outlines the permit fees applied to a solar installation.

Community Examples:
- Naperville, IL | SolSmart Silver
- Sacramento, CA | SolSmart Gold

Templates:
- PI-10 SolSmart Solar Residential Fees Template Memo | SolSmart
- PI-1 SolSmart Solar Permitting Checklist Template | SolSmart

Resources:
- Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting | Interstate Renewable Energy Council (IREC)
- Simplifying the Solar Permitting Process: Residential Solar Permitting Best Practices Explained | Interstate Renewable Energy Council (IREC)
- Solar PV Construction: Codes, Permitting, and Inspection | SolSmart's Toolkit for Local Governments

PI-11	10	Demonstrate that commercial permit fees for solar PV are based on cost-recovery and capped at a reasonable level so fees do not become a net revenue source. (e.g. fees cover the cost of the staff time required to review and process the permit application).	☐

Many local governments permit solar systems through existing permitting processes and permit fees for solar are often calculated according to value-based methods typically associated with building permits (where the fee is a certain percentage of the overall project cost). Due to the higher cost of solar installations relative to comparable projects, fees calculated by a value-based method can become expensive and exceed the cost of the staff time required to review and issue the permits. For commercial systems, basing fees on a cost-recovery method can ensure permit fees cover staff costs without unnecessarily increasing project costs.

Recommended Verification:
- Provide a link to the permit fee schedule or a document that outlines the permit fees applied to a solar installation.
- Provide a narrative that explains the costs incurred in processing the permits (this should include estimates of the amount of staff hours for each stage of the process and the hourly cost of staff time). This narrative should show that the fee is not significantly higher than these costs.

Community Examples:
- Naperville, IL | SolSmart Silver
- Sacramento, CA | SolSmart Gold

Templates:
- PI-11 SolSmart Solar Commercial Fees Template Memo | SolSmart
- PI-1 SolSmart Solar Permitting Checklist Template | SolSmart

Resources:
- Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting | Interstate Renewable Energy Council (IREC)
- Simplifying the Solar Permitting Process: Residential Solar Permitting Best Practices Explained | Interstate Renewable Energy Council (IREC)
- Solar PV Construction: Codes, Permitting, and Inspection | SolSmart's Toolkit for Local Governments

PI-12	10	Post solar PV inspection requirements online, including the inspection process and what details inspectors will review.	☐

Providing an online list of inspection requirements will reduce informational barriers between inspectors and solar installers, helping to ensure that all items in the inspection process have been adequately addressed before inspectors arrive on site. These checklists can be used to highlight "common mistakes" made by installers.

Recommended Verification:
- Provide a link to the online document outlining the inspection process and requirements.

Community Examples:
- Camden County, NJ | SolSmart Bronze
- Ramsey County, MN | SolSmart Bronze

Templates:
- PI-12 SolSmart Rooftop Solar Photovoltaic (PV) System Field Inspection Checklist | SolSmart
- Model Inspection Checklist for Residential Rooftop PV | Interstate Renewable Energy Council (IREC)
- Field Inspection Checklist | New York State Energy and Research Development Authority (NYSERDA)

Resources:

- Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting | Interstate Renewable Energy Council (IREC)
- Simplifying the Solar Permitting Process: Residential Solar Permitting Best Practices Explained | Interstate Renewable Energy Council (IREC)
- Solar PV Construction: Codes, Permitting, and Inspection | SolSmart's Toolkit for Local Governments

PI-13	10	Require no more than two inspections for small rooftop solar PV.	☐

Inspections of standard rooftop solar energy systems installed on existing homes should be consolidated into a single inspection trip. Any inspections should be limited to the electrical, structural, and fire safety aspects of the system; excessive reviews add to the time and cost of the inspection process while doing little to ensure system efficiency or further protect public health or safety. Building and Fire Authorities can enter into agreements allowing for a single agency to conduct all inspections for systems meeting certain design standards.

Recommended Verification:

- Provide details about the solar PV inspection process that includes information on the type of inspections (and which departments are involved) and total number inspection trips required.

Community Examples:

- Lake in the Hills, IL | SolSmart Gold
- South St. Paul, MN | SolSmart Bronze

Templates:

- PI-1 SolSmart Solar Permitting Checklist Template | SolSmart
- Model Inspection Checklist for Residential Rooftop PV | Interstate Renewable Energy Council (IREC)
- Field Inspection Checklist | New York State Energy and Research Development Authority (NYSERDA)

Resources:

- Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting | Interstate Renewable Energy Council (IREC)
- Simplifying the Solar Permitting Process: Residential Solar Permitting Best Practices Explained | Interstate Renewable Energy Council (IREC)
- Solar PV Construction: Codes, Permitting, and Inspection | SolSmart's Toolkit for Local Governments

PI-14	10	Offer inspection appointment times in lieu of appointment windows for solar PV.	☐

Though inspections of standard rooftop solar PV systems can take as little as 30 minutes to complete, inspection appointment windows can be up to four or more hours long. Replacing appointment windows with scheduled appointment times will ensure the inspector and installer are both prepared for the inspection to occur when they arrive on site. This can save time and money for both the local government and the installer (and for solar customers as well).

Recommended Verification:

- Provide details about the solar PV inspection process that includes information on inspection appointment times and how to request an appointment.

Community Examples:

- Coventry, CT | SolSmart Gold
- Pulaski County, VA | SolSmart Gold

Templates:

- PI-1 SolSmart Solar Permitting Checklist Template | SolSmart

Resources:

- Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting | Interstate Renewable Energy Council (IREC)
- Simplifying the Solar Permitting Process: Residential Solar Permitting Best Practices Explained | Interstate Renewable Energy Council (IREC)
- Solar PV Construction: Codes, Permitting, and Inspection | SolSmart's Toolkit for Local Governments

PI-15	10	Provide an online process for solar PV inspection scheduling.	☐

Similar to online permit submittal, review, and approval processes, an online option for scheduling and managing inspection requests can promote process efficiency and reduce demands on time and resources for local government staff.

Recommended Verification:

- Provide a link to the online platform for inspection scheduling.
- If an email-based online process is used:
  1) Provide details from building official or staff describing the process.
  2) Provide a copy of a sample email with personal and confidential information removed.

Community Examples:

- Prince George's County, MD | Not Designated
- San Leandro, CA | SolSmart Bronze

Templates:

- Several software providers have integrated the solar PV inspection request process into their online systems.

Resources:

- Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting | Interstate Renewable Energy Council (IREC)
- Simplifying the Solar Permitting Process: Residential Solar Permitting Best Practices Explained | Interstate Renewable Energy Council (IREC)
- Solar PV Construction: Codes, Permitting, and Inspection | SolSmart's Toolkit for Local Governments

PI-16	10	**Train fire and safety staff on solar PV and/or solar and storage systems. Training must have occurred in the past five years.**	☐

Regular solar PV training, at least every few years, is a best practice to ensure firefighters and first responders are up-to-date on new procedures, codes, and products within the solar industry. Though fires caused by rooftop solar PV systems are extremely rare, firefighters responding to fires caused by other means need to take special precautions when a solar PV system is present. Training fire safety staff on how to identify and avoid potential hazards can help ensure the safety of first responders and reduce misconceptions or discomfort around increased solar deployment.

Recommended Verification:

- Provide a memo with details about the fire and safety staff training including name of training, name of trainer, attendees (name, title, department), date and time, location, agenda, and presentation/slides.

Templates:

- PI-16 SolSmart Solar Fire Training Template Memo | SolSmart

Resources:

- Photovoltaic (PV) Systems | National Fire Protection Association (NFPA)
- Solar + Storage, A Guide for Local Governments | SolSmart Webinar
- Solar PV Safety for Firefighters | Interstate Renewable Energy Council (IREC)

PI-17	10	**Train fire and safety staff on specific plans and procedures for responding to an emergency at a large-scale solar PV system within the jurisdiction. (This may include a walk-through of the site, coordinated with the project's owner/operator).**	☐

Though fires and other emergencies at large-scale solar PV systems are extremely rare, fire and safety staff should partner with a large-scale solar system owner/operator to ensure first responders have a standard operating procedure (SOP) outlining how to address a fire or rescue operation at the large-scale solar project. The solar system owner/operator should work with fire responder to ensure SOPs are established and that the fire and safety staff have received any necessary training. Along with a basic understanding of solar PV and fire safety, firefighters and safety staff should be familiar with the project site and characteristics, including where to enter the site, location of system components, if battery storage is present at the site, and proper shutdown procedures. First responders should also know key points of contact for the project in case of an emergency.

Recommended Verification:

- Provide a memo with details about emergency response plans and procedures.
- Provide a link to the requirement in the community's code of ordinances.

Community Examples:

- Putnam County, GA (e,9) | SolSmart Silver
- York, ME (pg. 178 – f,3) | Not Designated

Templates:

- PI-17 SolSmart Solar Large-scale Training Template Memo | SolSmart

Resources:
- Fire Fighter Safety and Emergency Response for Solar Power Systems | The Fire Protection Research Foundation
- Solar PV Safety for Firefighters | Interstate Renewable Energy Council (IREC)

PI-18	10	Share site specific solar PV and/or solar and storage permit data, including addresses, with first responders and their departments. (e.g. through software that allows users to view searchable, filterable data about a specific site and system).	☐

Fire and safety staff can benefit from having access to the locations of permitted solar PV systems. This gives fire departments advanced knowledge about homes or business that have on-site solar and allows them to development a plan before arriving onsite.

Recommended Verification:
- Provide details about the process for information sharing, including how fire and safety staff received the data.
- Provide a link to the platform that allows fire and safety staff to access the data.

Community Examples:
- Adams County, CO | SolSmart Gold
- Freeport, IL | SolSmart Gold

Resources:
- Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting | Interstate Renewable Energy Council (IREC)
- Simplifying the Solar Permitting Process: Residential Solar Permitting Best Practices Explained | Interstate Renewable Energy Council (IREC)
- Solar PV Construction: Codes, Permitting, and Inspection | SolSmart's Toolkit for Local Governments
- Solar PV Safety for Firefighters | Interstate Renewable Energy Council (IREC)

PI-19	10	Post an online checklist detailing the required permit(s), submittals, and steps of your community's energy storage system permitting process.	☐

Providing a set of requirements for the local energy storage permitting process (for both residential and commercial solar) on an easy-to-find local government web page represents a major step toward overcoming informational barriers. An online energy storage permit checklist can be a simple way for a community to accelerate permit approval timelines and save staff time by reducing the number of inquiries received from energy storage installers and requests for additional information associated with incomplete permit applications. Such checklists typically detail all the plans and forms required for approval and system design requirements.

Recommended Verification:
- Provide link to online permitting checklist for energy storage systems.

Community Examples:
- Rocklin, CA | Not Designated
- Sonoma, CA | Not Designated

Templates:
- Battery Energy Storage System Model Permit | New York State Energy and Research Development Authority (NYSERDA)
- Storage Battery System Requirements | Sustainable Energy Action Committee (SEAC)

Resources:
- Solar + Storage, A Guide for Local Governments | SolSmart Webinar

PI-20	10	Post energy storage system inspection requirements online, including the inspection process and what details inspectors will review.	☐

Providing an online list of inspection requirements will reduce informational barriers between inspectors and energy storage installers, helping to ensure that all items in the inspection process have been adequately addressed before inspectors arrive on site. These checklists can be used to highlight "common mistakes" made by installers.

Recommended Verification:
- Provide a link to the online document outlining the inspection process and requirements.

Community Examples: • Palo Alto, CA | Not Designated
Templates: • Battery Energy Storage System Electrical Checklist | New York State Energy and Research Development Authority (NYSERDA) • Storage Battery System Requirements | Sustainable Energy Action Committee (SEAC)
Resources: • Solar + Storage, A Guide for Local Governments | SolSmart Webinar

Planning and Zoning

PZ-1	**Req'd**	**Review zoning requirements and identify restrictions that intentionally or unintentionally prohibit solar PV development. Compile findings in a memo. (Required for Bronze).** **Examples include: height restrictions, set-back requirements, screening requirements, visibility restrictions, etc.**	☐
A community's zoning ordinance and land use regulations create statutory limits on what individuals may do with their property as a matter of right and often provides additional processes to consider special exceptions. Land use regulations			

often contain use standards that provide additional requirements for certain types of development. Local governments should be aware of any restrictions that could intentionally or unintentionally prohibit solar energy development within their community and consider removing those barriers to promote easier and more equitable solar deployment. Often, removing restrictive zoning language can save property owners time and money because they can avoid going through a more extensive process to have their solar system considered.
Recommended Verification: • Provide a signed SolSmart Zoning Review Memo.
Community Examples: • Framingham, MA | SolSmart Silver
Templates: • SolSmart Zoning Review Template | SolSmart
Resources: • Planning for Solar Energy | American Planning Association (APA) • Planning, Zoning & Development | SolSmart's Toolkit for Local Governments

PZ-2	5	Present PZ-1 memo findings to planning commission or relevant body.	☐
The zoning ordinance review memo can be the starting point for ordinance amendments to remove barriers to solar or add language that could promote development. Presenting the findings of the memo to a relevant commission or body can start conversations about updates to solar energy regulations within the community. If the relevant commission or body is interested in updating the zoning ordinance, they can direct staff to draft recommendations.			
Recommended Verification: • Provide meeting minutes, meeting agenda, or materials prepared for the meeting (e.g., handouts and slides) that demonstrate a discussion about the zoning review.			
Community Examples: • Lewisville, TX | SolSmart Bronze			
Resources: • Planning for Solar Energy | American Planning Association (APA) • Planning, Zoning & Development | SolSmart's Toolkit for Local Governments			

PZ-3	5	Draft proposed language for changes to zoning code based on PZ-1 memo and PZ-2 dialogue. Involve planners and/or local zoning experts in the creation of the draft language.	☐
A local government interested in enabling solar energy development should consider including basic solar information in the zoning ordinance such as a purpose, definitions, clarification on accessory use and primary use solar, and use standards. Zoning codes that contain no or little information about solar energy can complicate the process for homes and business that want to install a solar energy system. Including basic information about solar energy improves transparency of processes and clarity of development requirements and can enhance the growth of the local solar market in an organized and efficient manner.			
Recommended Verification: • Provide draft language of the proposed zoning ordinance changes that relate to solar energy.			
Community Examples: • Coming Soon			
Templates: • Model Zoning for the Regulation of Solar Energy Systems | Massachusetts Department of Energy Resources • Renewable Energy Ordinance Framework: Solar PV | Delaware Valley Regional Planning Commission (DVRPC)			
Resources: • Planning for Solar Energy | American Planning Association (APA) • Planning, Zoning & Development | SolSmart's Toolkit for Local Governments			

PZ-4	0	Post an online document from the Planning/Zoning Department that states accessory use solar PV is allowed by-right in all major zones. (e.g. via a zoning determination letter). (Required for Silver unless Gold Requirement PZ-5 is achieved. If PZ-5 is achieved, PZ-4 is not necessary.)	☐
Including solar energy in the zoning ordinance provides the highest level of policy certainty and clarity. A zoning ordinance change that codifies accessory use solar as an allowed or by-right use is a best-case scenario. However, this may be			

impractical or politically difficult to achieve in the short term, or outside of a zoning update cycle. Instead of an ordinance change, local governments may write and publish a zoning determination letter clarifying that accessory use solar is an allowed or by-right use in all major zones. This clarification removes uncertainty and can increase solar adoption and lower costs for residents and businesses.

Recommended Verification:

- Provide a link to an online document (and the parent webpage) that clarifies that accessory solar PV is an allowed or by-right use in all major zones.
- This document should:
  1) show that the process does not involve staff discretion, special permits, conditional permits, use permits, or variances
  2) have language that demonstrates its applicability in all major zones
  3) be made public

Community Examples:

- Egg Harbor, WI | SolSmart Silver
- South Miami, FL | SolSmart Silver

Resources:

- Planning for Solar Energy | American Planning Association (APA)
- Planning, Zoning & Development | SolSmart's Toolkit for Local Governments

PZ-5	20	Codify in the zoning ordinance that accessory use solar PV is explicitly allowed by-right in all major zones. Zoning ordinance language should not include intentional or unintentional barriers to accessory use solar, such as limits to visibility from public rights-of-way, excessive restrictions to system size, glare studies, subjective design reviews, and neighbor consent requirements. (Required for Gold, PZ-4 is optional)	☐

A community's zoning ordinance and land use regulations create statutory limits on what individuals may do with their property as a matter of right. Zoning often provides additional processes, which can be long and costly, to consider special exceptions when a proposal is inconsistent with current land use regulations. Codifying solar as an accessory use and as an allowed or by-right use in all major zoning categories provides policy certainty and clarity which can promote easier and more equitable solar deployment. It can increase solar development and save property owners time and money because they can avoid going through a more extensive process to have their solar system considered.

Recommended Verification:

- Provide a link to the zoning ordinance or land use regulations that codify solar as an accessory use and allowed or by-right use. Please indicate the relevant section(s).

Community Examples:

- Brownsville, TX | SolSmart Silver
- Pinecrest, FL | SolSmart Silver

Templates:

- Georgia's Model Solar Ordinance | Georgia Tech Strategic Energy Institute
- Model Solar Energy Local Law (NY) | New York State Energy Research and Development Authority (NYSERDA)
- Model Zoning for the Regulation of Solar Energy Systems | Massachusetts Department of Energy Resources
- Renewable Energy Ordinance Framework: Solar PV | Delaware Valley Regional Planning Commission (DVRPC)
- Solar Model Ordinance | Grow Solar Toolkit
- Template Solar Energy Development Ordinance for North Carolina | North Carolina Clean Energy Technology Center (NCCETC)

Resources:

- Best Practices in Zoning for Solar | National Renewable Energy Laboratory (NREL)
- Planning for Solar Energy | American Planning Association (APA)
- Planning, Zoning & Development | SolSmart's Toolkit for Local Governments

PZ-6	5	Ensure the zoning ordinance exempts rooftop solar PV from certain restrictions on accessory uses (e.g. height limits, rooftop equipment screening requirements, or other restrictions).	☐

Height restrictions are often imposed on buildings within specific zoning districts to satisfy several planning objectives such as protection of views, controlling neighborhood character, density, and access to sunlight. In many districts, buildings are constructed up to the maximum allowed height. Many local governments exempt antennas, chimneys, flagpoles from height limits to allow for their placement and use. Since solar panels are most efficient when installed at an angle equal to a location latitude, local governments should consider adding solar to the list of height exemptions.

Recommended Verification:

- Provide a link to the zoning ordinance or land use regulations that exempts rooftop solar PV from certain restrictions on accessory uses. Please indicate the relevant section(s).

Community Examples:

- Brownsville, TX | SolSmart Silver
- Plymouth, IN (pg. 204, 210 D.2.a) | SolSmart Gold

Templates:

- Model Zoning for the Regulation of Solar Energy Systems | Massachusetts Department of Energy Resources
- Renewable Energy Ordinance Framework: Solar PV | Delaware Valley Regional Planning Commission (DVRPC)

Resources:

- Planning for Solar Energy | American Planning Association (APA)
- Planning, Zoning & Development | SolSmart's Toolkit for Local Governments

PZ-7	**5**	**Ensure the zoning ordinance permits small ground-mounted solar PV as an accessory use in at least one zoning district.**	☐

Sometimes a property is not suitable for rooftop solar because the building has structural limitations, or the rooftop is shaded. In this case, a small ground-mounted solar PV system can still allow the property owner to install solar and enjoy the benefits. Permitting or allowing small ground-mounted solar PV as an accessory use in at least one zoning districts can promote easier and more equitable solar deployment. It can increase solar development and save property owners time and money because they can avoid going through a more extensive process to have their solar system considered.

Recommended Verification:

- Provide a link to the zoning ordinance or land use regulations that allows small ground-mounted solar PV as an accessory use. Please indicate the relevant section(s).

Community Examples:

- Philadelphia, PA | SolSmart Gold
- La Crescent, MN | SolSmart Bronze

Templates:

- Model Zoning for the Regulation of Solar Energy Systems | Massachusetts Department of Energy Resources
- Renewable Energy Ordinance Framework: Solar PV | Delaware Valley Regional Planning Commission (DVRPC)

Resources:

- Best Practices in Zoning for Solar | National Renewable Energy Laboratory (NREL)
- Planning for Solar Energy | American Planning Association (APA)
- Planning, Zoning & Development | SolSmart's Toolkit for Local Governments

PZ-8	**5**	**Ensure the zoning ordinance exempts small ground-mounted solar PV from certain restrictions on accessory uses (e.g. setbacks, coverage or impervious surface calculations, or other restrictions).**	☐

Small ground-mounted solar PV that is considered an accessory use may be subject to certain restrictions such as setbacks, lot coverage, and impervious surface ratios. These types of regulations are normally applied to accessory structures like sheds, garages, or accessory dwelling units which can have a greater impact on neighbors when built up against a lot line or covering a larger percentage of the lot. Solar is less obtrusive and contains pervious surfaces underneath the panels and it can be exempted from certain restrictions to promote easier and more equitable solar deployment.

Recommended Verification:

- Provide a link to the zoning ordinance or land use regulations that exempts small ground-mounted solar PV from certain restrictions on accessory uses. Please indicate the relevant section(s).

Community Examples:

- Edina, MN | SolSmart Gold
- Schaumburg, IL | SolSmart Silver

Templates:

- Model Zoning for the Regulation of Solar Energy Systems | Massachusetts Department of Energy Resources
- Renewable Energy Ordinance Framework: Solar PV | Delaware Valley Regional Planning Commission (DVRPC)

Resources:

- Planning for Solar Energy | American Planning Association (APA)
- Planning, Zoning & Development | SolSmart's Toolkit for Local Governments

PZ-9	5	**Ensure the zoning ordinance establishes a clear regulatory pathway for large-scale solar PV (e.g. through a special use permit or through inclusion among allowed conditional uses).**	☐

A local government should consider including large-scale solar regulations in their zoning ordinance or land use regulations to provide clarity and consistency to the development process. Including the type of district (e.g. commercial, industrial, low productivity agricultural land) were development is allowed, the type of applicable permit(s) (e.g. conditional use permits, use permits), and use standards or special regulations provide solar developers with a clear set of guidelines and a more predictable approval process.

Recommended Verification:

- Provide a link to the zoning ordinance or land use regulations that establishes a regulatory pathway for large-scale solar PV development. Please indicate the relevant section(s).

Community Examples:

- Freeport, IL | SolSmart Gold
- La Crosse, WI | SolSmart Silver

Templates:

- Model Zoning for the Regulation of Solar Energy Systems | Massachusetts Department of Energy Resources
- Renewable Energy Ordinance Framework: Solar PV | Delaware Valley Regional Planning Commission (DVRPC)

Resources:

- Land Use Considerations for Large-scale Solar | SolSmart Issue Brief
- Planning for Solar Energy | American Planning Association (APA)
- Planning, Zoning & Development | SolSmart's Toolkit for Local Governments

PZ-10	10	**Ensure the zoning ordinance includes a native perennial vegetation and/or habitat-friendly ground cover requirement or standard for large-scale solar PV.**	☐

Large-scale solar projects cover many acres that can be used for the dual purpose of providing clean, renewable energy and growing native perennial vegetation or habitat-friendly ground cover. Planting native perennial vegetation under solar PV systems can improve soil health and water retention, while providing habitat for pollinators and native species.

Recommended Verification:

- Provide a link to the zoning ordinance or land use regulations that includes language about a native perennial vegetation and/or habitat-friendly ground cover requirement or standard. Please indicate the relevant section(s).

Community Examples:

- Stearns County, MN (6.52.2 H) | SolSmart Silver
- St. Joseph County, IN | SolSmart Gold

Templates:

- Minnesota Solar Model Ordinance | Great Plains Institute (GPI)
- Model Solar Energy Local Law (NY) | New York State Energy Research and Development Authority (NYSERDA)

Resources:

- Land Use Considerations for Large-scale Solar | SolSmart Issue Brief
- NREL Beneath Solar Panels, the Seeds of Opportunity Sprout | National Renewable Energy Laboratory (NREL)
- State Pollinator-friendly Scorecards | Fresh Energy

PZ-11	5	**Ensure the zoning ordinance enables co-location of solar PV with an agricultural use such as grazing, apiaries, or crops (agrivoltaics).**	☐

Large-scale solar projects cover many acres that can be used for the dual purpose of providing clean, renewable energy and co-locating with forms of agriculture. Co-locating solar PV with crops can enhance yields, soil health, and water retention while improving system efficiency by reducing air temperature near the panels.

Recommended Verification:

- Provide a link to the zoning ordinance or land use regulations that includes language enabling the co-location of solar with an agricultural use. Please indicate the relevant section(s).

Community Examples:

- Leon County, FL | SolSmart Gold

- San Luis Obispo County, CA (D.9) | Not Designated

Templates:
- Illinois Solar Model Ordinance | Great Plains Institute (GPI)

Resources:
- Co-Location of Solar and Agriculture Webinar | National Renewable Energy Laboratory (NREL)
- Land Use Considerations for Large-scale Solar | SolSmart Issue Brief
- NREL Beneath Solar Panels, the Seeds of Opportunity Sprout | National Renewable Energy Laboratory (NREL)

PZ-12	5	**Ensure the zoning ordinance requires a decommissioning plan that outlines the terms and conditions for a large-scale solar PV system's proper removal at the end of its useful life cycle or in the event of cessation of operation. (The decommissioning plan may include steps to remove the system, requirements for disposal and/or recycling of system components, and restoration as needed to allow for return to agriculture or other land use).**	☐

A community's zoning ordinance can require a decommissioning plan that clearly outlines the roles, responsibilities, terms, and conditions to ensure the local government will not be responsible for the removal of a large-scale solar PV system. Decommissioning is the responsibility of the system owner and requiring a plan can alleviate concerns that a local government will be unnecessarily burden with system removal.

Recommended Verification:
- Provide a link to the zoning ordinance or land use regulations that includes language about a decommissioning plan for large-scale solar PV. Please indicate the relevant section(s).

Community Examples:
- La Crosse, WI | SolSmart Silver
- Will County, IL | SolSmart Gold

Templates:
- Model Solar Energy Local Law | New York State Energy Research and Development Authority (NYSERDA)
- Template Solar Energy Development Ordinance for North Carolina | North Carolina Clean Energy Technology Center (NCCETC)

Resources:
- Decommissioning Solar Panel Systems | New York State Energy Research and Development Authority (NYSERDA)
- Land Use Considerations for Large-scale Solar | SolSmart Issue Brief

PZ-13	5	**Ensure the zoning ordinance establishes solar energy zones and/or solar overlays for large-scale solar PV.**	☐

A community's zoning ordinance and land use regulations could establish a solar energy zone or overlay. This strategy can encourage solar development on favorable sites and reduce the project development timeline by streamlining permitting and zoning requirements.

Recommended Verification:
- Provide a link to the zoning ordinance or land use regulations that establishes solar energy zones and/or solar overlays for large-scale solar PV. Please indicate the relevant section(s).

Community Examples:
- Framingham, MA (pg. 96) | SolSmart Silver
- Wellesley, MA (pg. 101) | SolSmart Silver

Resources:
- Planning for Solar Energy | American Planning Association (APA)
- Planning, Zoning & Development | SolSmart's Toolkit for Local Governments

PZ-14	10	**Require new construction to be solar ready in at least one zoning district by adopting Appendix U (International Code Council), Appendix RB (International Energy Conservation Code), or another mechanism.**	☐

Local governments can proactively plan for increased solar deployment by requiring new construction to be solar ready which can reduce the installation costs if a solar system will be installed at some point in the future. Solar ready buildings are designed and engineered in such a way that allows for the easy installation of a future solar system. The International Code Council (ICC) has developed model codes and standards for solar ready construction.

Recommended Verification:

- Provide a link to the adopted code(s) or language that requires new construction to be solar ready.

Community Examples:

- El Paso, TX | SolSmart Gold
- Warrenville, IL | SolSmart

Templates:

- Appendix U | International Residential Code (IRC)
- Appendix RB | International Energy Conservation Code (IECC)

Resources:

- Planning for Solar Energy | American Planning Association (APA)
- Planning, Zoning & Development | SolSmart's Toolkit for Local Governments
- Solar Ready Construction Guidelines | Mid-America Regional Council (MARC)

PZ-15	20	Codify a solar requirement for new construction and/or retrofits meeting a specific threshold, in at least one zoning district.	☐

Local governments can proactively promote solar development by requiring a solar installation on new construction, and/or retrofits. Installing solar on new construction is cost-effective and can rapidly increase solar deployment in a community. A solar requirement can be mandated at a local level in the code of ordinances or, as in the case of California, at the state level.

Recommended Verification:

- Provide a link to the adopted code(s) or language that requires solar on new construction or retrofits.

Community Examples:

- Santa Monica, CA | SolSmart Gold
- South Miami, FL | SolSmart Silver

Resources:

- Better Roofs Ordinance | San Francisco Planning Department
- Planning for Solar Energy | American Planning Association (APA)
- Planning, Zoning & Development | SolSmart's Toolkit for Local Governments

PZ-16	10	Provide clear guidance for the installation of solar PV on historic properties and in special overlay districts.	☐

Many communities contain historic properties or historic districts that aim to preserve a community's character and heritage. These properties and districts are often regulated by specific design guidelines that outline how a historic property may be modified. These guidelines can include the best methods to incorporate a solar energy installation while maintaining the historical nature of the structure and surrounding neighborhood.

Recommended Verification:

- Provide a link to the zoning ordinance or land use regulations that includes guidance on the installation of solar PV on historic properties and in special overlay districts. Please indicate the relevant section(s).
- Provide a link to guidance for the installation of solar PV on historic properties and in special overlay districts

Community Examples:

- Ann Arbor, MI | SolSmart Bronze
- Park City, UT | SolSmart Gold

Resources:

- Implementing Solar PV Projects on Historic Buildings and in Historic Districts | National Renewable Energy Laboratory (NREL)
- Installing Solar Panels on Historic Buildings | North Carolina Clean Energy Technology Center (NCCETC)
- Planning for Solar Energy | American Planning Association (APA)
- Planning, Zoning & Development | SolSmart's Toolkit for Local Governments

PZ-17	5	Post an online fact sheet that provides an overview of what zoning allows for solar PV under what conditions (e.g. types and sizes of solar systems permitted, the processes required, and other relevant information).	☐

A community's zoning ordinance and land use regulations create statutory limits on what individuals may do with their property as a matter of right and often provides additional processes to consider special exceptions. Land use regulations

often contain use standards that provide additional requirements for certain types of development. However, these regulations can sometimes be unclear and difficult to access, especially for topics like solar PV. Posting an online fact sheet that summarizes zoning regulations for solar represents a major step toward overcoming informational barriers.
Recommended Verification: • Provide a link to the fact sheet, zoning determination letter, or other online document that clarifies and summarizes how the zoning ordinance and land use regulations regulate solar energy.
Community Examples: • San Diego County, CA | SolSmart Gold • Sedona, AZ | SolSmart Bronze
Resources: • Planning, Zoning & Development | SolSmart's Toolkit for Local Governments

PZ-18	**10**	**Train planning and zoning staff on best practices in planning and zoning for solar PV. Training must have occurred in the past five years.**	☐
Regular solar PV training, at least every few years, is a best practice to ensure planning and zoning staff are up-to-date on strategies for incorporating solar into plans, ordinances, and development regulations. Training staff in planning and zoning best practices for solar can help them to evaluate the options available for reducing barriers to solar and enable them to customize these best practices to their local context. Training can help staff develop clear, transparent, well-defined, and consistent planning and zoning regulations and processes that provide certainty for property owners and solar developers. Local governments can require staff to attend full or half-day workshops (either live or online) and provide or create resources designed to help staff keep up with advances in solar planning and zoning best practices.			
Recommended Verification: • Provide a memo with details about the planning and zoning training including name of training, name of trainer, attendees (name, title, department), date and time, location, agenda, and presentation/slides.			
Templates: • PZ-18 SolSmart Solar Planning and Zoning Training Template Memo | SolSmart			
Resources: • Best Practices in Solar Planning and Zoning | SolSmart Webinar • Planning for Solar Energy | American Planning Association (APA) • Planning, Zoning & Development | SolSmart's Toolkit for Local Governments			

PZ-19	**5**	**Draft new or updated language and provide a timeline for the inclusion of specific solar PV goals, metrics, and/or strategies into existing and/or future plans.**	☐
Planning documents provide the foundation for a community's vision for how and where it would like future development to occur. Comprehensive, sub-area, and functional plans also provide policy guidance to the local government as it weighs how future development aligns with other objectives. Communities that would like to promote solar development in an organized and efficient manner should draft solar energy goals, metrics, or strategies for inclusion in new or updated plans.			
Recommended Verification: • Provide draft language of the proposed plan changes that relate to solar energy and a timeline for inclusion in future plans.			
Community Examples: • Chatham County, NC | SolSmart Gold • South St. Paul, MN | SolSmart Bronze			
Templates: • Solar Resource Development Requirement | Metropolitan Council (Met Council)			
Resources: • Integrating Solar Energy into Local Plans | American Planning Association (APA) • Planning for Solar Energy | American Planning Association (APA) • Planning, Zoning & Development | SolSmart's Toolkit for Local Governments			

PZ-20	**10**	**Include specific solar PV goals, metrics, and/or strategies in the most current version of relevant local plans (e.g. energy plan, climate plan, comprehensive plan).**	☐

Planning documents provide the foundation for a community's vision for how and where it would like future development to occur. Development is governed largely by the components of the comprehensive plan and guided by the policies and strategies outlined in other functional plans such as a Climate Action Plan or Sustainability Plan. These planning documents should align to have solar energy goals, metrics, and strategies that promote solar development in an organized and efficient manner.
Recommended Verification: • Provide a link to the relevant plans that incorporate solar PV goals, metrics, and/or strategies. Please indicate the relevant section(s).
Community Examples: • Ann Arbor, MI | SolSmart Bronze • Philadelphia, PA | SolSmart Gold
Resources: • Integrating Solar Energy into Local Plans | American Planning Association (APA) • Local Government Strategies for 100% Clean Energy | SolSmart Webinar • Planning for Solar Energy | American Planning Association (APA) • Planning, Zoning & Development | SolSmart's Toolkit for Local Governments

PZ-21	**10**	**Develop a solar PV assessment that identifies all feasible sites for large-scale solar PV development within a jurisdiction.**	☐
Local governments can proactively identify sites that are favorable for solar PV projects. Identifying sites that have high solar potential and the best characteristics for large-scale solar development can reduce potential conflicts between solar and other land uses and speed up the project development timeline.			
Recommended Verification: • Provide a link to the large-scale solar PV assessment.			
Community Examples: • Mountain Iron, MN | SolSmart Bronze • Santa Clara County, CA | Not Designated			
Resources: • Planning for Solar Energy | American Planning Association (APA) • Planning, Zoning & Development | SolSmart's Toolkit for Local Governments • Solar Resource Protection Requirement | Metropolitan Council (Met Council)			

PZ-22	**10**	**Enable solar rights through a local solar access ordinance.**	☐
In some states, local governments have jurisdiction to enable solar rights through an ordinance. A solar rights or access ordinance protects a property owner 's right to sunlight, ensuring a solar installation has access to the sunlight it needs to generate electricity. A solar access ordinance can also remove restrictive covenants for solar PV in relevant zones.			
Recommended Verification: • Provide a link to the zoning ordinance or land use regulations that protects solar rights and access. Please indicate the relevant section(s).			
Community Examples: • Ashland, OR | Not Designated • Freeport, IL | SolSmart Gold			
Templates: • A Comprehensive Review of Solar Access Law in the United States | Solar America Board for Codes and Standards (Solar ABCs)			
Resources: • A Comprehensive Review of Solar Access Law in the United States | Solar America Board for Codes and Standards (Solar ABCs) • Best Practices in Zoning for Solar | National Renewable Energy Laboratory (NREL) • Planning for Solar Energy | American Planning Association (APA) • Planning, Zoning & Development | SolSmart's Toolkit for Local Governments			

PZ-23	20	**Codify in the zoning ordinance that accessory use energy storage systems are explicitly allowed by-right in all major zones.**	☐

A community's zoning ordinance and land use regulations create statutory limits on what individuals may do with their property as a matter of right. Zoning often provides additional processes, which can be long and costly, to consider special exceptions when a proposal is inconsistent with current land use regulations. Codifying residential energy storage as an accessory use and allowed or by-right use in all major zoning categories provides policy certainty and clarity which can promote easier and more equitable energy storage deployment. It can increase energy storage development and save property owners time and money because they can avoid going through a more extensive process to have their energy storage system considered.

Recommended Verification:

- Provide a link to the zoning ordinance or land use regulations that codify energy storage as an accessory use and allowed or by-right use. Please indicate the relevant section(s).

Community Examples:

- Coming Soon

Templates:

- Battery Energy Storage Model Law | New York State Energy Research and Development Authority (NYSERDA)

Government Operations

GO-1	20	**Demonstrate coordination between local government inspectors and utility staff to reduce Permission to Operate timeline for solar PV.**	☐

A solar system that has not been granted permission to operate (PTO), is not allowed to produce electricity which can have economic impacts for the system owner. To reduce economic loss, local governments can coordinate with the electric utility to ensure solar PV systems can begin operation as soon as it has been confirmed that the systems are properly constructed and connected to the grid. Consolidating and/or coordinating local government inspections and utility interconnection inspections can save time and money for solar installers and property owners.

Recommended Verification:

- Provide details about the coordination process and explaining how this process reduces the time between inspection and Permission to Operate

Community Examples:

- Leon County, FL | SolSmart Gold

Resources:

- Utility Engagement | SolSmart's Toolkit for Local Governments

GO-2	10	**Discuss community goals for solar PV, net metering, community solar, and/or interconnection processes with the local utility and explore areas for future collaboration. Compile summary and next steps in a memo.**	☐

Local governments can leverage their relationship with electric utilities to encourage increased support for, and development of, solar energy. Local governments and utilities can partner to provide community solar programs, solar incentives, and help improve the solar interconnection process. Utilities can also help local governments meet municipal or community-wide renewable energy goals by procuring large amount of solar energy.

Recommended Verification:

- Provide meeting minutes (including a list of follow-up action items), e-mail correspondence, meeting agenda, materials prepared for the meeting (e.g., handouts and slides), or other evidence that at least one meeting occurred with your local utility.

Community Examples:

- Minneapolis, MN | SolSmart Gold
- Missoula, MT | SolSmart Silver

Resources:

- Making Solar & Electrification Policies Mutually Beneficial | SolSmart Webinar
- Procurement Guidance | American Cities Climate Challenge Renewables Accelerator
- Solar & Electrification, A Beneficial Partnership | SolSmart Issue Brief
- Utilizing City-Utility Partnership Agreements to Achieve Climate and Energy Goals | World Resources Institute (WRI)

GO-3	10	**Coordinate with regional organizations and/or local governments to engage utilities on advancing solar policies such as utility procurement of solar PV, green tariffs, and/or interconnection process improvements.**	☐

Local governments can find strength in numerous as they advance ambitious energy transformation goals. Collaborating with other local governments and/or regional organizations allows resources, expertise, and staff to be pooled together which can enhance efforts to work with utilities. Networks of communities and utilities can provide opportunities to share best practices and common strategies through peer-to-peer learning. They can also help build coalitions and advocate for state policy.

Recommended Verification:

- Provides details about your community's participation in coordinated efforts between local governments and/or regional organizations to engage utilities with the goal of advancing solar initiatives.

Community Examples:

- Lake Forest, IL | SolSmart Bronze
- Salt Lake City, UT | SolSmart Bronze

Resources:

- Engagement Tracker | American Cities Climate Challenge
- PJM Cities & Communities Coalition | World Resources Institute (WRI)
- Procurement Guidance | American Cities Climate Challenge Renewables Accelerator
- Utilizing City-Utility Partnership Agreements to Achieve Climate and Energy Goals | World Resources Institute (WRI)

GO-4	10	**Conduct feasibility analysis for solar PV on local government facilities and/or local government-controlled land.**	☐

Local governments can lead by example and install solar PV on their facilities and/or land to achieve clean energy goals and generate electricity cost savings. The first step is conducting a feasibility analysis to discover which rooftops or grounds have the highest solar potential and best characteristic for a solar installation. An RFP can then be issued for the most favorable sites.

Recommended Verification:

- Provide a link to the feasibility analysis or details about the feasibility analysis that was conducted – who conducted, what were the sites, when was it conducted, what were the recommendations and next steps.

Community Examples:

- Asheville, NC | SolSmart Gold
- Mountain Iron, MN | SolSmart Bronze

Resources:

- Decision Support Tools for Local Solar Planning & Development | SolSmart Webinar
- Solar Project Development Pathway - Site and Opportunity Assessment | Environmental Protection Agency (EPA)
- Solar Development on Public Facilities and Under-utilized Land | SolSmart's Toolkit for Local Governments
- System Advisor Model (SAM) | National Renewable Energy Laboratory (NREL)

GO-5	20	**Install solar PV on local government facilities and/or local government-controlled land.**	☐

Local governments can lead by example and install solar on their facilities and/or land to achieve clean energy goals. Solar installations can generate revenue for local governments, deliver electricity cost savings, and serve as an educational tool for community members.

Recommended Verification:

- Provide news articles, a press release announcing the commissioned system, or webpage that summarizes the details of the installation(s) including total number of systems, size, location, and photos.

Community Examples:

- Johnson County, IA | SolSmart Gold
- New York City, NY | SolSmart Gold

Resources:

- Procurement Guidance | American Cities Climate Challenge Renewables Accelerator
- Solar Decision Support and Resources for Local Governments | National Renewable Energy Laboratory (NREL)
- Solar Development on Public Facilities and Under-utilized Land | SolSmart's Toolkit for Local Governments
- Solar Power Purchase Agreements: A Toolkit for Local Governments | Interstate Renewable Energy Council (IREC)

GO-6	20	Install solar PV on local government-controlled brownfields and/or under-utilized properties.	☐

As large, open spaces with limited future uses, brownfields, landfills, and other under-utilized lands are favorable locations for solar PV systems. Local governments can lease these lands for solar development to increase locally installed solar capacity while generating land lease revenue.

Recommended Verification:

- Provide a news article, a press release announcing the commissioned system, or webpage that summarizes the details of the installation(s) including total number of systems, size, location, and photos.

Community Examples:

- Cary, NC | Not Designated
- Eau Claire, WI | SolSmart Gold

Resources:

- Developing Solar on Brownfields | SolSmart Webinar
- RE-Powering America's Land | Environmental Protection Agency (EPA)
- Solar Development on Public Facilities and Under-utilized Land | SolSmart's Toolkit for Local Governments
- The Guide to Developing Solar Photovoltaics at Massachusetts Landfills | Massachusetts Department of Energy Resources

GO-7	20	Install solar PV integrated with other technologies such as combined heat and power or electric vehicle charging on local government facilities and/or local government-controlled land.	☐

Solar can provide unique benefits when paired with other distributed energy technologies. Co-locating solar with other technologies can improve resilience, provide demand-charge reductions, and charging electric vehicles with a renewable source of energy.

Recommended Verification:

- Provide a news article, a press release announcing the commissioned system, or webpage that summarizes the details of the solar installation(s) integrated with other technologies including total number of systems, size, location, technologies used, and photos.

Community Examples:

- Boulder, CO | SolSmart Gold
- Montgomery County, MD | SolSmart Gold

Resources:

- Best Practices for Solar & Electric Bus Charging at Transit Agencies | SolSmart Webinar
- REopt: Renewable Energy Integration & Optimization | National Renewable Energy Laboratory (NREL)
- Solar and Electric Vehicles: A Guide for Local Governments | SolSmart
- Solar & Electric Vehicle Best Practices for Local Governments | SolSmart Webinar

GO-8	20	Install solar PV plus storage on local government facilities and/or local government-controlled land.	☐

Solar can provide resilience benefits and serve as emergency backup power to local government facilities in case of a power outage. Local governments have leveraged solar PV and storage to provide lighting for evacuation routes, power to shelters, and extend the fuel supply of diesel generation. Solar plus storage can also be used to provide demand-charge reductions by reducing peak load.

Recommended Verification:

- Provide a news article, a press release announcing the commissioned system, or webpage that summarizes the details of the solar installation(s) plus storage including total number of systems, size, location, and photos.

Community Examples:

- Fayetteville, AR | SolSmart Gold
- Portland, OR | Not Designated

Resources:

- REopt: Renewable Energy Integration & Optimization | National Renewable Energy Laboratory (NREL)
- Resiliency: Solar + Storage | SolSmart's Toolkit for Local Governments
- Solar + Storage: A Guide for Local Governments | SolSmart Issue Brief
- Solar and Energy Storage for Resiliency (Solar Resilient) | San Francisco Department of the Environment
- Solar + Storage / Resiliency | CUNY Smart Distributed Generation Hub

GO-9	10	**Require new local government facilities and/or facility retrofits meeting a specific threshold to be solar ready.**	☐

Local governments can lead by example and require new facilities or those completing a retrofit to be solar ready. Solar ready construction can reduce the installation costs if a solar system will be installed at some point in the future. Solar ready buildings are designed and engineered in such a way that allows for the easy installation of a future solar system.

Recommended Verification:

- Provide a link to adopted code(s) or language that require new construction and/or retrofits of local government facilities to be solar ready.

Community Examples:

- Montgomery County, MD | SolSmart Gold

Resources:

- Solar-Ready Building Design: A Summary of Technical Considerations | National Renewable Energy Laboratory (NREL)

GO-10	20	**Procure solar energy for municipal operations through an offsite physical PPA, virtual PPA, green tariff, or similar structure.**	☐

To meet climate and energy goals, local governments can procure a large amount of solar energy through an appropriate structure, depending on the types of contracts allowed by state and utility regulations.

Recommended Verification:

- Provide a document such as a news article, contract, press release, or similar official document containing the details how the local government is procuring solar energy.

Community Examples:

- Cincinnati, OH | Not Designated
- Denton, TX | SolSmart Silver

Resources:

- How Cities Benefit from Power Purchase Agreements | Center for Climate and Energy Solutions (C2ES)
- How Local Governments Can Buy Renewable Energy & Support Market Development | SolSmart Webinar
- Local Government Strategies for 100% Clean Energy | SolSmart Webinar
- Procurement Guidance | American Cities Climate Challenge Renewables Accelerator

Community Engagement

CE-1	10	**Post a solar landing page on local government's website with information that may include the community's solar goals, educational materials and tools that promote solar, and resources for solar development (e.g. permitting checklist, application forms, zoning regulations, etc.).**	☐

A solar landing page is a way to provide residents, businesses, and solar installers with important information about your community's solar energy policies, processes, goals, and metrics from one centralized location. It is also a way to educate community members about solar energy topics like financing options and consumer protection best practices.

Recommended Verification:

- Provide a link to the solar landing page.

Community Examples:

- Pulaski County, VA | SolSmart Gold
- Tyngsborough, MA | SolSmart Gold

Templates:

- CE-1 SolSmart Solar Landing Page Template | SolSmart

Resources:

- Homeowner's Guide to Going Solar | U.S. Department of Energy (DOE)
- Residential Consumer Guide to Solar Power | Solar Energy Industries Association (SEIA)

CE-2	5	**Post online resources about solar installers and/or solar quote platforms for solar PV.**	☐

More solar companies operating in your community means residents and businesses are faced with more choices as they consider who to select for their solar project. Providing relevant local information on active solar installers can help community members make the best choice given their circumstances.

Recommended Verification:

- Provide a link to a webpage that contains information about local solar installers and/or solar quote platforms.

Community Examples:

- Denver, CO | SolSmart Gold
- Schaumburg, IL | SolSmart Silver

Templates:

- CE-1 SolSmart Solar Landing Page Template | SolSmart

Resources:

- Board Certified Professionals Directory | North American Board Certified Energy Practitioners (NABCEP)
- EnergySage | EnergySage
- Pickmysolar | Pick My Solar
- Solar Buyer's Markets: Potential PV Price Savings of Online Quote Platforms | National Renewable Energy Laboratory (NREL)

CE-3	5	**Post online resources about residential and commercial solar PV financing options and incentives.**	☐

Many different financing options are available for residential and commercial solar PV. Local governments can play an important role in providing access to information about available options.

Recommended Verification:

- Provide a link to a webpage that contains information about financing options and incentives.

Community Examples:

- Walnut Creek, CA | SolSmart Gold
- Wood County, WI | SolSmart Gold

Templates:

- CE-1 SolSmart Solar Landing Page Template | SolSmart

Resources:

- A Homeowner's Guide to Solar Financing: Leases, Loans and PPAs | Clean Energy States Alliance (CESA)
- Database of State Incentives for Renewables and Efficiency (DSIRE) | North Carolina Clean Energy Technology Center (NCCETC)
- Financing your solar panel system | EnergySage

CE-4	5	Post online resources about consumer protection and solar PV.	☐

Solar energy can be a new and complex topic for community members. Local governments can provide online guides and resources to help community members have a clear understanding of solar PV, allowing them to make informed decisions.

Recommended Verification:

- Provide a link to a webpage containing consumer protection resources.

Community Examples:

- Alexandria, VA | SolSmart Gold
- James City County, VA | SolSmart Bronze

Templates:

- CE-1 SolSmart Solar Landing Page Template | SolSmart

Resources:

- Consumer Solar Checklist | Interstate Renewable Energy Council (IREC)
- EnergySage | EnergySage
- Residential Issues and Existing Regulatory Framework | SolSmart's Toolkit for Local Governments
- Solar Customer Resource Portal | Solar Energy Industries Association (SEIA)

CE-5	5	Post an online summary of state policies related to a property owner's solar access and solar rights, including links to state-level policy.	☐

Community members are often unaware that state policy could impact their property's solar rights. Solar rights and solar access are terms which describe the ability of property owners to utilize sunlight on their property. Each state has its own unique policy and enforcement regime.

Recommended Verification:

- Provide a link to a webpage with information about state policies relating to solar access and/or rights.

Community Examples:

- Torrance, CA | SolSmart Gold
- Wilmette, IL | SolSmart Silver

Templates:

- CE-1 SolSmart Solar Landing Page Template | SolSmart

Resources:

- A Comprehensive Review of Solar Access Law in the United States | Solar America Board for Codes and Standards (Solar ABCs)
- Database of State Incentives for Renewables and Efficiency (DSIRE) | North Carolina Clean Energy Technology Center (NCCETC)

CE-6	5	Post an online summary of state policies related to Homeowner Associations (HOAs) ability to regulate and/or restrict solar PV, including links to state-level policy.	☐

Homeowner Associations often aim to impose restrictive measures on solar PV systems. Community members should be aware of state policy that defines what HOAs are allowed and not allowed to do in terms of regulating solar PV systems.

Recommended Verification:

- Provide a link to a webpage with information about state policies relating to Homeowner Associations and solar PV.

Community Examples:

- Hallandale Beach, FL | SolSmart Silver
- Torrance, CA | SolSmart Gold

Templates:

- CE-1 SolSmart Solar Landing Page Template | SolSmart

Resources:
- A Beautiful Day in the Neighborhood: Encouraging Solar Development through Community Association Policies and Processes | The Solar Foundation

CE-7	5	Post an online dashboard or summary of the solar PV metrics for your community.	☐

Key solar metrics such as the number of installations and total installed capacity can help communicate progress towards local and state renewable energy goals. Other related metrics could include the percentage of municipal energy provided by solar energy, installed capacity per capita and progress towards greenhouse gas emissions targets.

Recommended Verification:
- Provide a link to a webpage displaying solar PV metrics.

Community Examples:
- Boulder, CO | SolSmart Gold
- Westminster, CO | Not Designated

Templates:
- CE-1 SolSmart Solar Landing Page Template | SolSmart

CE-8	5	Post an online solar map for your community.	☐

Solar maps can provide community members with an estimate of the solar potential of their rooftop. Solar maps can also show the location of solar installations within a community.

Recommended Verification:
- Provide a link to the solar map for your community.

Community Examples:
- Los Angeles County, CA | Not Designated
- Westminster, CO | Not Designated

Templates:
- CE-1 SolSmart Solar Landing Page Template | SolSmart

Resources:
- Data Explorer | Google
- Go Solar Ready | Ohio-Kentucky-Indiana Regional Council of Governments
- NY Solar Map |Sustainable CUNY
- Project Sunroof | Google

CE-9	5	Support a solar informational session and/or solar tour explaining solar PV opportunities and policies. Session/Tour must have occurred within the last 5 years.	☐

An engaged and informed community can encourage solar market growth and increase the likelihood that local homes and businesses will pursue solar installations. Solar informational sessions and solar tours are ways to educate community members about the solar energy and the processes involved with an installation.

Recommended Verification:
- Provide a link(s) to details about the solar informational session or tour such as an agenda, date, time, and location.

Community Examples:
- Lower Merion, PA | SolSmart Bronze
- Sarasota County, FL | SolSmart Silver

Resources:
- Virtual Solar Tours | National Solar Tour

CE-10	5	Distribute solar job training and career opportunities in coordination with local colleges and/or workforce development organizations.	☐

Solar jobs have grown 12 times faster than the U.S. economy since 2014. As local solar markets grow, local governments can promote solar job opportunities with community colleges and workforce development organizations to ensure a well-trained, local workforce.

Recommended Verification:

• Provide posted job descriptions, screenshots from employment websites, evidence of classified ads or advertisement of job trainings.
Community Examples: • Fitchburg, WI | SolSmart Bronze • Washington, DC | SolSmart Gold
Templates: • CE-1 SolSmart Solar Landing Page Template | SolSmart
Resources: • Solar Training Network | The Solar Foundation • Solar Workforce Development Pilot | St. Louis, MO • Workforce Development | Grid Alternatives

CE-11	**5**	**Demonstrate local government support for local solar projects through speeches, press releases, opinion articles, etc.**	☐
Local governments can encourage solar market growth by highlighting solar energy goals, initiatives, and success stories through various communications strategies.			
Recommended Verification: • Provide a link to a document demonstrating encouragement of solar PV projects.			
Community Examples: • Fayetteville, AR | SolSmart Gold • Louisville, KY | SolSmart Gold			
Resources: • Stakeholder Engagement | SolSmart's Toolkit for Local Governments			

CE-12	**10**	**Discuss solar PV goals and/or strategies for increasing solar PV development within an appropriate committee, commission, taskforce, and/or working group. (e.g. solar is a recurring agenda item during monthly sustainability commission meetings).**	☐
An Environmental Advisory Council, Sustainability Committees, or Climate Action Taskforce is a great way to keep residents and key stakeholders actively engaged in community energy policy and development. These groups can assist in the development of solar energy goals and strategies, lead community-based solar initiatives, and provide communication and outreach support to inform community members about solar initiatives and plans.			
Recommended Verification: • Provide meeting minutes (including a list of follow-up action items), meeting agenda, or materials prepared for the meeting (e.g., handouts and slides) from within the past year and provide documentation of the regularly scheduled frequency of these meetings.			
Community Examples: • Branford, CT | SolSmart Bronze • Fairfield, CT | SolSmart Gold			
Templates: • CE-1 SolSmart Solar Landing Page Template | SolSmart			
Resources: • Stakeholder Engagement | SolSmart's Toolkit for Local Governments			

Market Development

MD-1	20	Demonstrate activity in state regulatory and/or legislative proceedings regarding solar PV.	☐

Local governments can provide an important voice into the development of state-level solar energy policy, strategies, and incentives. Government staff can track policy developments actively and develop appropriate strategies to interact with state regulators and legislators.

Recommended Verification:

- Provide a link to public comments on solar energy or related energy proceedings, op-eds in local newspapers, or agenda, minutes, and/or recordings of meetings attended by representatives of the local government.

Community Examples:

- Ann Arbor, MI | SolSmart Bronze
- Santa Fe, NM (Resolution 2018-71) | SolSmart Bronze

Resources:

- Engagement Tracker | American Cities Climate Challenge
- The Federal and State Context: Policies Affecting Solar Energy Development | SolSmart's Toolkit for Local Governments

MD-2	20	Support a community-wide group purchase program (e.g. Solarize). Program must have occurred within the last 5 years.	☐

Local governments can support or host community group purchase programs for solar energy. Bulk purchasing can reduce the costs of solar installations for community members. These limited time-offers have had consistent success in providing discounts of up to 20% of installed costs for residential systems.

Recommended Verification:

- Provide a link to a website where the Solarize campaign has been publicly announced.
- Provide details about the status of an ongoing solarize campaign or final metrics of a completed solarize campaign.

Community Examples:

- La Crosse County, WI | SolSmart Bronze
- Montgomery County, MD | SolSmart Gold

Templates:

- Solarize Your Community | New York State Energy and Research Development Authority (NYSERDA)

Resources:

- How to Development a Solarize Campaign | SolSmart Webinar
- Market Development and Finance | SolSmart's Toolkit for Local Governments
- Solarize Mass | Massachusetts Clean Energy Center

MD-3	10	Encourage low-to-moderate income (LMI) participation in community-wide group purchase program through program design and/or financing support options.	☐

Local governments can support or host community group purchase programs for solar energy. Group purchase programs can incorporate incentives for income-qualified participants to promote equitable participation.

Recommended Verification:

- Provide details that explains the forms of financing support or program design elements that support LMI residents in solar PV group purchase program.

Community Examples:

- Durham, NC | SolSmart Gold
- Philadelphia, PA | SolSmart Gold

Templates:

- Solarize Your Community | New York State Energy and Research Development Authority (NYSERDA)

Resources:

- How to Development a Solarize Campaign | SolSmart Webinar
- Market Development and Finance | SolSmart's Toolkit for Local Governments
- Solarize Mass | Massachusetts Clean Energy Center

MD-4	20	**Support a community solar program.**	☐

Community solar offers residents and businesses an opportunity to own or lease a portion of a solar project in exchange for economic benefits proportional to their share. These economic benefits are commonly delivered in the form of electricity bill credits. For renters, and homes or business that are not suitable sites for solar, community solar programs allow consumers to access solar without installing panels on their homes or business. Community solar can be provided by utilities, a third party, or a non-profit.

Recommended Verification:

- Provide a link to information about the community solar program, including any outreach materials and details about program design.

Community Examples:

- Austin, TX | SolSmart Gold
- Fort Collins, CO | SolSmart Gold

Resources:

- A Guide to Community Share Solar: Utility, Private, and Nonprofit Project Development | National Renewable Energy Laboratory (NREL)
- Community Solar | SolSmart's Toolkit for Local Governments
- Expanding Solar Participation through Community Solar | SolSmart Issue Brief
- Expanding Solar Participation through Community Solar | SolSmart Webinar
- Procurement Guidance | American Cities Climate Challenge Renewables Accelerator

MD-5	10	**Encourage low-to-moderate income (LMI) participation in a community solar program through program design and/or financing support options.**	☐

Community solar provides opportunities to open access to solar to low-to-moderate income households. To fully achieve this potential, a community program should design programs and financing to support low to moderate income participation, including savings from day one. It is also important to ensure that appropriate and trusted messengers are used and that offerings are designed to be flexible without long-term commitments.

Recommended Verification:

- Provide details that explains the forms of financing support or program design elements that support LMI residents in a community solar program.

Community Examples:

- Denver, CO | SolSmart Gold
- Washington, DC | SolSmart Gold

Resources:

- A Guide to Community Share Solar: Utility, Private, and Nonprofit Project Development | National Renewable Energy Laboratory (NREL)
- Community Solar | SolSmart's Toolkit for Local Governments
- Design and Implementation of Community Solar Programs for Low- and Moderate-Income Customers | National Renewable Energy Laboratory (NREL)
- Procurement Guidance | American Cities Climate Challenge Renewables Accelerator

MD-6	20	**Provide residents with Community Choice Aggregation/Energy that includes solar PV as a power generation source.**	☐

Local governments can increase access to solar energy for their operations and their residents through community choice aggregation. Community Choice Aggregation allows local governments to aggregate energy demand within their jurisdiction and procure power from an energy supplier while the local utility provides transmission and distribution services. Many local governments utilize community choice to procure more renewable energy, including solar, than would be available from their local electric utility. States must have enabling legislation for local governments to provide community choice aggregation.

Recommended Verification:

- Provide a link to details about a Community Choice program (with solar PV as a power generation source) that is available for residents.

Community Examples:

- San Jose, CA | SolSmart Gold
- Somerville, MA | SolSmart Gold

Templates:
• Community Choice Aggregation Toolkit | New York State Energy and Research Development Authority (NYSERDA) • Starting a New CCA | California Community Choice Association (CalCCA)
Resources: • Community Choice Aggregation | Environmental Protection Agency (EPA) • Community Choice Aggregation | SolSmart Issue Brief • Community Choice Aggregation: Challenges, Opportunities, and Impacts on Renewable Energy Markets | National Renewable Energy Laboratory (NREL) • Using Community Choice Aggregation to Achieve Clean Energy Goals | SolSmart Webinar

MD-7	10	Provide a PACE financing program that includes solar PV as an eligible technology.	☐
Property Assessed Clean Energy (PACE) financing is an on-bill financing mechanism which enables repayment of long-term, low-interest loans on property tax bills. PACE can be used to finance renewable energy and energy efficiency projects on residential and/or commercial properties, depending on the PACE financing program design. In order for residents and business to access PACE financing, it must be enabled at the state and local level.			
Recommended Verification: • Provide a link to the local ordinance creating a PACE program. • Provide a link to the PACE program webpage.			
Community Examples: • Deerfield Beach, FL | SolSmart Silver • Grand Rapids, MI | SolSmart Silver			
Resources: • Market Development and Finance | SolSmart's Toolkit for Local Governments • Resources | PACENation			

MD-8	20	Provide local incentives or locally-enabled finance (e.g. a revolving loan fund) for solar PV.	☐
In addition to state and federal incentives, local governments can also encourage solar development within their jurisdictions by providing tax exemptions, rebates, or other financial incentives. Some jurisdictions have enabled community finance through revolving loan funds or credit enhancement facilities for renewable energy projects. These actions can help lower the cost of solar for residents.			
Recommended Verification: • Provide a link to an ordinance creating local incentives or financing options. • Provide a link to an application or form that are required for a solar PV system to be eligible for incentives or financing.			
Community Examples: • Boulder, CO | SolSmart Gold • Loudoun County, VA | SolSmart Silver			
Resources: • Market Development and Finance | SolSmart's Toolkit for Local Governments			

MD-9	5	Provide local incentives for solar PV to low-to-moderate income (LMI) households, Disadvantaged Business Enterprises (DBEs), and/or non-profit organizations that provide community services.	☐
Local governments can support solar installations by LMI households, DBEs, and non-profit organizations by providing incentives such as low-interest loans, grants, on-bill financing and a variety of tax incentives and rebates. Local governments can expand solar programs to disadvantaged residents by implementing any number of these programs.			
Recommended Verification: • Provide a link to an ordinance creating local incentives or financing options. • Provide a link to an application or form that are required for a solar PV system to be eligible for incentives or financing.			
Community Examples: • Boulder, CO | SolSmart Gold • Portland, OR | Not Designated			
Resources:			

- Market Development and Finance | SolSmart's Toolkit for Local Governments
- Projects & Programs in Low-to-Moderate Income Communities | SolSmart Webinar
- Resources to Support Initiatives for Low-to-Moderate Income Communities | SolSmart Webinar
- Unlocking Solar for Low- and Moderate-Income Residents: A Matrix of Financing Options by Resident, Provider, and Housing Type | National Renewable Energy Laboratory (NREL)

MD-10	**20**	**Partner with financial institutions and/or foundations to offer loans, rebates, grants, or other incentives for solar PV projects. (Financial institutions could include entities such as a local or regional bank, CDFI, or credit union).**	☐

Loans, rebates, or grants can improve the financial prospects of a solar project, allowing more community members to install solar. Local governments can work with local financial institutions to offer and/or promote financing options for solar projects.

Recommended Verification:

- Provide link to financing options for solar energy.
- Provide a memo detailing how the local government partnered with the financial institution to offer a financial incentive for solar energy.

Community Examples:

- Lafayette, CO | SolSmart Gold
- Milwaukee, WI | SolSmart Gold

Resources:

- Market Development and Finance | SolSmart's Toolkit for Local Governments

Innovative Action

IA-1	**Varies**	**The actions identified in the categories above represent many of the most common and impactful efforts communities are taking to make going solar easier and more affordable for residents and businesses. However, we know that communities across the country are developing innovative**	☐

		ways to promote and deploy solar energy. If your community has taken action that was not captured in any of the credits above, please share it with us.	
Innovative actions will be reviewed by a team of solar experts and each action may be worth up to 20 points.			
Recommended Verification: • Provide a memo describing the innovative action and include any supporting documentation or links that provide additional details.			
Community Examples: • Grayslake, IL | SolSmart Bronze o The Grayslake Sustainable Business Initiative recognizes local businesses that are choosing to be more sustainable. Solar energy is emphasized by awarding a business automatic gold designation if they have installed a solar energy system. • Montgomery County, MD | SolSmart Gold o Montgomery County's 4th Solar Co-op offered EV charging as an option through the solar co-op. This helps promote EV charging and can reduce costs through group purchasing.			

Acknowledgment

This material is based upon work supported by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) under the Solar Energy Technologies Office Award Numbers DE-EE0007154 & DE-EE007155.

December 2020

Indiana Renewable Energy Guide

A Guide for Local Governments

This guide was authored by Jenna Greene, Brian Ross, and Jessi Wyatt of the Great Plains Institute in collaboration with the Environmental Resilience Institute at Indiana University. *The information and work presented herein was funded in part by Energy Foundation.*

Photo from Great Plains Institute by Katharine Chute

SUMMARY

Wind and solar energy are among the least expensive forms of electric generation in the country. Solar and wind resources are abundant throughout Indiana. Costs of both solar and wind energy systems are forecast to continue declining. Increased market activity in renewable energy development will therefore continue well into the future.

This guide provides Indiana communities with a long-range perspective on utility- and community-scale solar and wind energy markets and development trends. Understanding the long-term context helps communities make informed decisions in evaluating renewable energy proposals and creating plans about how future development should happen.

The Great Plains Institute is engaging local governments across the Upper Midwest on long-term planning for renewable energy. Additional guides are available on the Great Plains Institute website: www.betterenergy.org.

SUMMARY OF RENEWABLE ENERGY SITING AUTHORITY

Siting authority for solar and wind systems in Indiana resides at the local level.[1] Additional permits are granted by state bodies, but these projects are still subject to local land use controls. For example, the Indiana Utility Regulatory Commission issues a Certificate of Public Convenience and Necessity for large-scale energy facilities, but neither solar nor wind energy systems require a state-level siting permit.[2] Zoning and land use standards vary widely across Indiana's counties. Table 1 provides an overview of siting authority by project type and size.

Table 1. Indiana Siting Authority

ROLES	STATE	LOCAL
Wind energy systems		X
Solar energy systems		X

SUMMARY OF TAXATION AND LOCAL REVENUE

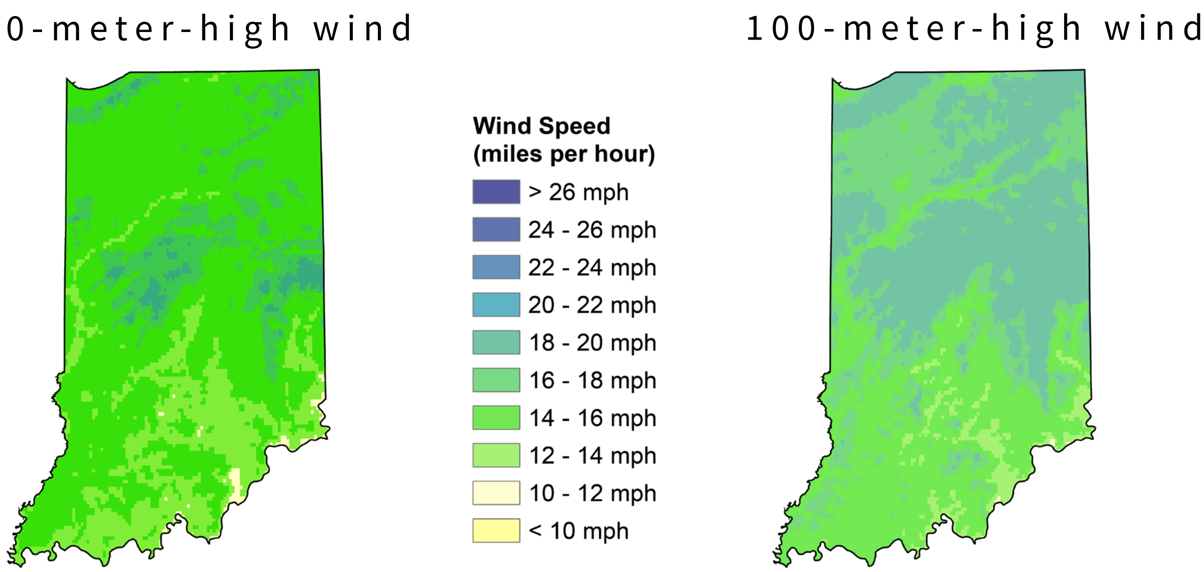
Utility-scale solar and wind development provides direct economic benefits to the community where they are located through property tax revenue and other agreements. In one example, White County, Indiana signed an economic development agreement with the renewable energy company seeking a 350-turbine project in their jurisdiction. As a result of that agreement, the County has received over $9 million in payments to compensate for the value of new development has been precluded in the area of the wind farm. The wind company has also made $35 million in payments to landowners in the county. These payments boost local spending power and translate to a higher level of local income taxes. Furthermore, the County receives around $2.4 million from personal property taxes annually because of the wind farms. [3]

Local governments benefit from solar and wind systems through tax revenue.

WIND AND SOLAR RESOURCES

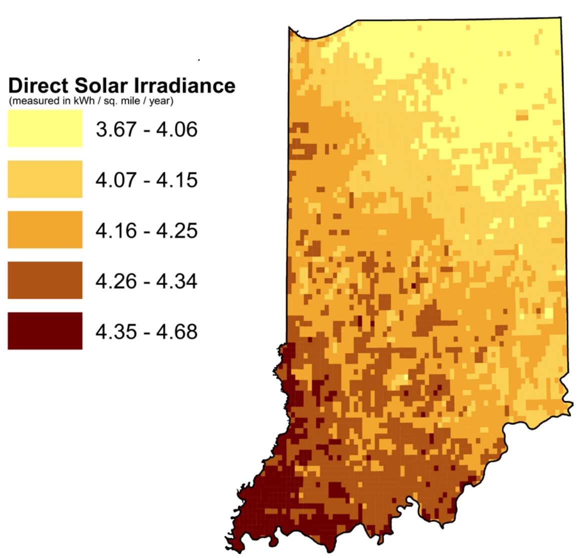
Indiana has abundant solar and wind resources. Figures 1 and 2 are a useful guide to identify regions with the best resource potential for renewable energy development. Local governments will need to consider a more granular view of the data for assessing renewable energy development potential.

Figure 1. Wind Resource



Data Source: National Renewable Energy Lab (NREL) national wind speed data, 2006-2013. NREL incorporates surface wind data, upper-air data, topography, and other factors to estimate the wind resource potential over many square miles. The data is most accurate for large spatial scales.[7]

Figure 2. Solar Resource



Data Source: NREL Multi-Year PSM Direct Normal Irradiance data available through National Solar Radiation Dataset, 2019.

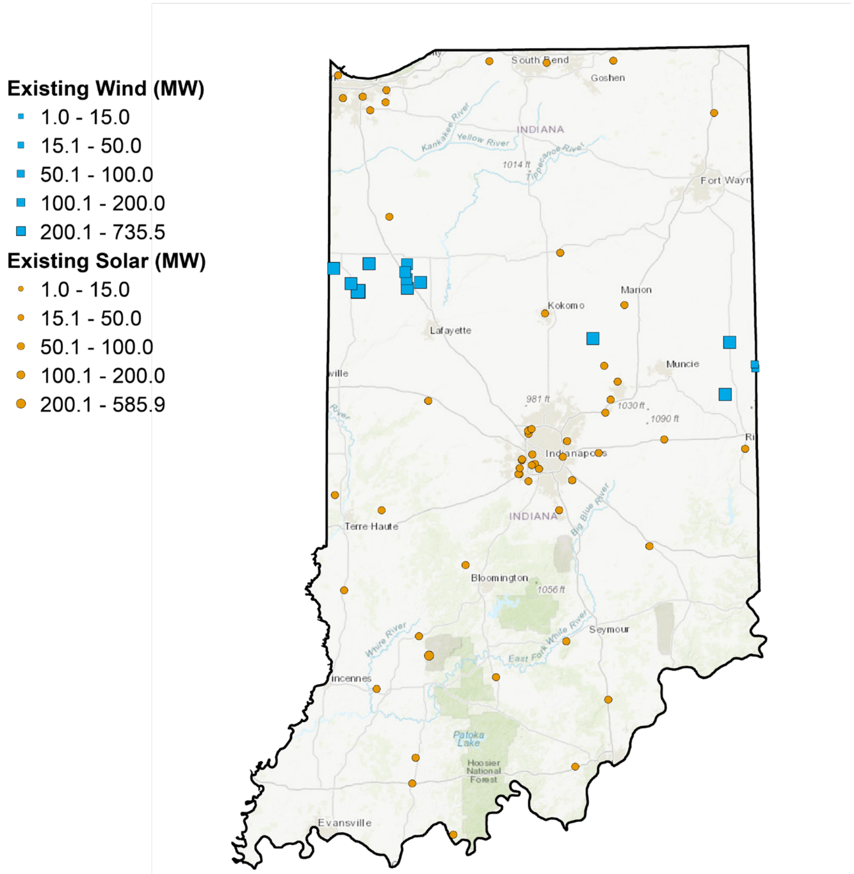
Figure 1 shows the wind potential (in miles per hour) across Indiana for both 80 meters and 100 meters above the ground. Blue and green areas represent the best wind resource and yellow areas represent marginal or poor resources. The elevation shows the resource by wind turbine tower height. Most new wind farms will have turbines at 100-meter height or greater.[4] The data is most accurate at large spatial scales.[5]

Figure 2 shows the solar potential across Indiana. Dark orange areas represent the highest solar resource and light yellow areas represent the lowest solar resource. Scientists collect solar resource data with Light Detection and Ranging (LiDAR) technology, which uses lasers to measure the amount of solar resource available for a given area by calculating the reflection.[6]

EXISTING WIND AND SOLAR PROJECTS

A small but growing portion of Indiana's energy production comes from renewable energy. As of 2018, wind energy made up about six percent of electricity generation in Indiana.[8] Solar energy made up a bit more than half of one percent in the state.[9]

Figure 3. Existing Wind and Solar



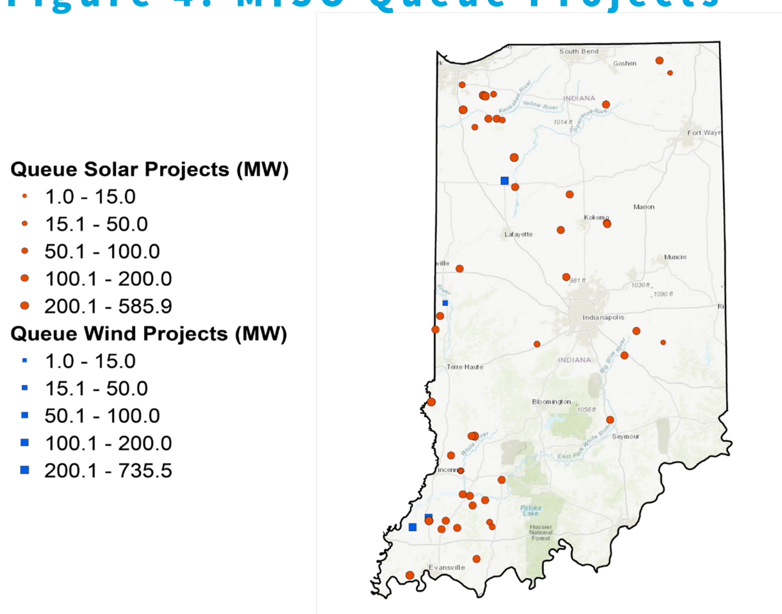
Source: Adapted from US Energy Information Administration Generation Data (via Form 860) for wind and solar energy systems, updated through 2018. Map created April 2020.

Figure 3 shows existing utility- and community-scale solar and wind projects in Indiana. The state had about 444.8 MW of solar installed as of August 2020 and approximately 2,317 MW of wind installed through August 2020.[10,11]

MARKET TRENDS IN WIND AND SOLAR

Every three years, utilities under the jurisdiction of the Indiana Utility Regulatory Commission file an integrated resource plan (IRP) that details their long-term plan for energy resource additions and retirements. Investor-owned utilities in Indiana included substantial renewable energy resources in their most recent IRPs.[13] Figure 4 shows proposed solar and wind energy projects that have filed an application for interconnection with the Midcontinent Independent System Operator (MISO) as of April 2020, which serves as an indicator of market activity and development interest.

Figure 4. MISO Queue Projects



Adapted from Midcontinent Independent System Operator (MISO) public interconnection queue dataset, accessed April 2020.

Wind: There has been an upsurge of wind energy permitting activity in recent years. Several proposed wind energy projects totaling over 1,400 MW have been approved for development in 2020. Several more are in the planning and investigation phase.

Solar: The Midwest is an increasingly attractive location for wholesale (larger than 10 MW) solar market developments, which could significantly increase Indiana's total solar deployment over the next five to seven years.

Figure 4 displays proposed solar and wind energy projects that have filed an application for interconnection with MISO as of April 2020. Three wind projects, comprising 430 MW of capacity, were in the MISO queue as of August 1, 2020. As of August 1, 2020, developers are pursuing 43 large-scale solar projects, with a generation capacity of nearly 6,900 MW.[12]

SOLAR ENERGY SITING AND POLICY

RESOURCES FOR SITING AND DESIGN BEST PRACTICES

Photo from Great Plains Institute by Katharine Chute

State Solar Policy Summary

In 2011, the Indiana legislature adopted a voluntary program for utilities that establishes a goal for 10% of electricity produced by the utility to come from clean energy sources by 2025.[14] To date, no utilities have opted into participating in this program.

Indiana's Utility Regulatory Commission regulates utility practices related to distributed generation or small-scale solar development, such as net metering and interconnection.

Existing Programs and Resources

A number of Indiana communities are participating in a best practice program, the National SolSmart solar-ready certification program for local governments. The SolSmart program offers additional models and guidance on land use and solar development, as well as free technical assistance to participating communities through 2020.[15]

Additional information is being developed on specific siting or ordinance topics that are evolving as the solar industry grows, such as decommissioning considerations, waste disposal (including solar panel replacement or wind turbine repowering), and integration of battery storage in large-scale projects.[16]

Local Government Policy, Programs, and Impact

Local government policies and goals also impact the solar and wind market as individual communities set renewable energy, electricity, and solar development goals. In Indiana, several communities have adopted renewable or clean energy goals. Indianapolis set a goal for 20% of energy consumed locally to come from renewable sources by 2025 and North Vernon set and already reached a goal to power city operations with 100% renewable energy.

Photo from Great Plains Institute by Katharine Chute

SITING AUTHORITY

In Indiana, all solar energy projects, regardless of size, are subject to local land use controls and must acquire zoning or development permits from the local government in which the project is located.[17]

Local governments may adopt solar ordinances but may not adopt an ordinance that prohibits or unreasonably restricts the use of solar energy systems, except to preserve or protect public health and safety. A solar ordinance may restrict solar energy systems so long as it does not significantly increase the cost of the system or decrease its efficiency or allow for an alternative system of comparable cost and efficacy.[18]
A number of local governments in Indiana (South Bend, Henry County, Porter County, among others) have adopted solar ordinances already, and Indiana University's Environmental Resilience Institute, in partnership with the Great Plains Institute, released a Model Solar Ordinance to help others do the same. Members of the public may provide comments on proposed solar energy developments through local Area Plan Commission, Board of Zoning Appeal, and Commissioner meetings.

WIND ENERGY SITING AND POLICY

State Wind Policy Summary

As of 2019, wind energy provides six percent of electricity in Indiana.[19] Communities across Indiana have developed local ordinances regulating wind energy development, with some differences in standards, restrictions, and requirements. In 2011, the Indiana legislature adopted a voluntary program that establishes a goal for 10% of electricity produced by the utility to come from clean energy sources by 2025.[20] To date, no utilities have opted into participating in this program.

SITING AUTHORITY

In Indiana, the siting regulation and land use permitting for wind energy development is currently handled by local governments through local zoning.20 Members of the public may provide comments on proposed wind energy developments through Area Plan Commission, Board of Zoning Appeal, and Commissioner meetings.

At the state level, Indiana does not assert jurisdiction over the siting of wind energy development, nor does it recommend any guidelines related to the siting of wind energy development.

Indiana Community Wind Ordinances

Many counties in Indiana have adopted wind development ordinances. A partial list of those local governments is provided by the Indiana Wind Exchange.[21] The counties in this study included Benton, Carroll, Cass, Clinton, Grant, Henry, Huntington, Jay, Logansport, Madison, Marshall, Montgomery, Randolph, Rush, Steuben, Tippecanoe, Tipton, Wabash, Warren, and White Counties.

Endnotes

1 Rynee, Suzanne, Larry Flowers, Eric Lantz, and Erica Heller, "Planning for Wind Energy," American Planning Association, November 2011.

2 Ind. Code § 8-1 – 8.8-11

3 "White County Wind Farm Case Study: White County, Indiana saves money and boosts the economy with wind energy," Meadow Lake Wind Farm Project Summary, University of Indiana, Environmental Resilience Institute, accessed November 2020, https://eri.iu.edu/erit/case-studies/white-county-wind-energy.html

4 "Wind Power Technology Trends," Electricity Markets and Policy, accessed September 2020, https://emp.lbl.gov/wind-power-technology-trends.

5 Draxl, Caroline, Andrew Clifton, Bri-Mathias Hodge, and Jim McCaa, "The wind integration national dataset (WIND) toolkit," National Renewable Energy Laboratory, August 2015.

6 Sengupta, M., Y. Xie, A. Lopez, A. Habte, G. Maclaurin, and J. Shelby, "The National Solar Radiation Data Base (NSRDB)," Renewable and Sustainable Energy Reviews, 89 (June 2018): 51-60.

7 National Renewable Energy Laboratory (NREL), Wind Integration National Dataset at 80- and 100-meter hub heights, accessed August 2020, https://www.nrel.gov/gis/wind.html.

8 "Wind Energy in Indiana," U.S. Department of Energy Office of Energy Efficiency and Renewable Energy, accessed August 2020, https://windexchange.energy.gov/states/in.

9 "Indiana Solar," Solar Energy Industries Association (SEIA), last modified Q4 2019, accessed August 2020, https://www.seia.org/state-solar-policy/indiana-solar.

10 "Indiana Solar," Solar Energy Industries Association (SEIA), last modified Q4 2019, accessed August 2020, https://www.seia.org/state-solar-policy/indiana-solar.

11 "Wind Energy in Indiana," U.S. Department of Energy Office of Energy Efficiency and Renewable Energy, accessed February 2020, https://windexchange.energy.gov/states/in.

12 MISO Generation Interconnection Queue, Midcontinent Independent System Operator (MISO), accessed August 1, 2020. https://www.misoenergy.org/planning/generator-interconnection/GI_Queue/.

13 "Integrated Resource Plans," Indiana Utility Regulatory Commission, accessed August 2020, https://www.in.gov/iurc/2630.htm.

14 "Indiana CHOICE Program," Indiana Office of Energy Development, accessed August 2020, https://www.in.gov/oed/2649.htm.

15 "SolSmart Designation Program", SolSmart. https://www.solsmart.org.

16 "Repowering and Decommissioning," Great Plains Institute, last modified April 2020, https://www.betterenergy.org/blog/repowering-and-decommissioning-what-happens-in-communities-when-solar-and-wind-projects-end/.

17 Ind. Code § 36-7-4-203

18 Ind. Code §36-7-2-8

19 "Wind Energy in Indiana," U.S. Department of Energy Office of Energy Efficiency and Renewable Energy, accessed August 2020, https://windexchange.energy.gov/states/in.

20 "Indiana CHOICE Program," Indiana Office of Energy Development, accessed August 2020, https://www.in.gov/oed/2649.htm.

21 "Wind Energy Policies and Incentives Ordinances Database," WINDExchange, last modified 2018, https://windexchange.energy.gov/policies-incentives?state=in.

ABOUT THE GREAT PLAINS INSTITUTE

GREAT PLAINS INSTITUTE

Better Energy. Better World.

A nonpartisan, nonprofit organization, the Great Plains Institute (GPI) is transforming the energy system to benefit the economy and environment. Working across the US, we combine a unique consensus-building approach, expert knowledge, research and analysis, and local action to find and implement lasting solutions. Our work strengthens communities and provides greater economic opportunity through creation of higher paying jobs, expansion of the nation's industrial base, and greater domestic energy independence while eliminating carbon emissions.

www.betterenergy.org

ABOUT INDIANA UNIVERSITY'S ENVIRONMENTAL RESILIENCE INSTITUTE

INDIANA UNIVERSITY
ENVIRONMENTAL RESILIENCE INSTITUTE

The Environmental Resilience Institute is a research body housed at Indiana University. The mission of the Environmental Resilience Institute is to enhance resilience to environmental change in Indiana and the Midwest by accurately predicting impacts and effectively partnering with communities to implement feasible, equitable, and research-informed solutions.

www.eri.iu.edu

If you would like more information on resources available (and relevant) to your specific community, please reach out to:

- Brian Ross, Vice President, Renewable Energy Program | bross@gpisd.net | 612-767-7296
- Emma Pierson, Communities Program Associate | epierson@gpisd.net | 612-208-9846

Fact Sheet:

Repowering and Decommisioning: End of Life for Renewable Energy

OCTOBER 2020

Local governments should include the end-of-life decisions and impacts of renewable energy systems when developing and planning projects in their community.

The end of life refers to the point at which renewable energy systems are no longer expected to operate as designed. Agreements such as land leases and power purchase agreements typically last until the system's end of life. Most wind and solar energy systems constructed before 2016 had a 20- to 30-year range, whereas newer systems can have upwards of a 30- to 35-year range. The lifespan of such systems varies between **wind**[1] and **solar**[2] systems and depends on the model type, and manufacturer, among other factors.

The primary options for a large renewable energy system when it reaches end of life are repowering or decommissioning. Deciding between these options depends on factors including project profitability, on-going opportunity for energy sales, re-negotiation of the land lease, land use permitting, and system condition. Communities may also set a definition in an ordinance at which point a repower constitutes the same permitting requirements as a decommission. For example, if over a certain percentage of a project's components are being replaced or upgraded, a community may require a new conditional use permit akin to a project undergoing decommissioning.

GREAT PLAINS INSTITUTE | Better Energy. Better World.

With questions or for more information, contact Jessi Wyatt at jwyatt@gpisd.net

Repowering

Repowering means that the renewable energy system will be refurbished, replaced, or upgraded, and the project will continue to operate at the same location for another lease cycle. A renewable energy system repower can take several forms:

- the entire system may be upgraded or replaced
- portions of the system (hardware or software) may be upgraded or replaced
- the power or energy output (power purchasing agreement [PPA] output) can be re-negotiated during a repower and may increase
- the size or configuration of the system may change (e.g., repowered wind turbines are generally taller, and the blades longer, whereas solar panels usually keep a similar land footprint)

Decommissioning

Decommissioning means that the system is deconstructed and removed from the site. The land is then made ready for redevelopment or reverted to its original use, depending on decommissioning plans or lease stipulation. A decommissioning plan and costs associated with project removal are usually included in the project application. Many local governments stipulate that a project must decommission if it is not in operation for several years (typically between one and five).

A project can initiate decommissioning in two ways: (1) At its end of life, when economics or regulatory barriers limit repowering; and (2) if a project is abandoned due to owner bankruptcy or a natural disaster damaging the installation beyond repair. Nearly all wind farms are required by lease or as a condition of a land use or operating permit to post decommissioning bonds or similar financial surety.

Local Government Considerations

The decision to repower or decommission wind and solar projects can have subsequent impacts for local communities. Communities should also consider how frequently they plan to revisit solar and wind siting rules and processes (e.g., adopted ordinance language or development review guidelines). As technology advances, updates may be necessary to ensure that language and intent stay relevant.

Table 1. Local impacts of wind and solar energy systems

Jobs	Both repowering and decommissioning may provide local job benefits, although those job benefits vary depending on end-of-life processes. Jobs may include construction, deconstruction, and maintenance of wind and solar energy systems.	
Roads	Increased traffic volume from either repowering or decommissioning increase general wear or congestion from heavy equipment. To mitigate this concern, communities typically require that companies post a bond related to heavy equipment on roads that may damage the road itself.	
Land Use	The land use footprint of the project will likely remain constant if a wind project repowers unless the turbine height increases. Increasing the turbine height can trigger additional setback or interspacing requirements, depending on local or state regulations. However, with increased turbine height and per turbine output, project footprint may also decrease if fewer, taller turbines are able to provide the same power output as prior to the repower.	Repowering will likely not result in a larger solar project footprint. Developers may decide to replace panels or the array configuration to improve the project efficiency, output, or economics; with more efficient panels, or use of a tracking system, the project can offer more power for sale more reliably, more often.
Taxes	Wind energy systems can provide local tax revenues through property, sales, and (depending on the state) production taxes. Repowered wind energy systems may provide increased production and sales tax revenue as (a) more parts are purchased as a function of the repower, and (b) more powerful systems generate more energy. However, if a project generates the same output with fewer turbines, it is possible that the project takes up less property space, thus resulting in less property tax revenue.	Solar energy systems can provide local tax revenues through property, sales, and (depending on the state) production taxes. Repowered solar energy systems may provide increased production and sales tax revenue (in states where energy system components are not exempt from sales tax) as (a) solar system parts are purchased as a function of the repower, and (b) more powerful systems generate more energy.
Waste and Recycling	Wind energy systems are made up of many materials that can be easily recycled and some that are more difficult to recycle. Experts are actively developing solutions to minimize waste generation and ensure proper disposal. States are also working to devise guidance policy on renewable waste and creation of recycling alternatives.	Solar energy systems are made up of recyclable and salvageable materials, and others that present more challenges. Experts are actively developing solutions to minimize waste generation and ensure proper disposal. States are also working to devise guidance policy, create programs to reduce waste, and create recycling alternatives.

ABOUT THE GREAT PLAINS INSTITUTE

GREAT PLAINS INSTITUTE

Better Energy. Better World.

A nonpartisan, nonprofit organization, the Great Plains Institute (GPI) is transforming the energy system to benefit the economy and environment. Working across the US, we combine a unique consensus-building approach, expert knowledge, research and analysis, and local action to find and implement lasting solutions. Our work strengthens communities and provides greater economic opportunity through creation of higher paying jobs, expansion of the nation's industrial base, and greater domestic energy independence while eliminating carbon emissions.

www.betterenergy.org

Endnotes

1 Vekony, Green Match, "The Opportunities of Solar Panel Recycling: What Happens to PV Panels When Their Life Cycle Ends," March 2020. https://www.greenmatch.co.uk/blog/2017/10/the-opportunities-of-solar-panel-recycling#:~:text=According%20to%20studies%2C%20the%20life,cent%20when%20reaching%2025%20years

2 Wiser and Bolinger, Lawrence Berkeley National Laboratory, "Benchmarking Anticipated Wind Project Lifetimes: Results from a Survey of U.S. Wind Industry Professionals," September 2019. https://eta-publications.lbl.gov/sites/default/files/wind_useful_life_report.pdf

Fact Sheet:

Harnessing Co-Benefits of Solar Development

OCTOBER 2020

Solar energy development can help communities meet their clean energy, greenhouse gas reduction, and economic development goals. When solar arrays are sited and designed to serve multiple purposes (not just energy production), communities can capture benefits beyond energy, reducing greenhouse gas emissions, and economic benefit goals. These co-benefits may include enhanced water quality, wildlife habitat, or agricultural development opportunities. Understanding the co-benefits that solar development can provide, and the mechanisms to enable various types of co-benefits, can allow communities to harness co-benefits to achieve community-specific, desired outcomes.

GREAT PLAINS INSTITUTE | Better Energy. Better World.

With questions or for more information, contact Jessi Wyatt at jwyatt@gpisd.net

Harnessing Co-Benefits of Solar Development

Until recently, solar was deployed as a form of industrial development in many parts of the country. This meant that site conditions maximized the utility for energy production, without much consideration for local impacts, or lost opportunity to create co-benefits. Siting location was often selected out of economic convenience, and site design involved acres of graded terrain with exposed soil or gravel—all practices which had potentially negative local consequences. However, as communities become increasingly aware of co-benefits, the approach to solar deployment is evolving—and the benefits are multiplying.

Siting Process Considerations

Co-Benefit	Mechanism
Habitat areas	Solar may be sited in areas near critical habitat corridors to and designed with appropriate vegetation or habitat elements to create buffers around critical areas. Habitat areas may cater to wildlife, pollinators, or specific types of vegetation like native prairies.
Economic development and repurposing of brownfields and contaminated sites	Solar may be sited on contaminated lands and closed landfills (called brightfields) for economic development and reconstituting land contamination.
Surface water quality	Solar sites can be designed and operated to have permanent perennial or native ground cover that serve as infiltration areas or buffers protecting surface waters, reducing impairments associated with nutrient or sediment.
Drinking water quality	Solar may be sited on recharge areas for drinking water supplies or wellhead protection areas to limit nitrate and other contamination vectors, and enhance water quality.
Restoring soil health and sequestering carbon	Perennial, prairie, or pollinator ground cover under and around solar developments will restore or build soil health, including building organic content and sequestering carbon. Results in more productive agricultural yields if returned to agricultural use at the end of the solar lease—typically 25-30 years.
Solar-integrated agriculture, agrivoltaics, soil grazing, and crop diversity	By integrating or co-locating agriculture and solar deployment, agrivoltaics emphasizes ways that solar panels can co-exist with either commodity production, like fruits or vegetables, or by planting grasses and forbes on which livestock like sheep can graze. Both approaches heighten the economic value of the site, and enhance the utility of the development. Solar designs that accommodate livestock are currently under investigation.

Opportunities for Co-Benefits through Site Design

Solar arrays have often been installed and operated as industrial energy systems, which involves to gravel-covered lots or acres of hardpacked, exposed soil. The site design of solar arrays can capture other co-benefits with best practices:

- creating pollinator habitat underneath and around arrays
- restoring and protecting native grassland habitat underneath and around arrays
- creating buffer areas to sensitive habitat(s)
- providing water quality protection in sensitive watersheds

Site Design Best Practices

Conventional Site Preparation	Low-Impact and Conservation Design Site Preparation
Clearing and grubbing of soil and roots	Existing vegetation is left intact or is replaced with low-growing native vegetation species or crops.
Topsoil stripping and stockpiling	Existing topsoil is left in place to allow for the successful growth of native vegetation and to promote soil health post-decommissioning of the solar project.
Land grading and leveling using heavy machinery	Natural contours of the land are worked into the design and configuration of the solar project, with minimal if any land grading required.
Soil compaction using heavy machinery	Soil and vegetation are left intact to facilitate the growth of native vegetation, improved stormwater management through less runoff and erosion, and soil health.
Land footprint for the foundations of vertical support structures, often including concrete	Lower land footprint for foundations of vertical support structures, often driven piles.
Vegetation that supports habitat is discouraged and removed	Vegetation that supports habitat (e.g., pollinator species, other native fauna) is encouraged.
Operation and maintenance (O&M) activities include herbicide spraying, mowing of weeds, and other vegetation	Minimal O&M activities due to low-growing native vegetation species, could involve livestock grazing.

Source: National Renewable Energy Laboratory, 2019

When solar arrays are integrated with other land uses, there are additional site considerations:

- Solar array height: for accomodating vegetated ground cover, co-located agriculture, and maintenance needs.
- Fencing: to accommodate wildlife or designed habitat goals, or for visual appearance.
- Screening and setbacks: to designate how and to what extent solar land uses interact with neighboring or surrounding land uses.

Local siting jurisdictions can choose to proactively integrate some or all of these considerations into local land use planning through zoning, ordinances, and development permits or review.

ABOUT THE GREAT PLAINS INSTITUTE

GREAT PLAINS INSTITUTE

Better Energy. Better World.

A nonpartisan, nonprofit organization, the Great Plains Institute (GPI) is transforming the energy system to benefit the economy and environment. Working across the US, we combine a unique consensus-building approach, expert knowledge, research and analysis, and local action to find and implement lasting solutions. Our work strengthens communities and provides greater economic opportunity through creation of higher paying jobs, expansion of the nation's industrial base, and greater domestic energy independence while eliminating carbon emissions.

www.betterenergy.org

Center for Rural Pennsylvania

Testimony on Solar Energy

Pennsylvania State Grange

Wayne Campbell
President
Pennsylvania State Grange
717-275-5045
president@pagrange.org

Thank you for holding this hearing on solar energy development. The Center for Rural Pennsylvania has always been in the forefront of matters affecting rural PA.

For the record, I am Wayne Campbell, President of the Pennsylvania State Grange. As you may know, the Pennsylvania State Grange is one of, if not the oldest organization, that advocates for rural Pennsylvanians, having been founded in 1873.

Enhancing the use of alternative energy is a positive goal for this General Assembly to pursue. Solar energy is a prime example of real-world energy generation leaving minimal climate footprint.

However, there are observations and suggestions that the Pennsylvania State Grange wishes to share with you about solar energy development and public policy.

Many environmental conversations in Harrisburg center around possible harms/benefits based on how energy is produced and distributed. Granted, most can agree that regardless of the source, energy's distribution infrastructure, The Grid, needs updating. Thankfully, that is more of a Federal issue with President Biden's Infrastructure legislation.

Most legislators would probably agree that more use of solar energy would be a positive regardless of their positions on volatile environmental issues. This hearing does not focus on perceived evils of a particular energy resources but looks positively on expansion of a consensus energy resource.

In addressing energy issues, the General Assembly must resist the call of putting all our public policy eggs in one basket. That is one lesson we should have learned loud and clear from Covid and the impact it had on our centralized food processing plants. We must not say that solar power is the only way and provide incentives that discourage innovative thinking about other ways. Some examples:

- A farmer who reduces fossil fuel use because of methane gas generation is as much of an environmental hero as a farmer who uses solar energy to do the same.
- A soybean farmer who can manufacture biofuel from his or her own crop reduces dependence on traditional gasoline.
- A farmer who marries several technologies (solar, natural gas, wind power, earth heat, and yes, probably high ethanol gasoline,) contributes to the public good and his or her farm's well-being.

In other words, legislators should not pick sides and suggest that there is only one energy solution worth pursuing. Allow farmers to look at options and decide for themselves what is best for their family and their farm.

Solar energy is a feasible option for many farms.

Recently, attention has been given to large-scale solar farms. Sometimes called utility scale solar energy production or solar industrial factory farming.

The Pennsylvania State Grange's concern is placement.

Given Pennsylvania's national ranking as number one in farmland preservation, we should not reduce productive farmland by replacing it with solar industrial factory farming. Protecting farmland is a public policy goal. So is alternative energy generation. **We should not make those two priorities conflict.**

Locating solar industrial factory production means that this land is no longer farmed as before. It is farmland being taken out of normal production. If it happens enough, there will be an impact on PA's Number One industry, Agriculture. Even one farm that was previously leased by a neighboring farmer to produce crops for his animals, but is now lost to these commercial solar farms, may force him out of business. When we lose a farm, we lose financial support to how many other businesses in that area?

If legislation is being drafted, perhaps there should be a stipulation that solar industrial factory farm construction should only be allowed on farmland which is unusable for production agriculture such as a steep slope.

Farmland is the usual placement for solar industrial factory farming. Why? It is regarded as cheaper and many farmers see placement as additional revenue. A warning to farmers though. This is almost like the early days of the Marcellus Shale land leasing rush. A farmer who does not retain a land-use attorney in negotiating for large-scale solar is asking for possible trouble down the road. What happens when the life of the solar panels is up? Who is going to pay the recycling costs? Can they be recycled? All very important issues!

Besides non-productive farmland, there are other placement alternatives.

These include brownfields and mine reclamation areas.

Brownfields are land where contamination has occurred but where this type of economic development could take place. A federal registry lists 468 brownfield locations in 24 Pennsylvania counties. Philadelphia leads with 180 followed by Allegheny with 81. There are four counties with between 20 and 37 brownfields locations: Cambria 37; Lancaster 22; Lehigh 23; and York County with 25 locations.

Falling in the 2-19 location range are thirteen counties: Lycoming 15; Bucks 14; Washington 12; Northumberland 11; Somerset 9; Centre, Chester, Dauphin, Lackawanna, and Luzerne counties with five brownfield locations each. Having three locations each are Berks, Montgomery, and Westmoreland counties.

Having one brownfield location are Armstrong, Bradford, Carbon, Delaware, and Mifflin counties.

A DEP database adds 12 additional sites in Tioga, Northumberland, Clinton, Potter, Union, and Clearfield counties.

That is a total of 480 brownfield locations in the Commonwealth, some of which might be feasible locations for construction of solar industrial factory farms.

Sources:

https://environment.netronline.com/state/PA/acres/.

https://files.dep.state.pa.us/EnvironmentalCleanupBrownfields/BrownfieldRedevelopment/BrownfieldRedevelopmentPortalFiles/BrownfieldsBasicsWebinarOctober292020.mp4.

Mine Reclamation

One legacy from mining over the decades is land made unusable because of mineral extraction.

DEP has inventoried over 287,000 acres of land still in need of reclamation. A 2018 inventory pointed to five billion dollars' worth of unfunded problems. Unfunded means that this reclamation will not happen unless there is a way to pay for it.

Source:

https://files.dep.state.pa.us/Mining/Abandoned%20Mine%20Reclamation/AbandonedMinePortalFiles/AML_Fact_Sheet_Final_2019_03_11.pdf.

If it is true that construction of solar industrial factory farms does not disturb land as much as conventional reclamation, perhaps this could be a more affordable option to consider for this economic development. This cost/benefit analysis may already have been done.

Given the desire to reclaim land from blighted areas, there may even be reduced cleanup requirements for land used to produce solar power instead of an economic project where there is greater risk to human health. That would presumably reduce the cost of installing solar industrial factory farms.

Before productive farmland is taken out of agricultural production, one of the research resources that the General Assembly has at its disposal is the Center for Rural Pennsylvania which could be utilized to survey what has been done regarding cost options. How will water run-off be managed? Can we double utilize some of these "farms" by perhaps grazing sheep under them? I hope we have learned from the past when so often we did not look at the big picture, how is this going to affect other industries, the land, the water, water run-off, etc. Time is of the essence here. We cannot just talk about it or we will find ourselves on the wrong side of the issue.

Again, the Pennsylvania State Grange appreciates this opportunity to present testimony.

The Pennsylvania State Grange suggests that **no legislative action be taken to incentivize placement of solar industrial factory farms on productive farmland**. As an alternative, perhaps the Center for Rural Pennsylvania should undertake analysis as to DEP and EPA data on the extent of brownfields and mine reclamation areas and where rural areas large enough for solar development could take place. The study could also analyze costs for reclamation by type of development that would take place.