



GRAHAM  
SUSTAINABILITY INSTITUTE  
UNIVERSITY OF MICHIGAN

# Planning (and zoning) for Renewables

Dr. Sarah Mills

Clinton County Advisory Committee  
June 29, 2023

# My background, perspective

- **PhD in rural land use planning**
  - Investigate claims of wind as farmland preservation tool
  - Surveys of 4,000+ Michiganders near windfarms
- **Research on renewable energy policy, public opinion**
  - Research on economic impacts of solar on farm communities in Midwest
  - Nationwide survey of solar farm neighbors
- **Funding from State Energy Office in EGLE**
  - Encourage proactive planning & zoning
  - Provide state-based data
  - Present pros and cons



# Overview

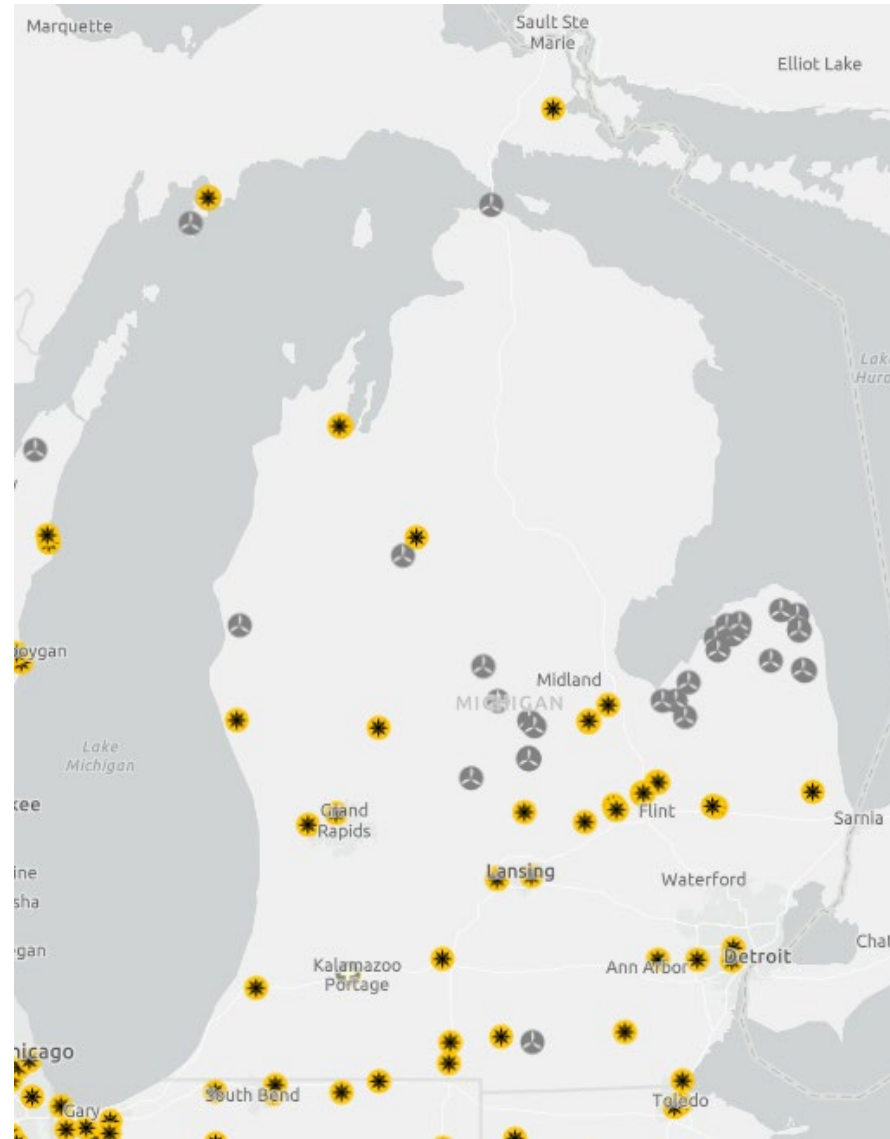
- **Why plan (or re-plan) for renewable energy?**
- **Community impacts of wind & solar**
- **Basic principles in planning/zoning for renewables**
- **Planning and zoning resources**



Photos by Gonz DDL and John Cameron on Unsplash, Jukka Niittymaa on Pixabay

# WHY PLAN (OR-REPLAN) FOR RENEWABLE ENERGY?

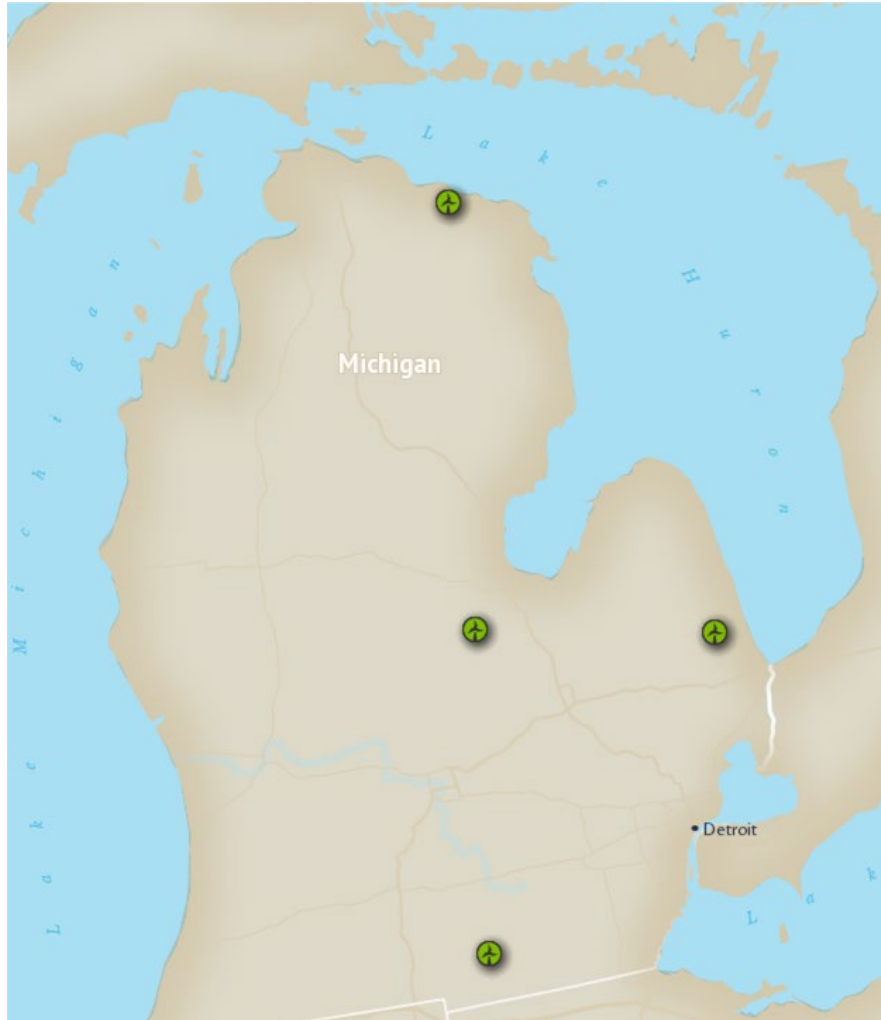
# Existing utility-scale wind & solar 4,348 MW



3,579 MW  
Wind  
769 MW  
Solar

Source: U.S. Energy Mapping System, April 7, 2023  
<https://www.eia.gov/state/maps.php>

# Wind being considered: 4\* projects, 786 MW

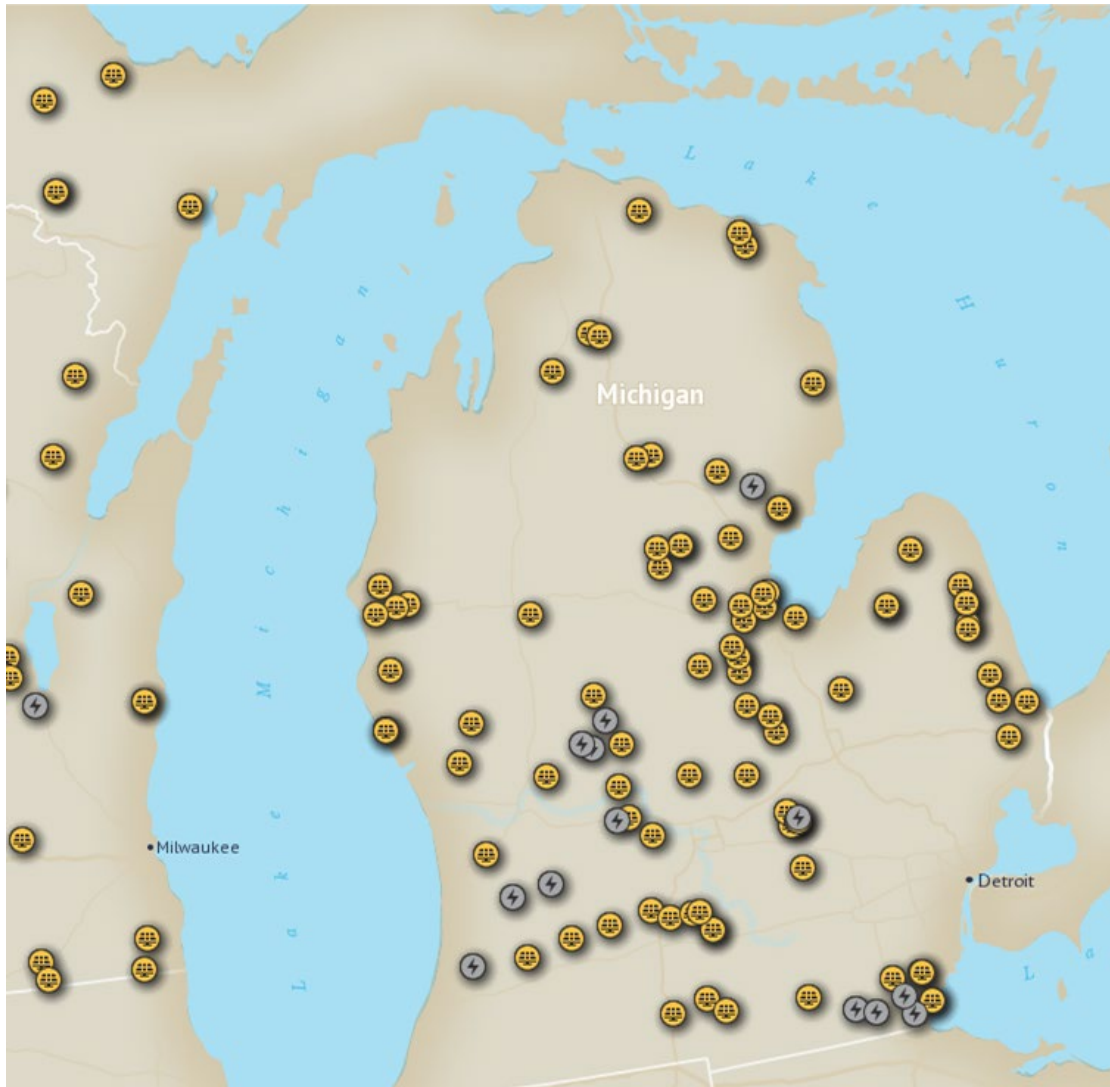


Smallest: 16 MW\*  
Largest: 293 MW

Source: MISO Queue, May 11, 2023  
<https://api.misoenergy.org/PublicGiQueueMap/index.html>



# (Large) Solar being considered: 118 projects - 19,160 MW



16,617 MW Solar  
2,543 MW Hybrid

Source: MISO Queue, May 19, 2023  
<https://api.misoenergy.org/PublicGiQueueMap/index.html> &  
[https://www.misoenergy.org/planning/generator-interconnection/GI\\_Queue/gi-interactive-queue/](https://www.misoenergy.org/planning/generator-interconnection/GI_Queue/gi-interactive-queue/)

# Not all—but lots—will be built

## **CRAIN'S** DETROIT BUSINESS

THIS WEEK

NEWS & DATA

AWARDS

SPECIAL FEATURES

VOICES

EVENTS

CONTENT

March 25, 2022 11:03 AM | UPDATED 32 MINUTES AGO

## Utilities on the hunt for thousands of acres for solar development

CHAD LIVENGOOD



**Consumers** (2021 IRP)  
64-80,000 acres  
by 2040

**DTE** (2022 IRP)  
52-65,000 acres  
by 2042



# Why so much activity?

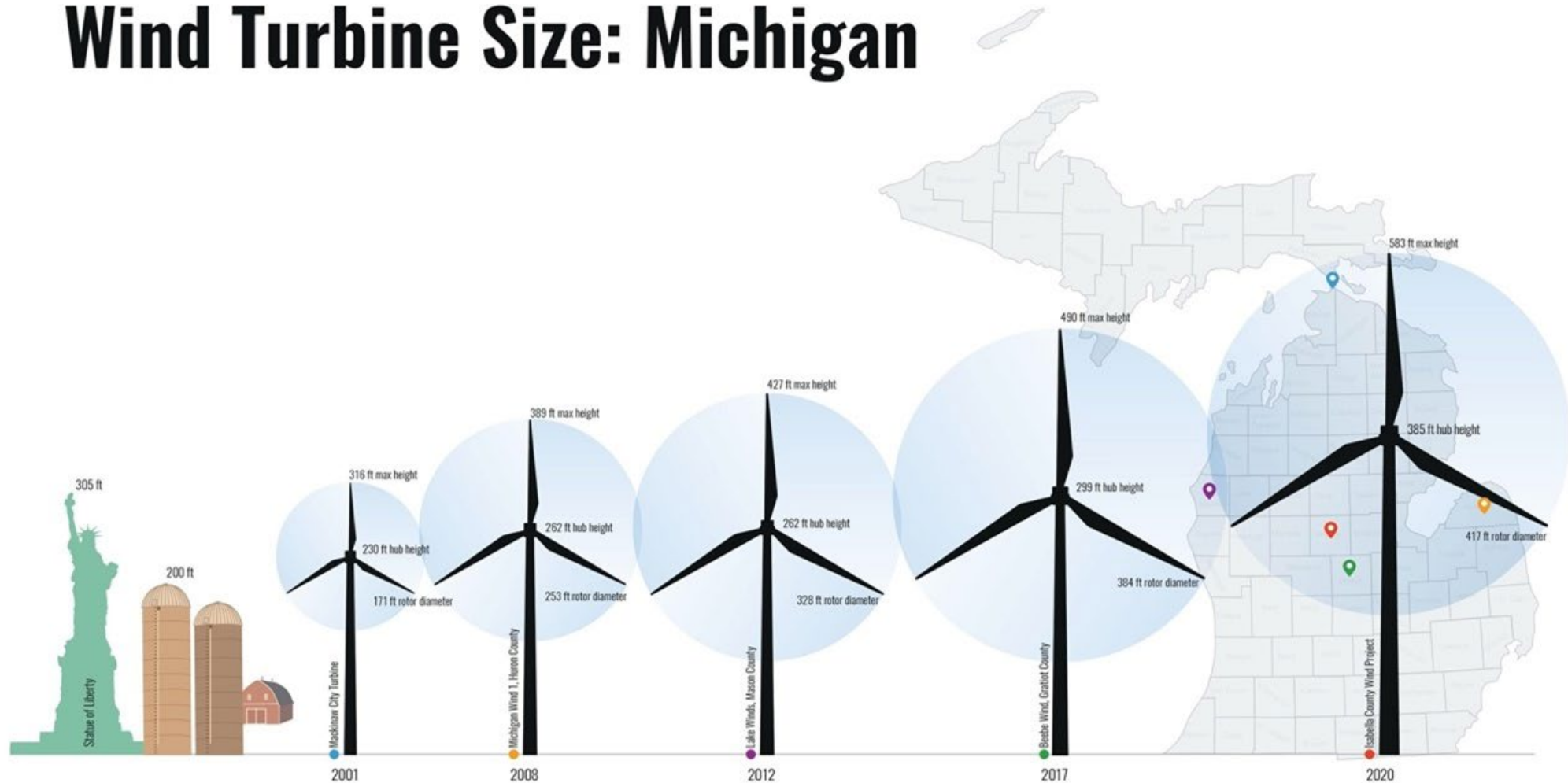


Technology (wind),  
cost reductions (solar)  
making renewables  
possible statewide

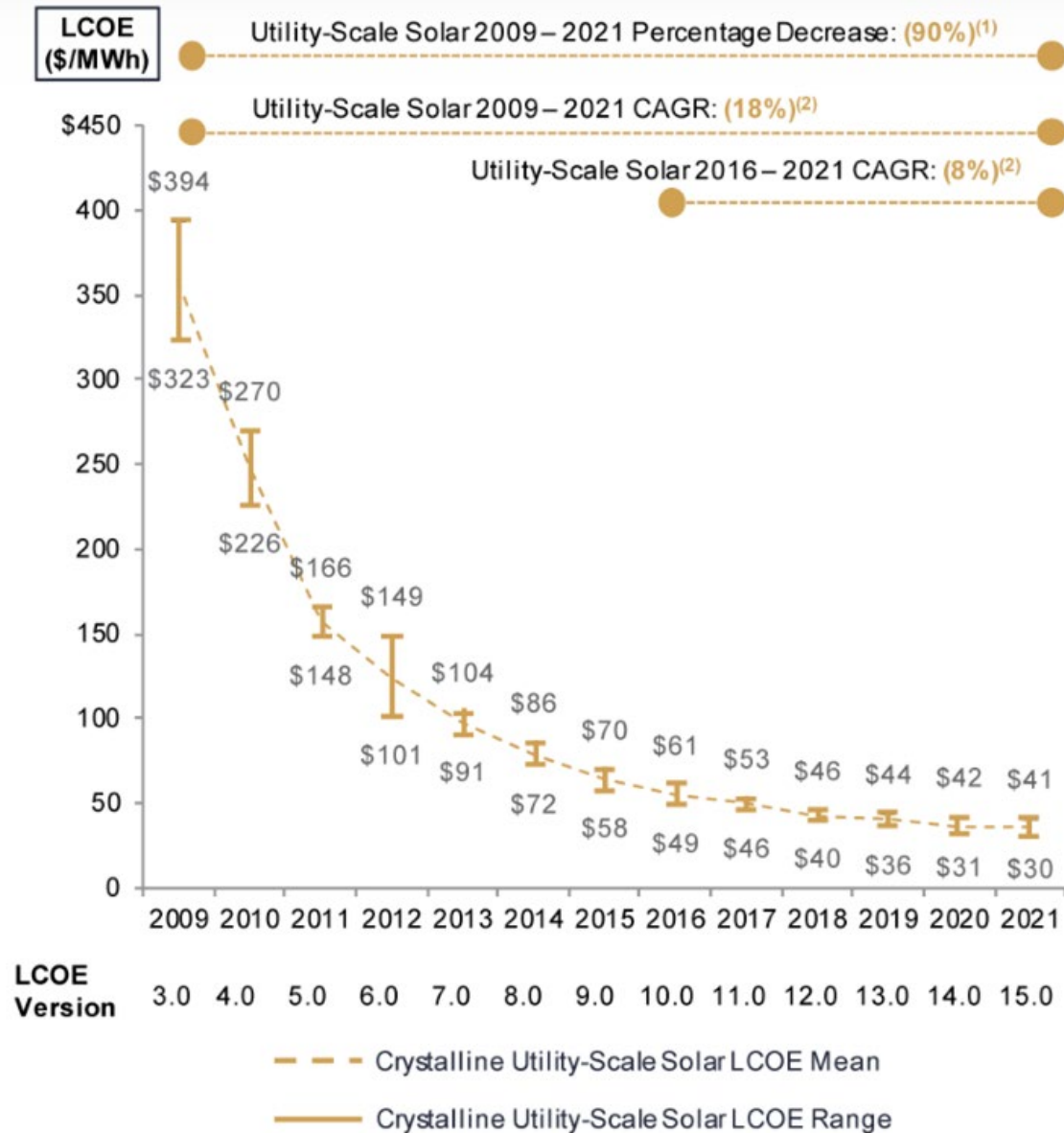
IRPs calling for 4x  
increase in renewables  
(hedge against future  
fuel costs, regulations)

# Wind turbine heights over time

## Wind Turbine Size: Michigan



## Unsubsidized Solar PV LCOE



Source: Lazard, October 28 2021  
<https://www.lazard.com/perspective/levelized-cost-of-energy-levelized-cost-of-storage-and-levelized-cost-of-hydrogen/>

# Is there a government requirement?

- Law for 15% by 2021 expired
- MI Healthy Climate Plan (2022)
  - Goal of 60% renewables by 2030
  - Currently at ~15%
  - Accelerated timeline from what utility plans calling for
  - Siting (zoning) acknowledged as challenge
- HB 4759 (introduced)
  - 60% renewable by 2030
  - 100% clean by 2035

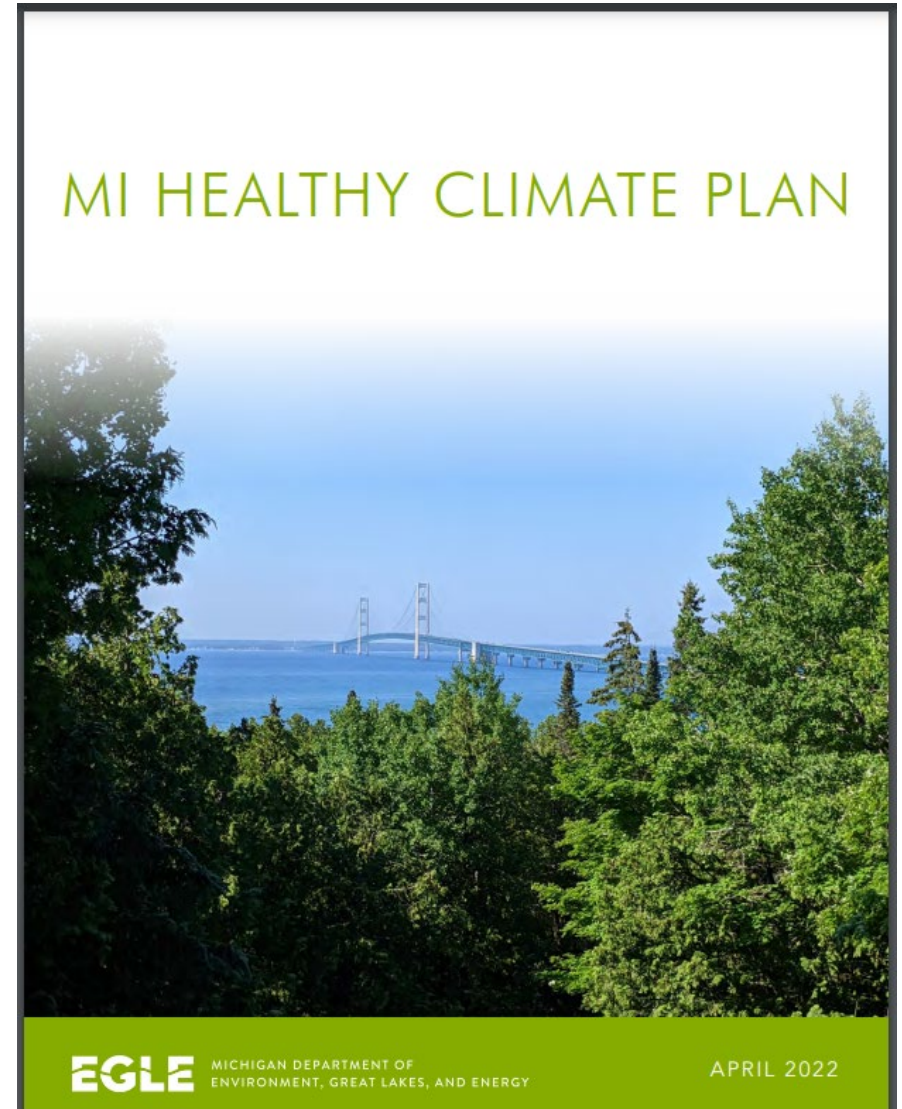






Photo by RawFilm of Unsplash

# COMMUNITY IMPACTS OF WIND

# Different scales





# Wind energy

## Local Benefits

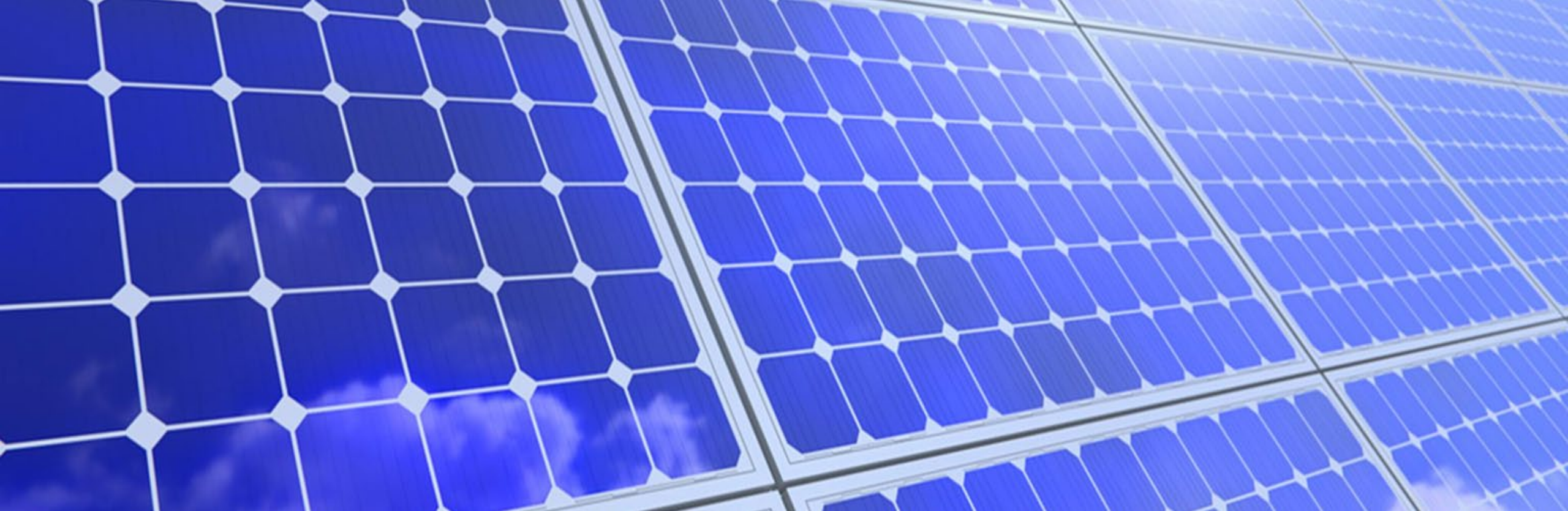
- Landowner payments
  - Farm reinvestment
  - Farm succession
  - Not just farmers
- Tax payments, developer donations (caveat)
- Jobs (caveat)

## Local Concerns

- Noise / health
- Wildlife
- Visual Impacts
  - Outright
  - On property values
- “Not why I moved here”

# Bottom line on wind

- Wind = economic development
- If goal is to sustain agriculture, wind can fit
- If goal is for substantial residential development or growth of tourism, wind may not be right



# WHAT YOU NEED TO KNOW ABOUT SOLAR ENERGY



# Solar comes in all sizes



<https://news.energysage.com/how-many-solar-panels-do-i-need/>



# Shifting scale of solar

	Existing	Proposed
Avg	11 MW	160 MW
Avg acres	55-88 acres each	800-1,300 acres each
Max	239 MW	500 MW
Max acres	1,900 acres (7.9 acres/MW)	2,500-4,000 acres



Photo: <https://inovateus.com/portfolio-items/lapeer-michigan-solar/>

# Utility-scale solar energy

## Local Benefits

- Landowner payments
- Tax payments (in flux)
- Jobs (caveat)

## Local Concerns

- Wildlife (?)
- Visual Impacts
  - “Not why I moved here”
  - Property values
- Wise use of land



# Solar: New threat or opportunity?

 **The Washington Post**  
*Democracy Dies in Darkness* 

Local

## Proposed solar energy developments draw opposition over loss of farmland



 **The Washington Post**  
*Democracy Dies in Darkness* 

Business

## The next money crop for farmers: Solar panels



# What are you trying to preserve?

- Urban boundary
- Rural vista
- Habitat
- Land for growing food
- Farm livelihoods



# What are you trying to preserve?

- **Urban boundary**
- Rural vista
- Habitat
- Land for growing food
- Farm livelihoods
- Land occupied 30+ years
  - Decommissioning standard
- No demands on services
- **Contributes to taxes**
  - How much varies based on millage rate
  - Pending leg = much simpler



# What are you trying to preserve?

- Urban boundary
- **Rural vista**
- Habitat
- Land for growing food
- Farm livelihoods



Source: Anthony Wahl/Janesville Gazette  
[https://mtribune.com/agriculture/farming-land-surrounded-by-solar/article\\_4159269a-boco-559e-aad5-fcb561b2ofb8.html](https://mtribune.com/agriculture/farming-land-surrounded-by-solar/article_4159269a-boco-559e-aad5-fcb561b2ofb8.html)

# What are you trying to preserve?

- Urban boundary
- Rural vista
- **Habitat**
- Land for growing food
- Farm livelihoods



<https://www.nature.org/en-us/about-us/where-we-work/united-states/north-carolina/stories-in-north-carolina/making-solar-wildlife-friendly/>



# What are you trying to preserve?

- Urban boundary
- Rural vista
- Habitat
- Land for growing food
- Farm livelihoods



Grazing possible

Other crops niche at the largest scale for medium term; research proposed!





# What are you trying to preserve?

- Urban boundary
- Rural vista
- Habitat
- Land for growing food
- Farm livelihoods
- Short-term vs. long-term?
- Do land use requirements limit “reversibility”?

# What are you trying to preserve?

- Urban boundary
- Rural vista
- Habitat
- Land for growing food
- Farm livelihoods



# What are you trying to preserve?

- Urban boundary
- Rural vista
- Habitat
- Land for growing food
- Farm livelihoods

## DOE-funded Research (2021-2024)

- How much solar land is leased vs. purchased?
- What are leaseholders doing with revenue?
  - How does lease revenue recirculate in local economy?
- Comparison of solar to ag (inputs, taxes)

# MI Farmland Preservation (PA 116) Policy as of June 2019

- **Can put agreement on “pause” if...**
  - Maintain existing drainage / field tile
  - Plant cover crop including pollinator habitat
  - End-of-life remediation
  - + Surety bond/letter of credit

**Aim to protect long-term farmability of land; provide farmers/farm communities with new income stream**

# Bottom line on rural (Ag) solar

- Solar = economic development
- Where land is of marginal quality, no-brainer
- Where ag-based economy with prime soils
  - Be consistent: What else do you allow in ag-district?
  - Solar as short- or long-term land use?
    - Short term: minimize soil movement/compaction & vegetative screening, require decommissioning
    - Long term: more emphasis on screening & stormwater management





Photos by Jukka Niittymaa on Pixabay, Gonz DDL and John Cameron on Unsplash

# CORE PRINCIPLES FOR PLANNING AND ZONING FOR CLEAN ENERGY



# Step 1: Plan first! You've started this!

- **How does renewable energy fit with your long-term plan?**
  - For quality of life (Goal 2, Obj 3, 5, 6)
  - For ag preservation (Goal 3, Obj 2, 4, 6, 7)
  - For land use (Goal 4, Obj 11, 13, 14)
  - For services/infrastructure (Goal 6, Obj 6)
  - For natural resources (Goal 7, Obj 7, 8, 9)
  - For economic development (Goal 8, Obj 5, 7)
- **What sort of renewable energy and in which part of community?**
  - Wind and solar play differently

# What are you trying to preserve?

	Wind	Solar
Urban boundary	✓	✓
Rural vista	✗	✗
Habitat	✓	✓
Land for growing food	✓	✗ / ✓
Farm livelihoods	✓	?

## Step 2: Make zoning match your plan

- Specifics matter for ability to realize plan
- Unlikely to satisfy everyone
  - Averaging satisfies no one
- Doesn't have to be all or nothing
- Beware of zoning out
  - MZEA says you can't (even if other communities have)
  - But doesn't need to be a free-for-all; in best place if you are consistent, well-reasoned
- Strategic use of overlay districts?

# When all else fails, or to arbitrate disputes: Be consistent

- What else do you allow in ag districts or on prime ag land?
- What else do you require screening for, set noise limits for?
- How do your proposed setback distances compare to other land uses?

# Planning and Zoning Resources

- Curated repository of templates, guidance
  - <https://www.michigan.gov/egle/about/organization/materials-management/energy/communities>
- Case Studies, FAQs
- March-April 2022 issue of MTA's Township Focus
- April 2020 issue of Planning & Zoning News



Department of Environment, Great Lakes, and Energy

About Us | For the Public | Regulatory Assistance | Maps and Data | Newsroom | Outreach | FAQs | Contact Us

## Office of Climate and Energy

### Community Impacts of Renewable Energy

Once you reach the fourth step in the community energy management process, it is important to understand the opportunities and challenges that a renewable energy project may bring to your community to determine the best course of action.

- Community Solar**  
Community solar is a solar energy system that generates renewable energy and is shared by multiple subscribers in a community. Learn more to find out about solar power in your community.
- Clean Energy in Michigan Series**  
The Clean Energy in Michigan Series provides case studies and fact sheets answering common questions about clean energy projects in Michigan.
- Frequently Asked Questions**  
Visit Frequently Asked Questions, updated regularly, to learn what others have been asking about the community impacts of renewable energy.

### Renewable Energy Planning and Zoning Guidance

Planning and zoning are tools that local governments can use to attract renewable energy projects that are in line with the community's vision for itself. Proactive action can increase success and decrease contention.

- Zoning database**  
Zoning for Renewable Energy Database  
In a unique project, EGLE and University of Michigan's Graham Sustainability Institute have developed the Michigan Zoning Database, a searchable source of information of municipal ordinances.
- Solar Resources**  
Guidance on incorporating renewable energy in to community plans and ordinances for solar energy.
- Wind Resources**  
Guidance on incorporating renewable energy in to community plans and ordinances for wind energy.



# Sample ordinances - with MSU-Extension (Thanks to EGLE)



## Sample Zoning for Wind Energy Systems 2020

[DOWNLOAD FILE](#)

October 11, 2020 - Author: [Mary Reilly](#) and [Brad Neumann](#)

*This publication presents a zoning ordinance sample amendment for utility scale wind energy systems and smaller wind electric generation systems for an individual business or home. There are earlier versions of this document. They should not be used. There are significant and important updates and changes to this version. Do not use a version dated prior to November 2017.*

This is a fact sheet developed by experts on the topic(s) covered within MSU Extension. Its intent and use is to assist Michigan communities making public policy decisions on these issues. This work refers to university-based peer reviewed research, when available and conclusive, and based on the parameters of the law as it relates to the topic(s) in Michigan. This document is written for use in Michigan and is based only on Michigan law and statute. One should not assume that this document reflects other regulation by Michigan municipalities and counties, as they do not. This is not original research or a set of conclusions.

Available at

<https://www.michigan.gov/egle/about/organization/materials-management/energy/renewable-energy>



## Planning & Zoning for Solar Energy Systems: A Guide for Michigan Local Governments

[DOWNLOAD FILE](#)

October 5, 2021 - Author: [Wayne Beyea](#), [Harmony Fierke-Gmazel](#), [M. Charles Gould](#), [Bradley Neumann](#) and [Mary Reilly](#), Michigan State University Extension; Sarah Mills, University of Michigan Graham Sustainability Institute



The purpose of this guide is to help Michigan communities meet the challenge of incorporating solar energy by addressing solar energy systems (SES) within their planning and zoning. The guide illustrates how various scales and shapes patterns ranging between rural, urban, and suburban. It was developed by experts within MSU Extension and Michigan State University in partnership with faculty at the University of Michigan. Further review of this document was completed by content experts from local units of government, legal counsel, energy-related non-profits, utility experts, and members of academia. Its intent is to help Michigan communities make public policy decisions related to solar energy



# Questions?

- **Reach out to us**
  - Answer questions
    - About impacts
    - Rationale for guidebook regs
  - Review draft zoning ordinances
    - Talk through pros/cons of alternatives
  - Connect you to MSU-Extension, other communities
- **More training**
  - Legal training, bus tours through MAP
  - Online webinars on zoning

## **Sarah Mills, PhD**

Senior Project Manager,  
University of Michigan  
[sbmills@umich.edu](mailto:sbmills@umich.edu)

## **Madeleine Krol**

Clean Energy Land Use Specialist,  
University of Michigan  
[krol@umich.edu](mailto:krol@umich.edu)