



**The SolSmart Advantage:
Simplifying Solar to Empower
Local Economies**

Benefits of Solar Development

- **Spurs economic growth**
- **Provides energy choices** for residents and businesses.
- **Reduces costs** and **dependence.**
- **Future Proofs** a region by creating redundancy to an aging infrastructure.

What is SolSmart?

Since 2016, SolSmart has provided **FREE** technical assistance to local governments to streamline local processes, train staff, reduce costs and accelerate solar deployment.

The SolSmart Team



SolSmart + Solar Development

“Soft Costs” make up **65%** of the total cost of a solar PV system”

Helps local governments:

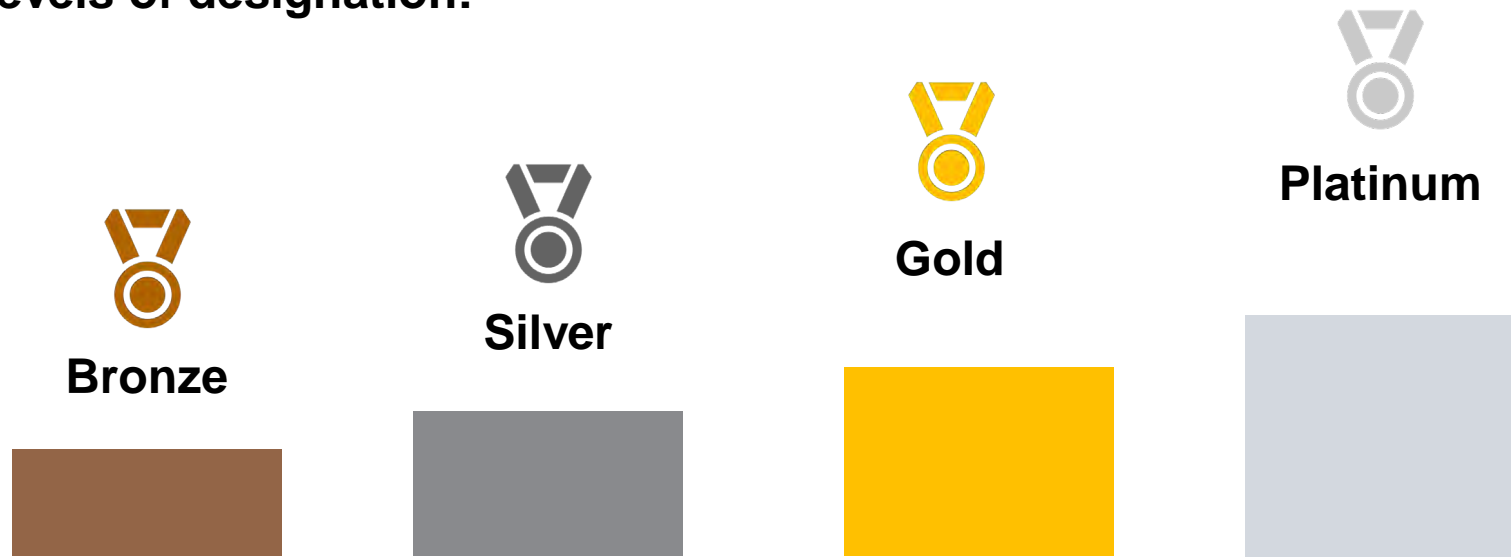
**1.
Removes
Barriers for
Solar**

**2.
Free Technical
Assistance,
Training &
Resources**

**3.
Reduces
solar
“soft costs”**

SolSmart Designation Structure

Four levels of designation:



Best Practices & Customized Support

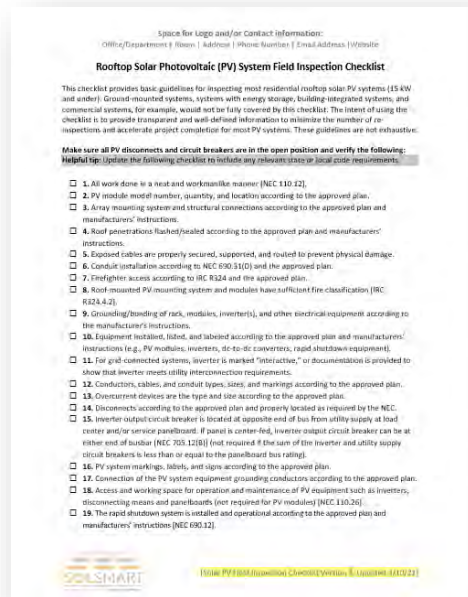
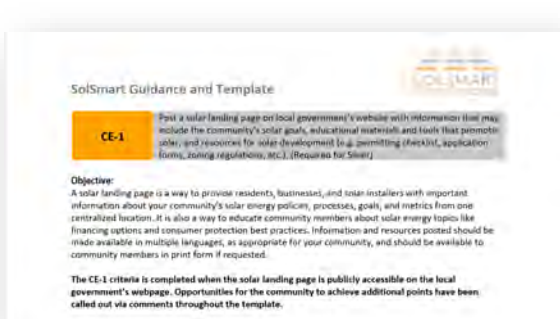
The **SolSmart Program Guides** summarize **best practices** for local governments, counties and regional governments.



Technical Assistance is tailored around the **goals and priorities of your community**.
Could include expert review of materials, webinars, trainings and 1:1 consultations.

Templates and Examples

Communities are provided with templates, checklists, community examples and guidance documents.



Industry Partners



Energy Ready

A Suite of Designation Programs

- Energy-Ready.org
- FREE Technical Assistance





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Planning and Zoning Best Practices for Solar Energy

SolSmart Program
April 23, 2025

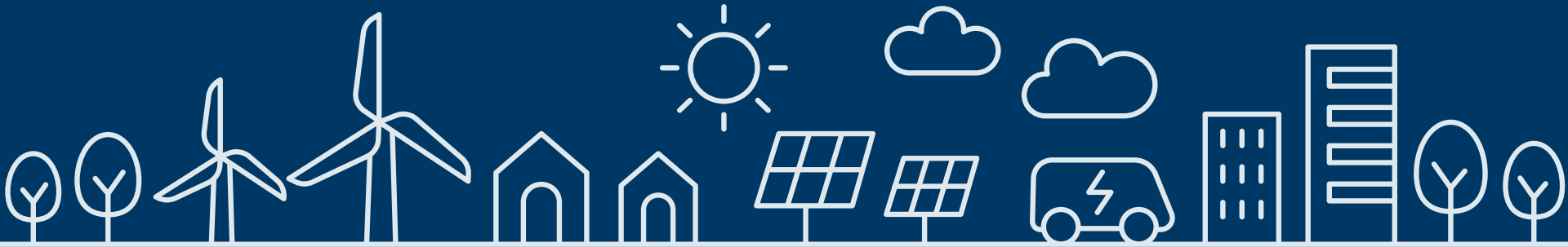
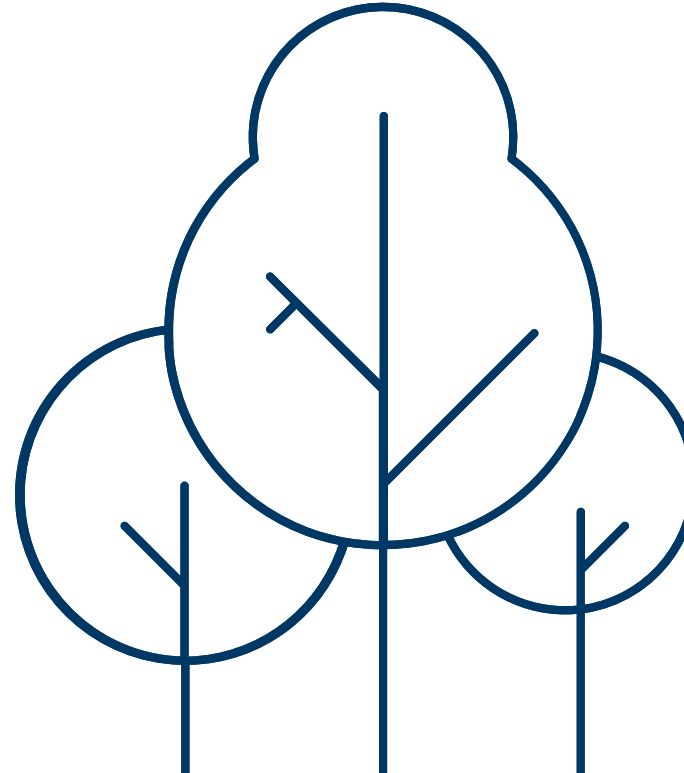



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Our Mission - Accelerate the transition to net-zero carbon emissions for the benefit of people, the economy, and the environment.



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If you remember one thing . . .

Every community is a host community in the clean energy future.

- Renewable energy is an economically valuable local resource in every community in United States
- Energy resource development should align with the community comprehensive or master plan
- Ordinances should enable reasonable development that also captures benefits and minimizes risks to the host community.



Polling Question #1 – Which best describes you?

1. Elected or appointed official in a city
2. City or county staff in a city
3. Elected/appointed official in an exurban or rural community
4. Staff for a exurban or rural community
5. Consultant working with local governments
6. Solar industry (developer, installer, associated industry)
7. Environmental advocate
8. Concerned resident



Polling Question #2 - What is your knowledge or familiarity with solar?

1. I work in or directly with the solar industry
2. I'm very familiar, have to address it frequently
3. I see solar being installed in or around my community, but don't know much about it
4. I hear that it's likely coming to our community
5. I know very little about solar energy
6. I don't know, I was just told that I had to attend this webinar



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Principles for Solar-Ready Communities

- 1. Comprehensive Plans** that describe solar resources and encourage development
- 2. Development Regulations** that explicitly address solar development in its varied forms
- 3. Permitting Processes** that are predictable, transparent, and documented
- 4. Public Sector Investment** in the community's solar resources
- 5. Local Programs** to limit market barriers and enable private sector solar development



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A photograph of a house with a dark metal roof and a gable window. Several solar panels are mounted on the roof. The house is surrounded by greenery and a cloudy sky is in the background.

Solar-Ready Planning



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Photo credit: Brian Ross



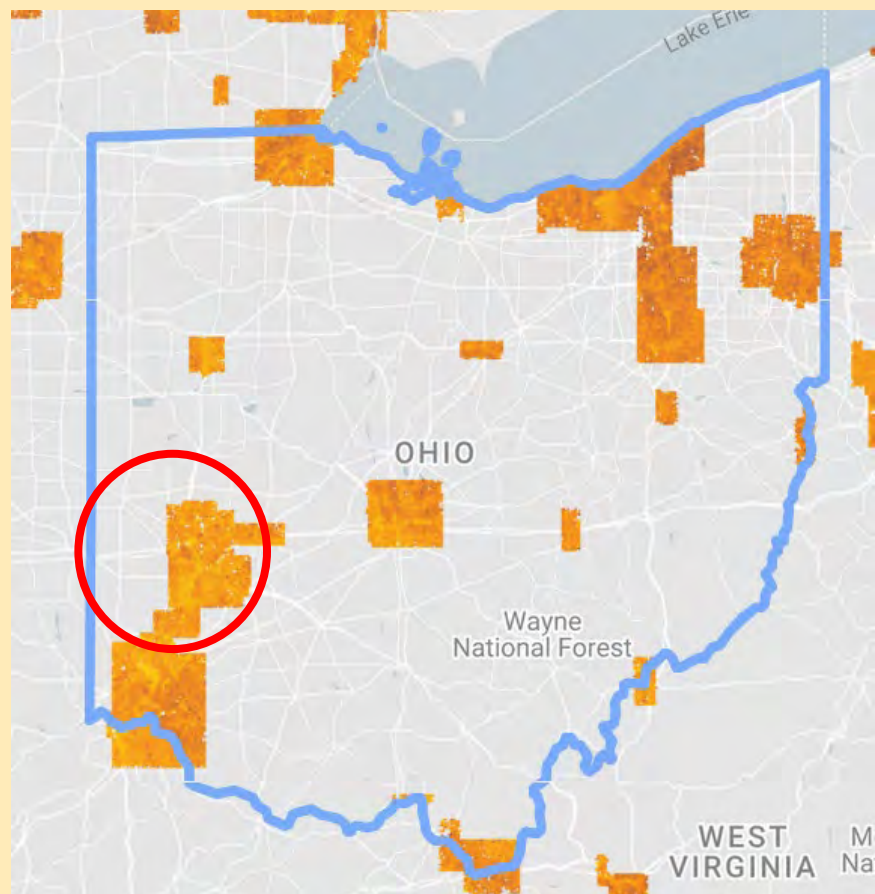
Principles for Solar-Ready Planning

- ✓ Identify and define solar resources,
- ✓ Acknowledge solar development benefits and desired co-benefits,
- ✓ Identify solar development opportunities and conflicts in the community,
- ✓ Set solar development targets or goals.



Local Solar Energy Reserves

- **Google Project Sunroof** Much of MVRPC has rooftop reserve estimates available
- National Renewable Energy Lab's **State and Local Planning for Energy (SLOPE)** has utility-scale and rooftop potential estimates

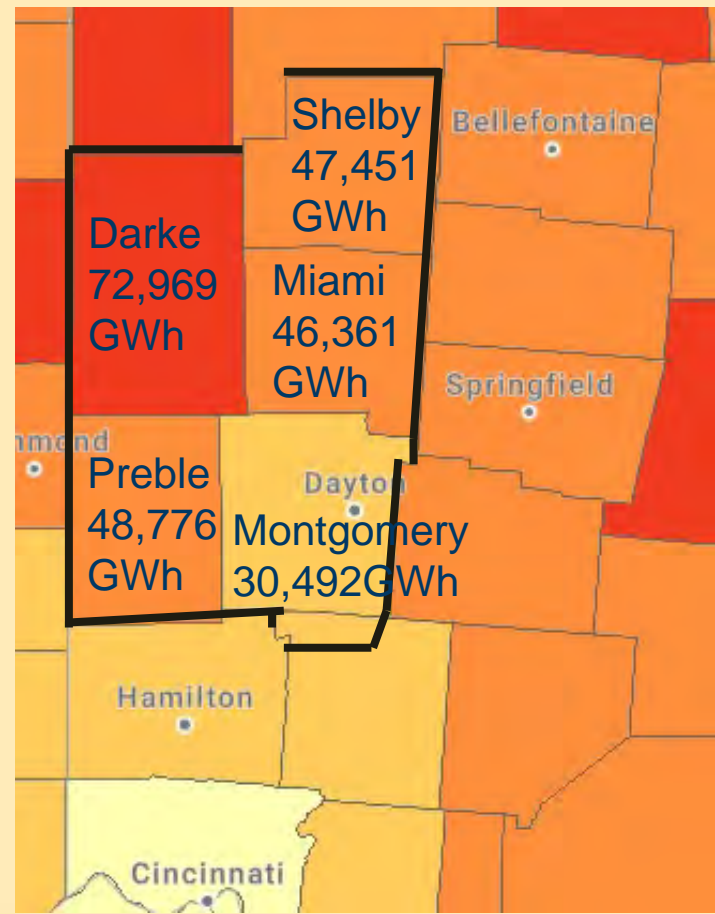


Source: Project Sunroof data explorer (April 2025).



Local Solar Energy Reserves

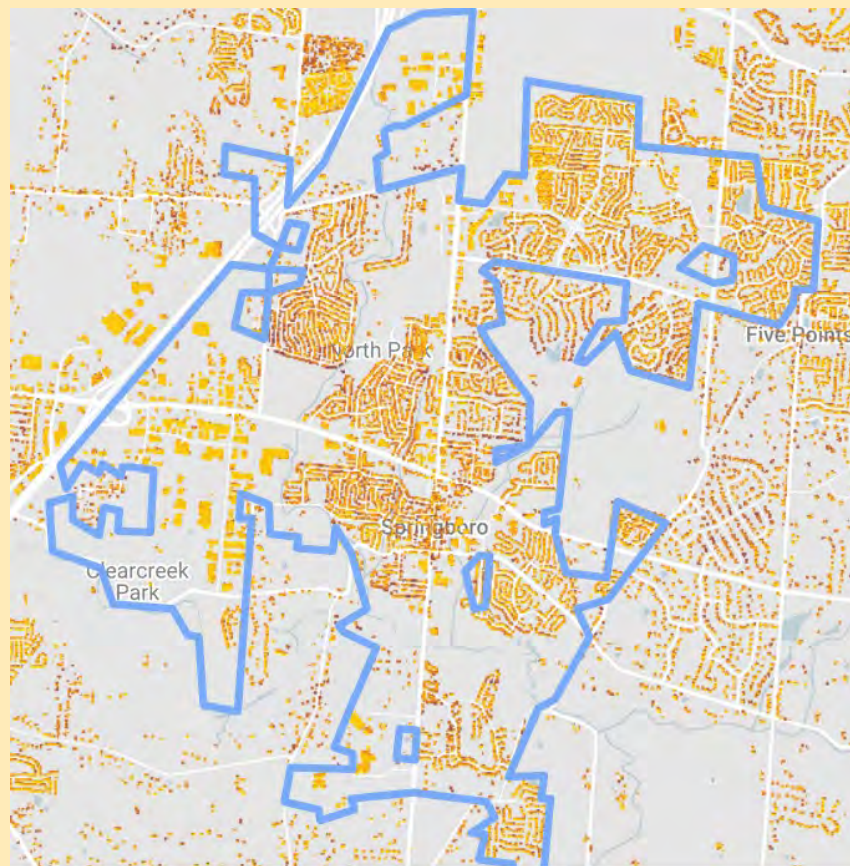
- **Google Project Sunroof** - Much of MVRPC has rooftop reserve estimates available
- National Renewable Energy Lab's **State and Local Planning for Energy (SLOPE)** has county-level utility-scale and rooftop potential estimates



Every Community, a Host Community

Springboro, OH (SolSmart Bronze)

- Rooftop reserves are approximately 211 MW of generating capacity
- Potential of 245 GWh of electricity
- Rooftop reserves are typically equivalent to 35-60% of community annual electric use



Source: Project Sunroof data explorer (April 2025).



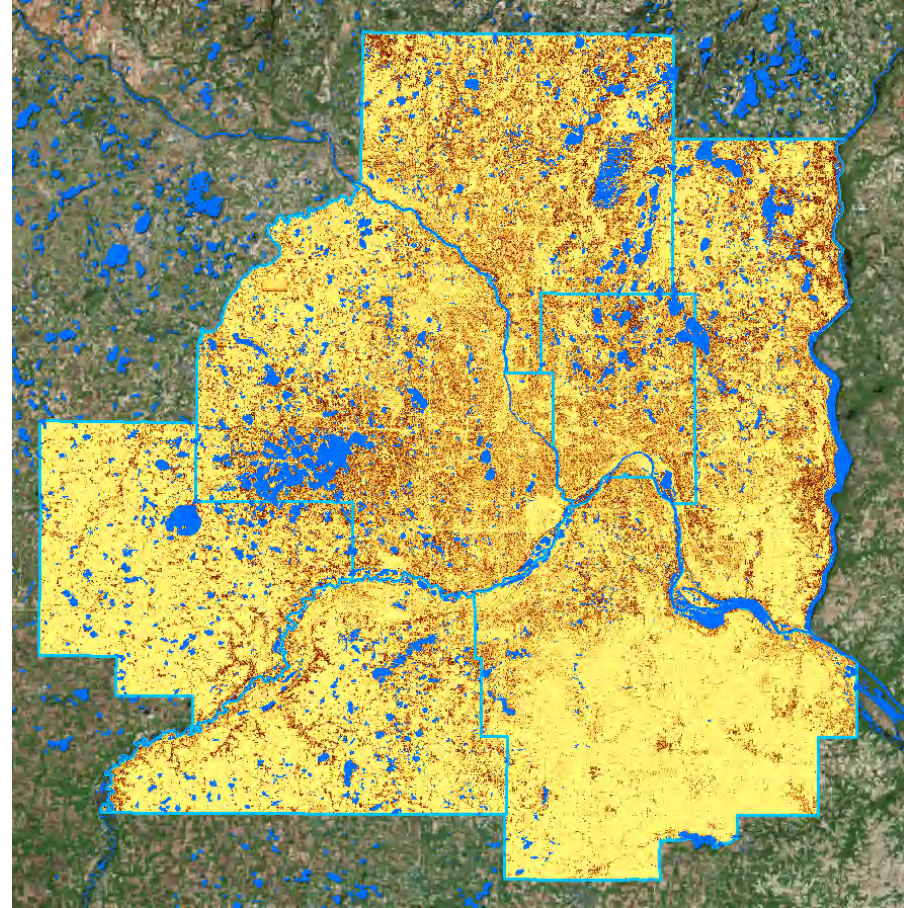
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Solar Energy Resources and Local Benefits

Minneapolis/Saint Paul Metropolitan Council (SolSmart Gold)

The Metropolitan Land Planning Act requires that all local comprehensive plans contain “an element for the protection and development of access to direct sunlight for solar energy systems.” With new data, our ability to measure solar as a natural resource has greatly improved.



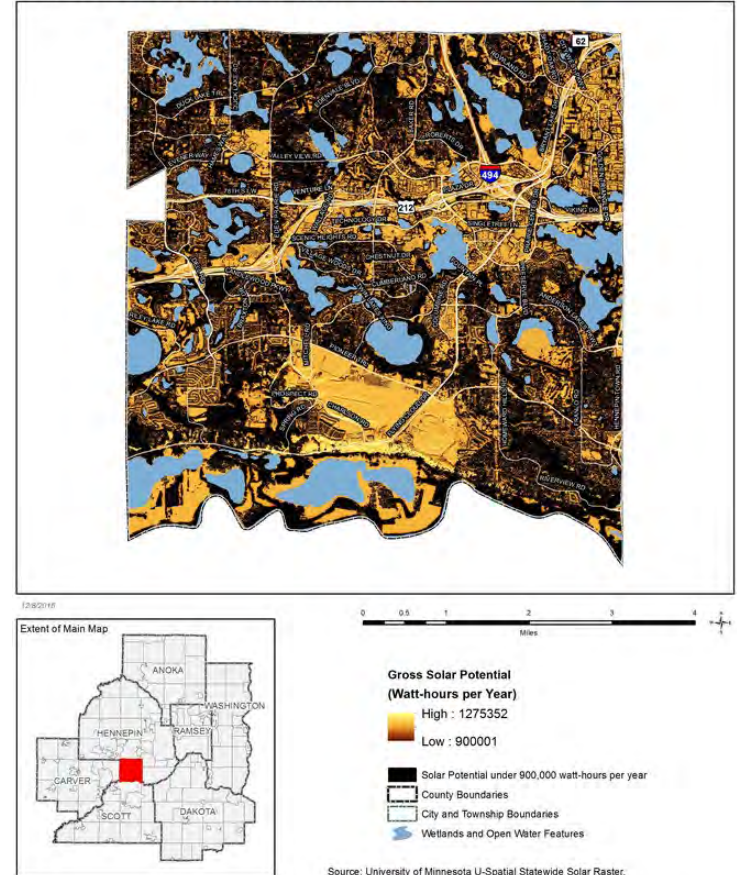
Solar Energy Resources and Local Benefits

Minneapolis/Saint Paul Metropolitan Council (SolSmart Gold)

Four (4) minimum requirements for 2040 comprehensive plan updates.

1. Include your community's Minnesota Solar Suitability Analysis Map.
2. Include calculations of your community's gross solar and rooftop solar resource.
3. Include a policy or policies relating to the development of access to direct sunlight for solar energy systems.
4. Include a strategy or strategies needed to implement the policy or policies.

Gross Solar Potential
City of Eden Prairie, Hennepin County

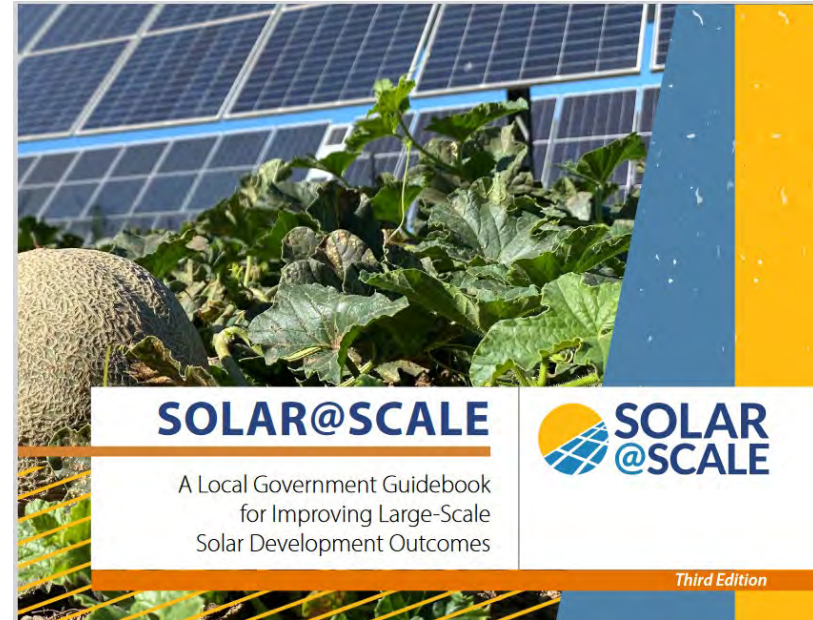


Identify Development Opportunities, Conflicts

Large-Scale Solar Development Guidance

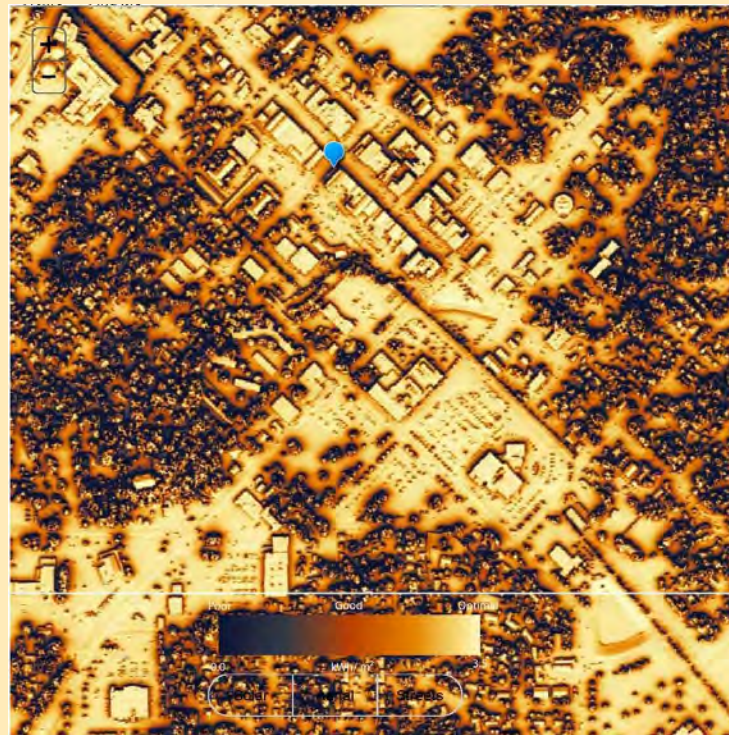
“The following questions may help process leaders and facilitators begin to draw out the most significant issues for stakeholders in their community (Bacher, Nolon, and Zezula 2015):

- How might large-scale solar development benefit you, your organization, or the community?
- What are your biggest concerns about large-scale solar development?
- What are some strategies for overcoming these concerns?
- What other land uses may wish to locate on sites that could host large-scale solar facilities?
- How do the potential land-use impacts of those other uses compare to large-scale solar development?”



To what extent have you integrated solar resources or land uses into your local plans and zoning?

- a. Addressed in the comprehensive plan
- b. Included some solar uses in our zoning ordinance
- c. Solar land uses are in both plan and zoning
- d. We've started conversations about solar, but it's not in the plan or zoning
- e. No one has raised it in either plan or zoning





Solar-Ready Zoning



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Principles for Solar-Ready Zoning

- ✓ Explicitly recognize and address the different forms/uses of solar development,
- ✓ Create by-right installation opportunities,
- ✓ Set clear and predictable standards that balance solar resources and development with other resources and land uses,
- ✓ Enable capture of desired local co-benefits,
- ✓ Maintain consistency with regional best practices.



A photograph of a house with a dark metal roof. Several solar panels are mounted on the roof, primarily on the left side of the gable. The house has light-colored siding and a dormer window. The background shows a cloudy sky and some greenery.

Accessory Use Solar

(Rooftop and Ground-mount)



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Photo credit: Brian Ross



Zoning best practices for distributed-scale solar

Define terms	Include storage and solar hot water heating installations in the definition of “solar,” differentiate systems by area and rooftop versus ground-mounted
By-right accessory use	Allow small rooftop and ground-mounted PV in all major zoning districts
Height	Allow rooftop solar an exemption from or allowance above building height restrictions
Accessory uses	Exempt solar from counting toward accessory uses maximum
Aesthetic requirements	<ul style="list-style-type: none">• Exempt solar from rooftop equipment screening requirements• Allow PV installations to be seen from public roadways• Limit screening or aesthetic requirements to historic districts
Ground -mounted	<ul style="list-style-type: none">• Include small ground-mounted systems as accessory structures• Require conditional use permit for principal use, ground-mounted systems
Lot coverage	Exempt ground-mounted solar from lot coverage restrictions that apply to buildings
Setbacks	Avoid applying principal building setbacks
Roof coverage	Address fire code setback requirements in coordination with fire officials
Glare	Glare studies not needed unless solar is on or adjacent to airport, in which case it will be regulated by FAA, not the local jurisdiction
Regulate based on impact/area	<ul style="list-style-type: none">• Not capacity (kW) as efficiencies and technologies change over time• Not where energy is used (e.g. on-site) as it has no bearing on the impact

Polling Question #4 - What is the biggest concern associated with accessory use solar?

1. Visual impacts
2. Structural issues with older buildings/roofs
3. Ground-mount solar in backyards
4. Glare from rooftop solar
5. Conflict with historic resources
6. Conflicts with urban forest goals
7. All of these
8. No real concerns, people are accepting of it



Height

Best practice: Exempt roof-mounted solar energy systems on flat roofs, similar to other function devices and equipment, from height calculations or allow systems to exceed the maximum height by a fixed amount (5 to 10 feet).

Model Ordinance Example

- For purposes for 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.



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Setbacks

Best practice: Allow ground-mounted solar energy systems the ability to have a modest encroachment into the setback, similar to other mechanical systems.

Model Ordinance Example

- 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.



Lot coverage, impervious surface

Best practice: Exempt ground-mounted systems from lot coverage/impervious surface calculations as long as the ground beneath the system is pervious (e.g. vegetated).

Model Ordinance Example

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



Aesthetics

Best Practice: Exempt solar from rooftop equipment screening requirements, limit screening or aesthetic requirements to historic districts

Model Ordinance Example

- Solar energy systems in residential districts shall be designed to minimize visual impacts from the public right-of-way. . . to the extent that doing so does not affect the cost or efficacy of the system.
- 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.



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Principal Use Solar

(Community- and Utility-scale)



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Zoning best practices for large-scale solar

Define Terms	<ul style="list-style-type: none">• Define large-scale solar as a unique land use (not an industrial land use),• Include storage in the definition of large-scale solar• Distinguish between small and large systems by area as needed
Enable Development	Most large-scale solar will be a conditional or interim use in those districts where allowed, although small or community scale development can be a permitted use
Land Use, not Energy Use	Performance or design standards should focus on land use impacts and benefits, not on energy use or performance
Recognize land use differences	<ul style="list-style-type: none">• Exempt PV panels from coverage limits• Exempt PV panels from impervious surface standards if ground cover is suitably pervious (see co-benefits below)
Capture Co-Benefits	<ul style="list-style-type: none">• Enable habitat-friendly ground cover to be installed, established, and maintained• Enable co-location of agricultural uses (sometimes in place of ground cover)• Enable water quality (surface and ground water) improvements
Screening requirements	<ul style="list-style-type: none">• Look to existing screening requirements as a guide, consistency across land uses• Limit screening to residential districts or existing uses• Balance screening against larger setbacks, both are not necessary
Setbacks	<ul style="list-style-type: none">• Look to existing setback distances as a guide• Balance setbacks with screening requirements (more screening, less setback)• Measure setbacks from array edge
Glare	Glare studies only needed if adjacent to an airport. On-airport solar will be appropriately regulated by FAA
Decommissioning	Require decommissioning to a reasonable standard and financial risk

Polling Question #5 - Which are the most prominent concerns that have been expressed in your community about large-scale solar development?

1. Impact on agricultural soils or prime farmland
2. Competition with local farmers for land or resources
3. Impact on habitat or natural systems
4. Stormwater runoff into surrounding properties or surface waters
5. Impact to groundwater or drinking water supplies
6. Loss of rural character
7. There are no significant concerns
8. I don't really know



Siting (where does it go?)

Community-Scale Solar

- Define by size (not MW)
- Permitted by-right where not in conflict with protected areas or through a conditional use permit in other non-residential districts

Large-Scale Solar

- Everything larger than community-scale
- Permitted through a conditional use permit
- Avoid conflicts with priority natural/economic resources, encourage where co-benefits are greatest



Siting (where does it go?)

Community-Scale Solar

- No conflict with agricultural economic base
- Easier to site on low-impact areas and difficult-to-use parcels
- Easier to interconnect to grid (distribution scale)

Large-Scale Solar

- Development pressure will be near to infrastructure (transmission grid)
- Prioritize low-impact sites where possible (marginal farmland, brownfields, former mine lands)
- Encourage development on sites with high co-benefit opportunities (watershed/habitat enhancement, wellhead protection, agricultural diversification)



Site Design (how is it built?)

- Setbacks
- Screening
- Ground cover and buffer areas
- Power and communication lines, fencing, buffers
- Agrivoltaics/ECOVOLTAICS



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Setbacks

- Property line
- Roadways
- Specific land uses, such as non-participating dwelling units
- Other features such as natural areas, commercial uses, recreation areas.



Setbacks

Model Ordinance Example Language (Minnesota)

- 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.5 below.
- 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.5 below.
- Housing unit setback of 150 feet from any existing dwelling unit of a non-participating landowner, except as otherwise determined in 1.a.5 below.
- Setback distance should be measured from the edge of the solar energy system array, excluding security fencing, screening, or berm.
- 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.

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). . . .*
- *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.*



Screening

- Use existing screening standards as your benchmark
- Consider the screening circumstances
- What is the relationship between screening and setbacks?
- Avoid arbitrary standards



Screening

Model Ordinance ([Minnesota](#))

- 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.
- Screening shall be consistent with Model Community's screening ordinance or standards typically applied for other land uses requiring screening.
- 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.
- Model Community may require screening where it determines there is a clear community interest in maintaining a viewshed.

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.



Ground Cover

- Visual impacts
- Water quality (surface and groundwater)
- Soil health
- Habitat
- Carbon sequestration



Ground Cover ([Illinois model solar ordinance](#))

1. Large-scale removal of mature trees on the site is discouraged. . .
2. The project design shall include the installation and establishment of ground cover meeting the pollinator-friendly standard consistent with 525 ILCS 55/1 “Pollinator-Friendly Solar Site Act” . . .
3. The applicant shall submit a vegetation management plan adhering to guidance set forth by the Department of Natural Resources.
4. Pollinator-friendly standards shall be maintained on the site for the duration of site operation, until the site is decommissioned.
5. The applicant shall submit a financial guarantee . . . equal to (125) percent of the costs to meet the pollinator- friendly standard. The financial guarantee shall remain in effect until vegetation is fully established . . .



The Solar/Agriculture Nexus

- Perceived and real conflicts with agricultural land uses and prime soil resources are the most prominent issues raised by host communities around large-scale solar development
- Local development and protection priorities include natural resource issues (prime soils), economic base (agricultural production), and community character (visual resources)



Polling Question #6 - What the biggest risk of putting solar on agricultural land?

1. Risk to prime or high-quality agricultural soils
2. Loss of productive agricultural capacity or diminishing economic base
3. Loss of rural character in the community
4. All of these
5. None of these (something else)
6. We don't have any ag land in our community



Mitigating Impacts to Agriculture

- **Interim use** - For solar facilities located primarily on prime soils, use interim use or time-limited CUP that allows the site to be returned to agriculture.
- **Soil health** - Require construction methods and maintenance that protects or enhances soil health.
- **Agrivoltaics** - Encourage or require commercial solar facilities that include co-location of agricultural uses (agrivoltaics) on the project site.
- **Co-benefits** - Encourage commercial solar facilities to be located on wellhead protection areas for the purpose of removing agricultural uses from high-risk recharge areas.
- **Mitigation** - Encourage use of ag conservation easements to mitigate loss of production.



Agriculture/Solar Resources

- [AgriSolar Clearinghouse](#) (National Center for Appropriate Technology)
- American Farmland Trust's [Smart SolarSM](#) Principles
- National Renewable Energy Lab's [InSPIRE](#) project
- [PV-SuCESS](#) project (The Great Plains Institute)
- Argonne National Lab's [Solar Soil](#) project
- Academic research and demonstration projects ([Iowa State Agrivoltaics](#) solar farm project)



CHARGING SMART

NATIONALLY DISTINGUISHED. **LOCALLY POWERED.**

Regulation and Zoning



Charging Smart Resources

Charging Smart has many technical assistance resources available to you! Check out these helpful links:

Key Resources:

- [Charging Smart website](#)
- [Electric Vehicle Ordinance Considerations guidebook](#)
- [EVSE Permitting Checklist template](#)



Thank you!
Questions?

