



Solar Energy Systems

- Intro to land use regulation -

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Extension

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Definition of SES

A device, array of devices, or structural design feature used for the collection, storage, and/or distribution of solar energy for space heating or cooling, lighting, electric generation, or water heating.

> *Wisconsin Solar Model Ordinance*, Great Plains Institute, 2020

"Solar energy system" means equipment which directly converts and then transfers or stores solar energy into usable forms of thermal or electrical energy.

> 13.48 (2) (h) 1. g., Wis. Stats.

(Neither definition is intended to include ground or wall mounted solar powered light fixtures, solar powered electric fences, or similar small solar devices.)

3 Categories of SES

“LARGE-SCALE” (aka “UTILITY-SCALE”)

A facility with an electrical generation capability of **100 MW (megawatts) or more**

“MID-SCALE”

A facility with an electrical generation capability of **less than 100 MW but more than 30 kW**

“SMALL-SCALE” (aka “RESIDENTIAL SOLAR”)

A facility with an electrical generation capability of **30 kW (kilowatts) or less**

Site Selection for SES

What makes a site suitable for a large or mid-scale SES?

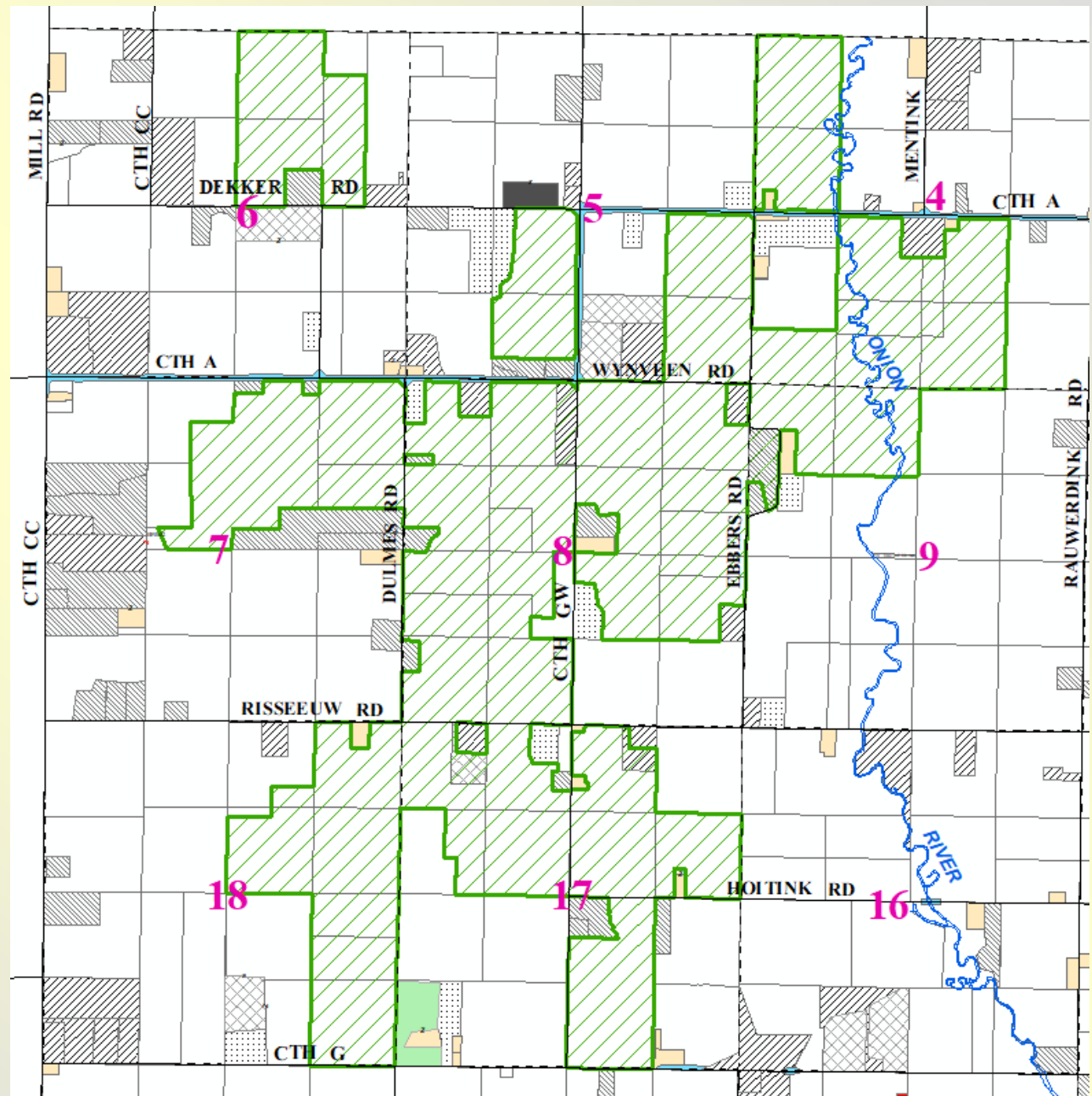
- ☐ Within 1 mile of transmission lines and 2 miles of electrical substations.
- ☐ Properties with less than 5% slope.
- ☐ Existing land uses such as agricultural fields or open areas without woodlands, wetlands, or surface waters.

Categories of SES

SES may include non-contiguous parcels, within different zoning districts —if owned or leased by a single developing entity.

*Onion River Solar Project,
Town of Holland,
Sheboygan Co.*

*1,700 acres
150 MW proposed*



Map: Kevin Struck

Categories of SES: Large-Scale

100 MW (megawatts) or more

- ❑ Must be approved by Wisconsin Public Service Commission.
- ❑ Require a building permit from the municipality.
- ❑ **County Shoreland and/or Floodplain Zoning permits, if applicable, may also be required.**
- ❑ Town/county's general zoning ordinance may require a Conditional Use Permit and/or **Developer's Agreement** as long as no conditions, in the opinion of the SES developer, inhibit or preclude the project. 196.491(3)(i), Wis. Stats.



*Cost of large-scale SES decreased in
2010-2020 by 82%
Source: International Energy Agency*

Categories of SES: Large-Scale

- ❑ **County Shoreland and/or Floodplain Zoning permits, if applicable, may also be required.**

2015 Assembly Bill 582

- SUMMARY -

The bill also provides that the construction or maintenance of property or equipment used for the transmission, delivery, or furnishing of natural gas, heat, light, or power and **owned by a public utility** or cooperative association organized for the purpose of producing or furnishing heat, light, or power to its members only **is considered to satisfy shoreland zoning laws and a county's shoreland zoning ordinance** if DNR has issued all required navigable water, water and sewage, and pollution discharge permits or approvals authorizing the construction or maintenance or, if no such permits or approvals are required, if the construction and maintenance is conducted in a manner that employs best management practices to infiltrate or otherwise control storm water runoff from that infrastructure.

Codified as Sec. 59.692(7), Wis. Stats.

Categories of SES: Large-Scale

❑ Developer's Agreement

Onion River Solar Project included:

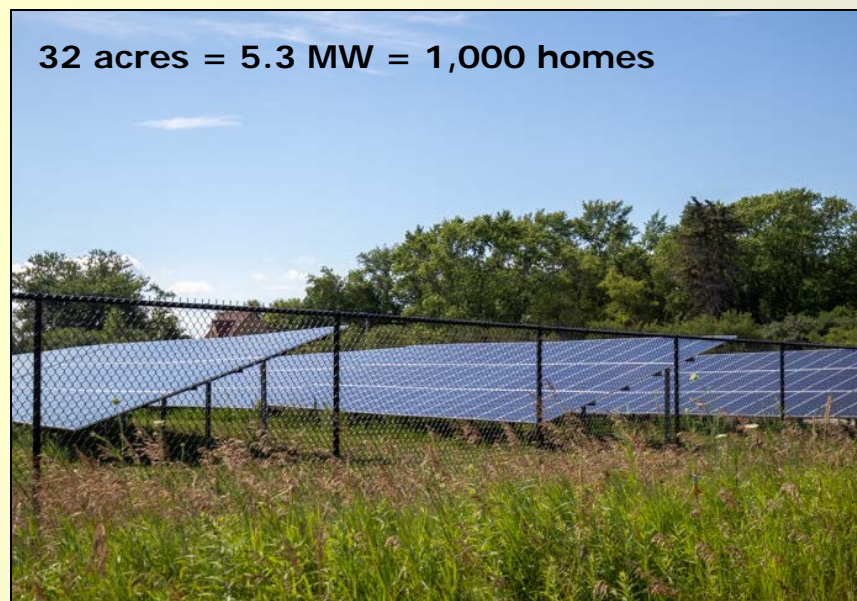
Developer will...

- ✓ repair and/or replace all culverts that are damaged or removed
- ✓ maintain the road infrastructure of the Construction Route and Project site access points in safe conditions consistent with County and Town standards
- ✓ provide a decommissioning plan that includes the restoration of farmland, if necessary
- ✓ repair any drainageways
- ✓ adhere to agreed upon standards for setbacks, fencing, vegetative buffers
- ✓ adhere to agreed upon hours of construction

Categories of SES: Mid-Scale

Less than 100 MW but more than 30 kW

- ❑ **Must meet requirements of any SES provisions in town/county general zoning ordinance.**
- ❑ Subject to any applicable Conditional Use Permit conditions in town/county general zoning ordinance and Developer's Agreement.
- ❑ Require a building permit from the municipality.
- ❑ County Shoreland and/or Floodplain Zoning permits, if applicable, may also be required.



*Cost of mid-scale SES decreased in
2010-2020 by 69%*

*Source: International Energy Agency
Photo: Kevin Struck*

Categories of SES: Mid-Scale

❑ Provisions in general zoning ordinance

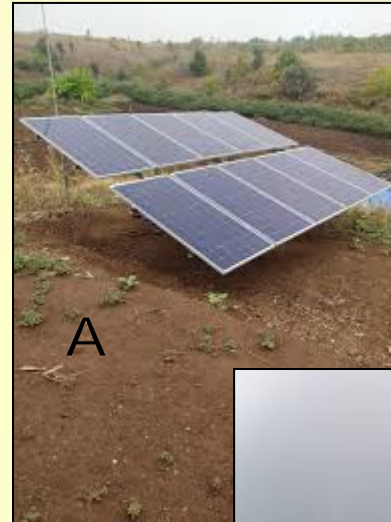
Typical local ordinance includes:

- ✓ listing of districts where mid-scale SES allowed
- ✓ site plan requirement
- ✓ reimbursement of costs incurred by local gov't for technical review
- ✓ provisions for protecting roads and making repairs if necessary
- ✓ limits on glare, noise
- ✓ standards for setbacks, fencing, vegetative buffers
- ✓ acceptable hours of construction
- ✓ decommissioning plan required that includes land restoration

Categories of SES: Small-Scale

30 kW or less

- ❑ Typically considered to be an accessory use and are usually a permitted use in most town/county zoning districts.
- ❑ Require a building permit from the municipality.
- ❑ County Shoreland and/or Floodplain Zoning permits, if applicable, may also be required.



*Cost of small-scale SES decreased in
2010-2020 by 64%*

Source: International Energy Agency

Future Trends

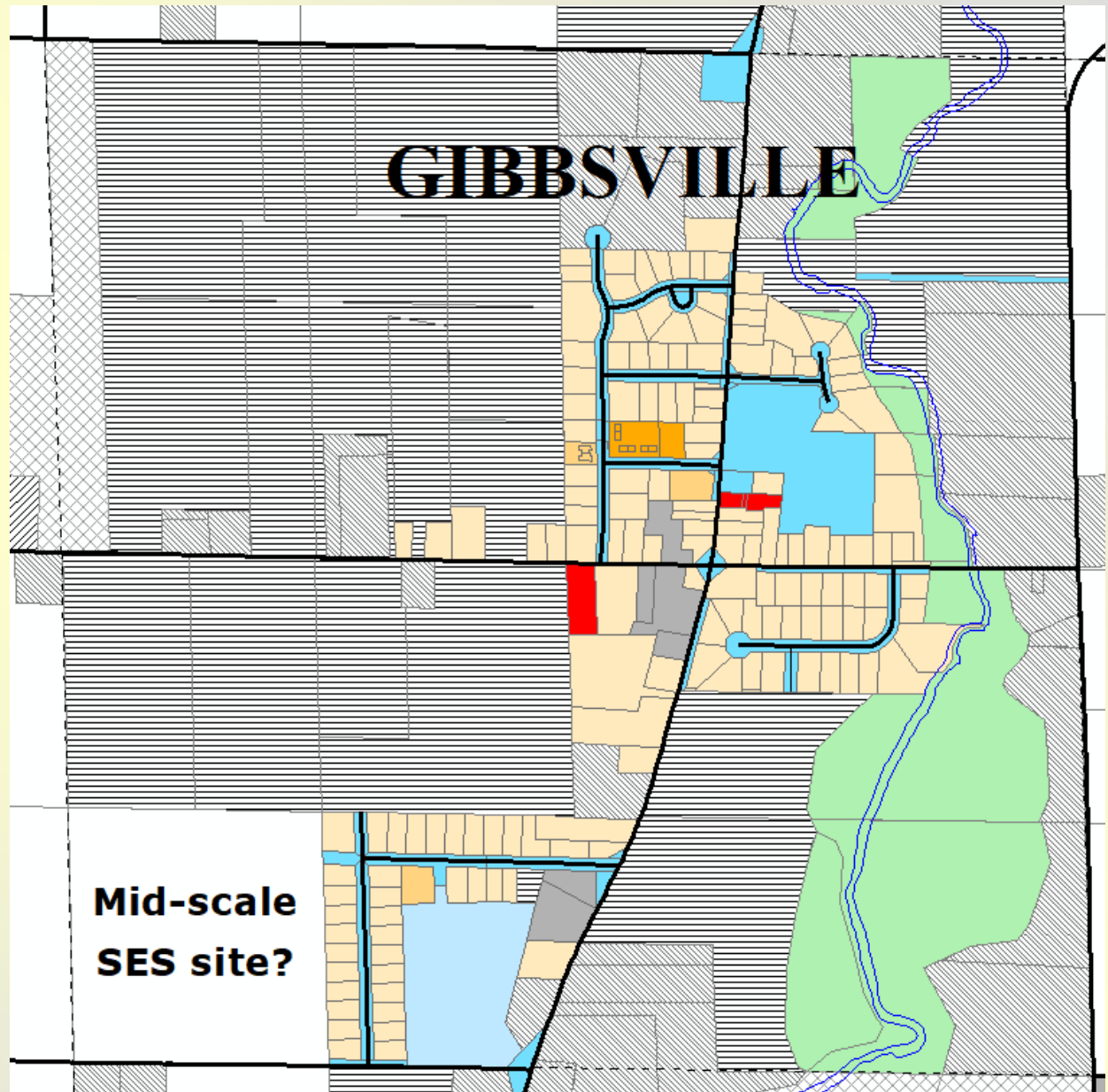
The next generation of solar panels will weigh less, which will make them better candidates for flat warehouse, factory, and office roofs.



Image: Sheboygan County, Kevin Struck

Future Trends

Solar farms can unintentionally have the effect of putting a "wall" around a city or village that would prevent it from growing for 30-40 years.



Future Trends

Renewable energy sources such as SOLAR are here to stay and very likely to increase...

- ❖ Through an executive order in 2019, Governor Tony Evers pledged that all electricity consumed in Wisconsin be 100% carbon-neutral by 2050.
- ❖ Alliant Energy announced plans in 2020 to eliminate coal from its generation portfolio by 2040 and achieve net-zero carbon dioxide emissions by 2050, partly by increasing their solar production. They are on track to add 12 solar farms across nine Wisconsin counties by the end of 2023.
- ❖ WEC Energy Group, the state's largest utility, plans to add +/- 800 MW (about 9 solar farms).



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