

Solar Siting Best Practices

National Governors Association

**Governors' Advisors Energy Policy
Institute**

July 13, 2021

Brian Ross, AICP, LEED GA

Great Plains Institute



**GREAT PLAINS
INSTITUTE**

Better Energy.
Better World.



TRANSFORMING THE ENERGY SYSTEM TO BENEFIT THE ECONOMY AND ENVIRONMENT.

- INCREASE ENERGY EFFICIENCY AND PRODUCTIVITY
- DECARBONIZE ELECTRICITY PRODUCTION
- ELECTRIFY THE ECONOMY AND ADOPT ZERO- AND LOW-CARBON FUELS
- CAPTURE CARBON FOR BENEFICIAL USE AND PERMANENT STORAGE



**GREAT PLAINS
INSTITUTE**

Better Energy.
Better World.

If you remember one slide ...

1. In the energy system of the future, **nearly everyone will be a host community.**
2. **Most communities have at least some land use jurisdiction over large-scale solar.**
3. **If sited and designed appropriately,** large-scale solar can provide local benefits to host communities - **consistent with community priorities, resources, and development plans.**



**GREAT PLAINS
INSTITUTE**

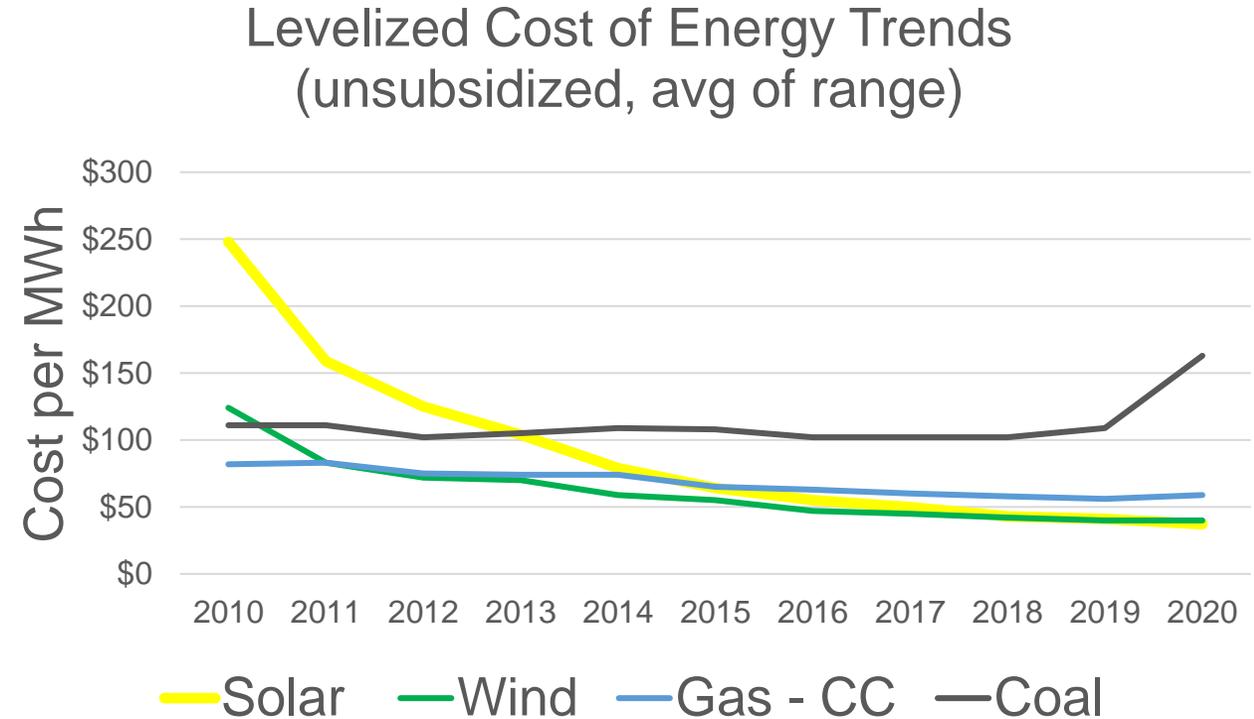
Better Energy.
Better World.



Photo credit: Brian Ross

Why? Cost...

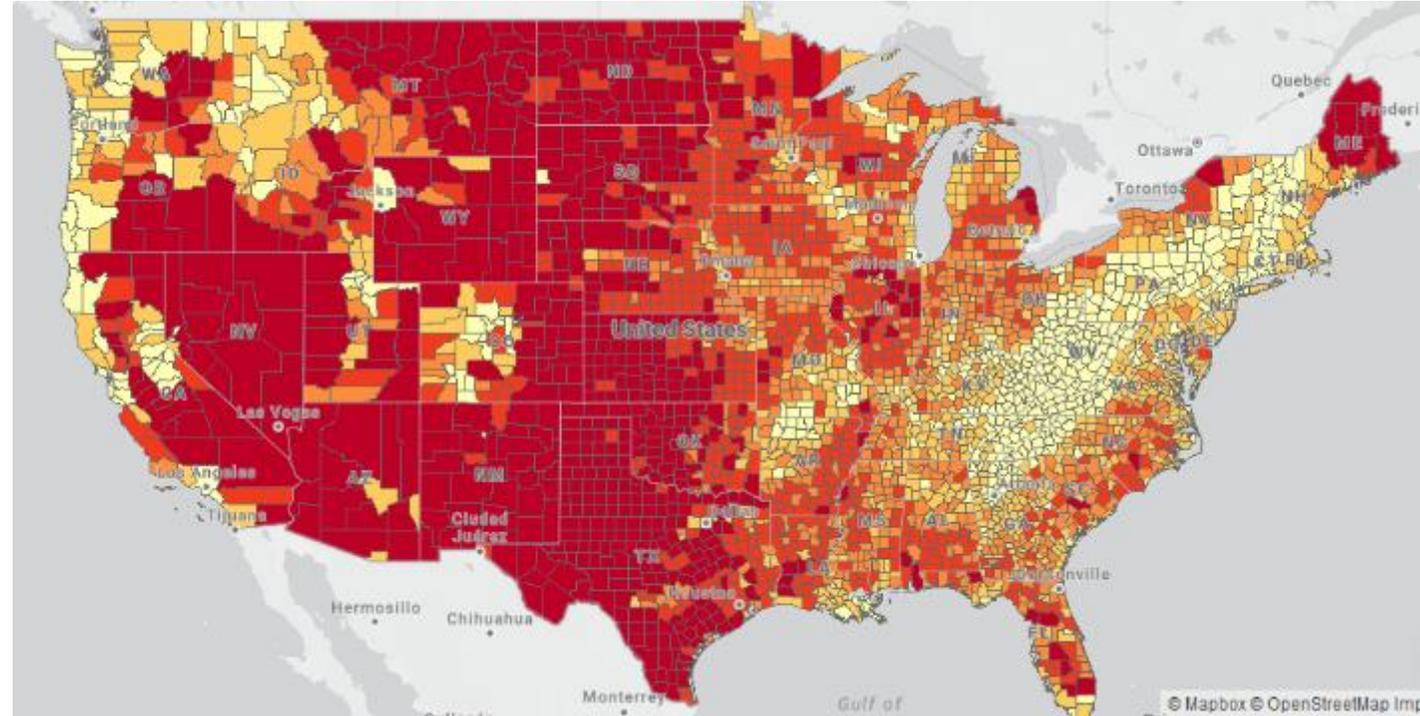
1. Solar energy electric generation is already lower cost than fossil fuel generation.
2. With on-going cost decreases, solar energy is expected to be the cheapest form of wholesale electric energy generation, of any type, within the next couple of years.



Why? Resources...

1. Solar resources that can be economically developed can be found in every jurisdiction in the U.S.
2. Every county and city will have property owners who will want to develop the valuable economic resources on their property.

Modeled Annual Technical Generation Potential - Utility PV



National Renewable Energy Laboratory. "Utility PV," *State and Local Planning for Energy*, accessed 7/11/2021, <https://gds.nrel.gov/slope>.



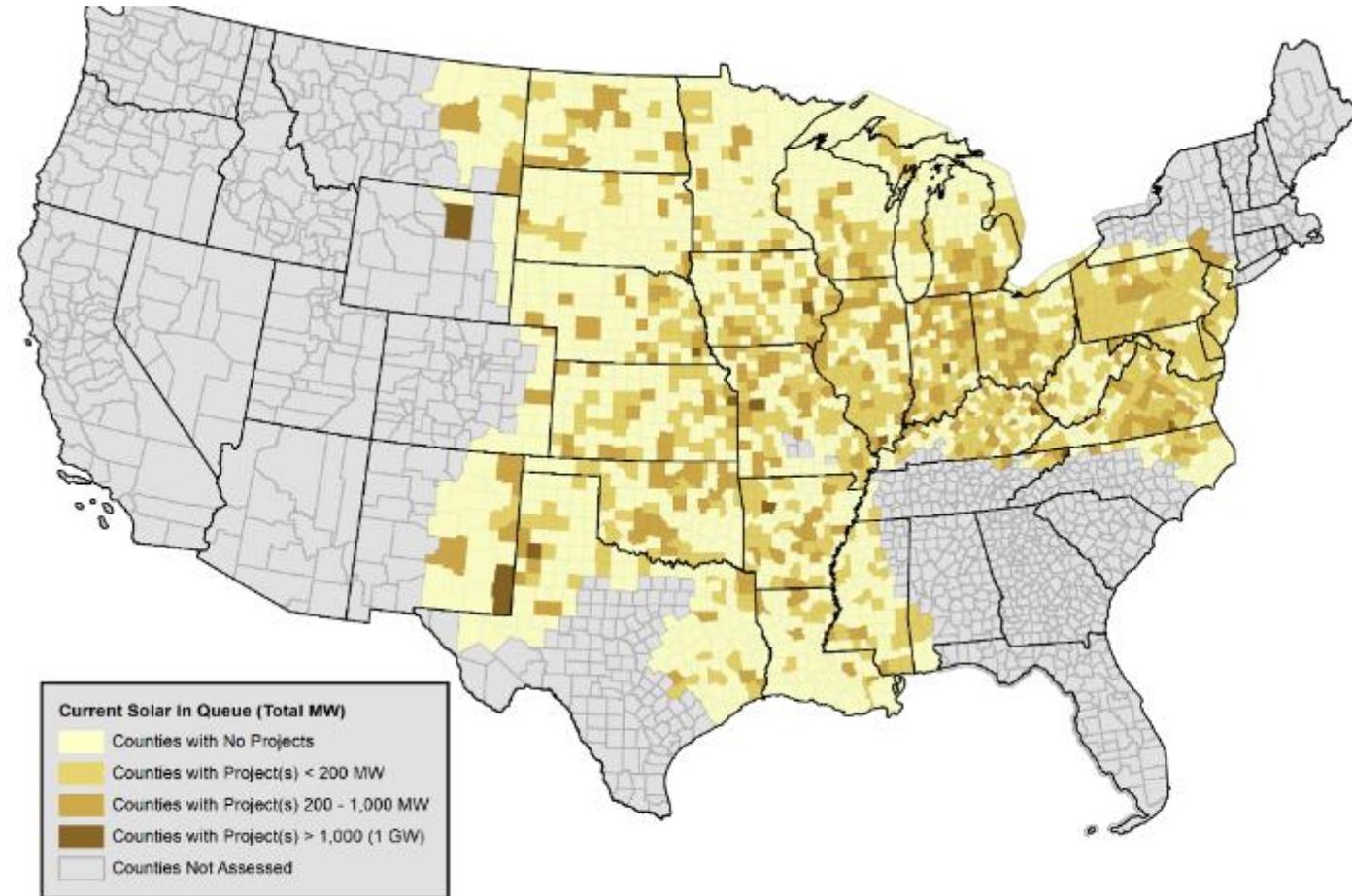
**GREAT PLAINS
INSTITUTE**

Better Energy.
Better World.

Why? Markets

188 GW of proposed solar projects,
affecting 1.3 – 1.8 million acres

1. Large energy consumers are demanding (and acquiring) inexpensive clean energy.
2. Electric utilities are transitioning: new solar and wind are cheaper than some existing generation.



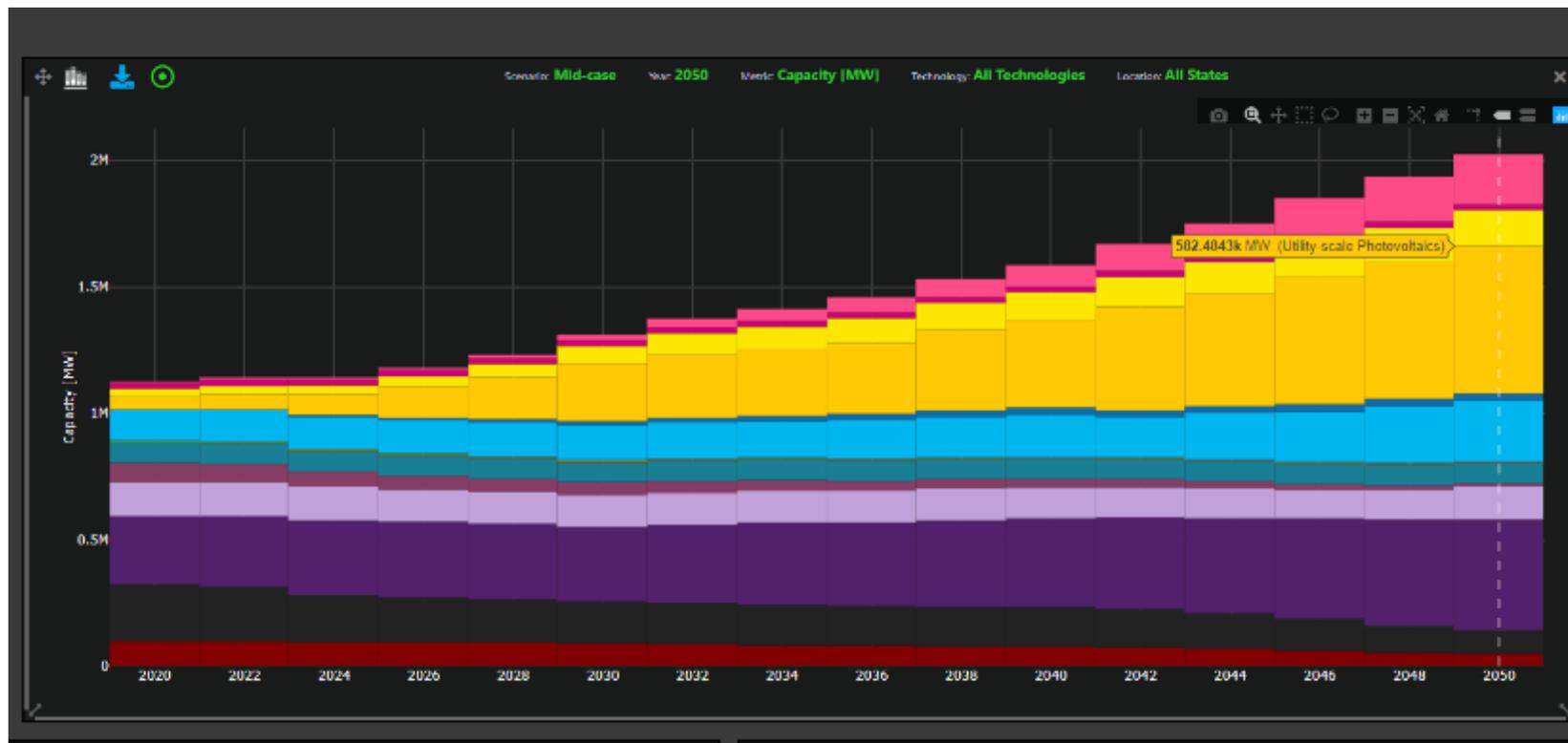
Map created by Jessi Wyatt, Great Plains Institute, 2021. Queue data for SPP, MISO, and PJM pulled April 6, 2021.
Note: queue data is frequently changing and this map reflects one snapshot in time.



**GREAT PLAINS
INSTITUTE**

Better Energy.
Better World.

Utility-Scale PV Deployment Projections



<https://cambium.nrel.gov/>

By 2050 under a Mid-Case, scenario, NREL's Cambium model projects a total of 583 GW of utility-scale PV in the contiguous 48 states:

- **More capacity than any other generation technology**
- **Needing 3.6 – 3.8 million acres of land**

Slide Credit: M. Day, National Renewable Energy Lab



**GREAT PLAINS
INSTITUTE**

Better Energy.
Better World.

Illinois Solar Model Ordinance



Photo by Katherine Chute

Prepared by Great Plains Institute



Iowa Solar Model Ordinance



Photo by Katherine Chute

Prepared by Great Plains Institute



Wisconsin Solar Model Ordinance



Photo by Katherine Chute

Prepared by Great Plains Institute



Minnesota Solar Model Ordinance



Photo by Katherine Chute

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



Last Updated August 2020

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



Last Updated December 2020



GREAT PLAINS INSTITUTE

Better Energy. Better World.

Communities as Partners

Creating Co-Benefits

- **Siting** – where should large-scale solar go to create synergies and minimize conflicts?
- **Site design** – How should development be designed to meet community priorities and protect community assets?



**GREAT PLAINS
INSTITUTE**

Better Energy.
Better World.



Land use 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

Resources

1. **Solar model ordinances and planning guidance** – Five Midwestern model ordinances, planning guidance and informational resources <https://www.betterenergy.org/blog/model-solar-ordinances/> , <https://www.betterenergy.org/blog/utility-scale-solar-and-wind-siting-resources-for-states-and-counties/>
2. **PV-Stormwater Management Research and Testing** – Science and best practices around water quality impacts of solar development (National Renewable Energy Lab) <https://www.nrel.gov/solar/pv-smart.html>
3. **SolSmart** – National “solar-ready” certification and technical assistance for local governments on large and distributed solar - <https://solsmart.org/>
4. **Solar@Scale** – Large-scale solar best practices for local government (Guidance in draft, National APA, ICMA) <https://icma.org/programs-and-projects/solarscale>
5. **Innovative Site Preparation and Impact Reductions on the Environment (InSPIRE)** - Resources on agricultural co-benefits of solar <https://openei.org/wiki/InSPIRE>
6. **Center for Pollinators in Energy** – Pollinator and habitat-friendly solar certification and guidance, procurement standards <https://fresh-energy.org/beeslovesolar>

Field tests at the InSPIRE test site in Minnesota, Photo Credit: NREL Flickr/ InSPIRE Minnesota Album





**GREAT PLAINS
INSTITUTE**

Better Energy.
Better World.

THANK YOU

Brian Ross | Vice President

612-767-7296 | bross@gpisd.net