



GRAHAM
SUSTAINABILITY INSTITUTE
UNIVERSITY OF MICHIGAN

Solar Energy : New threat or opportunity for farmland preservation

Sarah Mills, PhD

Purdue Farm Policy Study Group
December 14, 2021

The Problem



The (Unchanged) Farmland Preservation Toolbox

TDR
Use-value
taxation

PDR



Ag Zoning
Urban Service
Boundary

Greenbelt

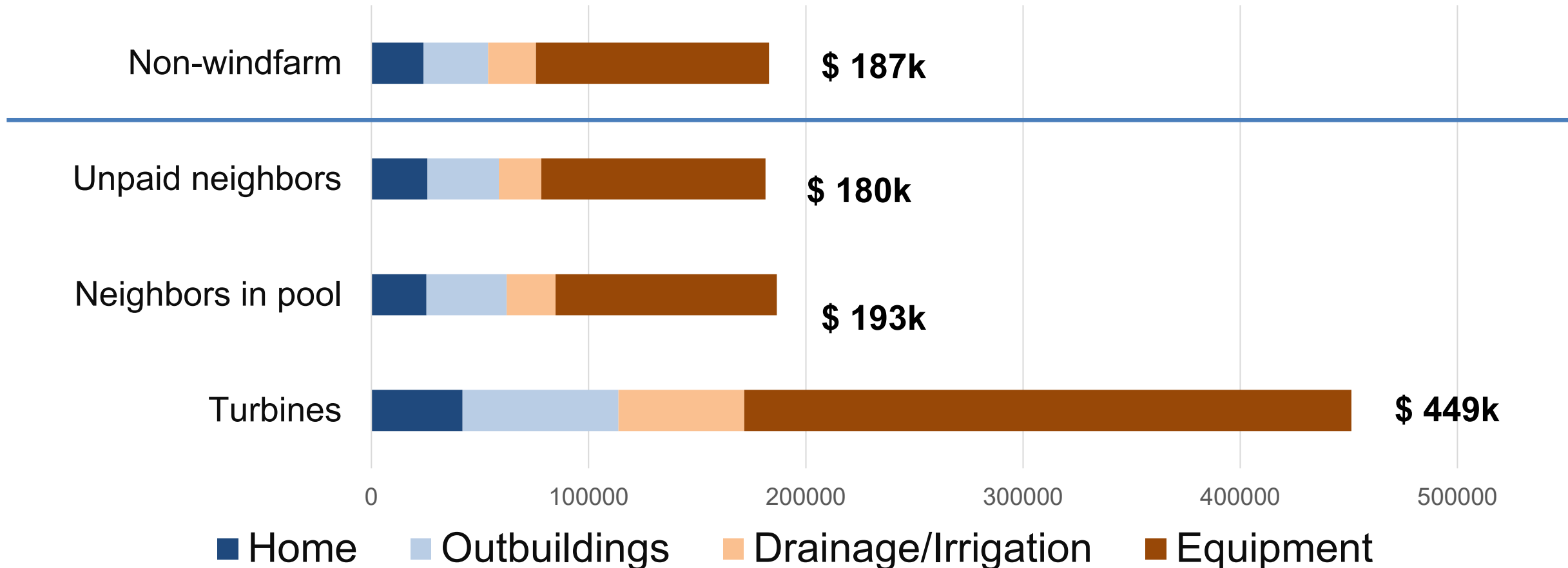
A Farmland Preservation Strategy?



Photo by Rawellm of Unplash

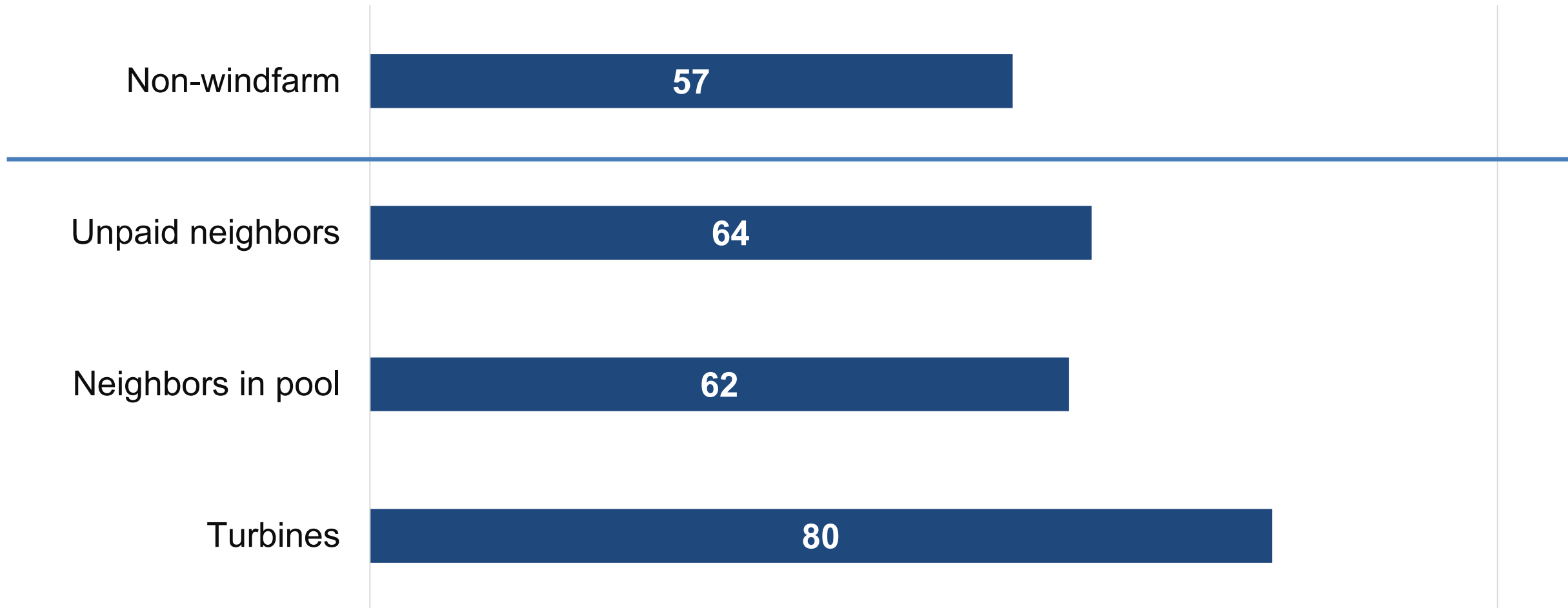
On-farm investment

Investments over 5 years: 2009-2013



Farm Succession

% with farm succession plan



Not without controversy; typically, non-farmers



Save the Huron Mountains



2018 research on Wind in 4 states



Energy Research & Social Science

Volume 72, February 2021, 101873



Original research article

Farmers vs. lakers: Agriculture, amenity, and community in predicting opposition to United States wind energy development

Douglas L. Bessette ^a  , Sarah B. Mills ^b

Contention may
be a fixed part
of the

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

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 we're not talking about



What we're not talking about (but will mention later)



<https://news.energysage.com/how-many-solar-panels-do-i-need/>
<https://www.purdue.edu/newsroom/releases/2019/Q3/new-research-aims-to-optimize-farmland-use-for-crops,-solar-electricity-production.html>

What we are talking about



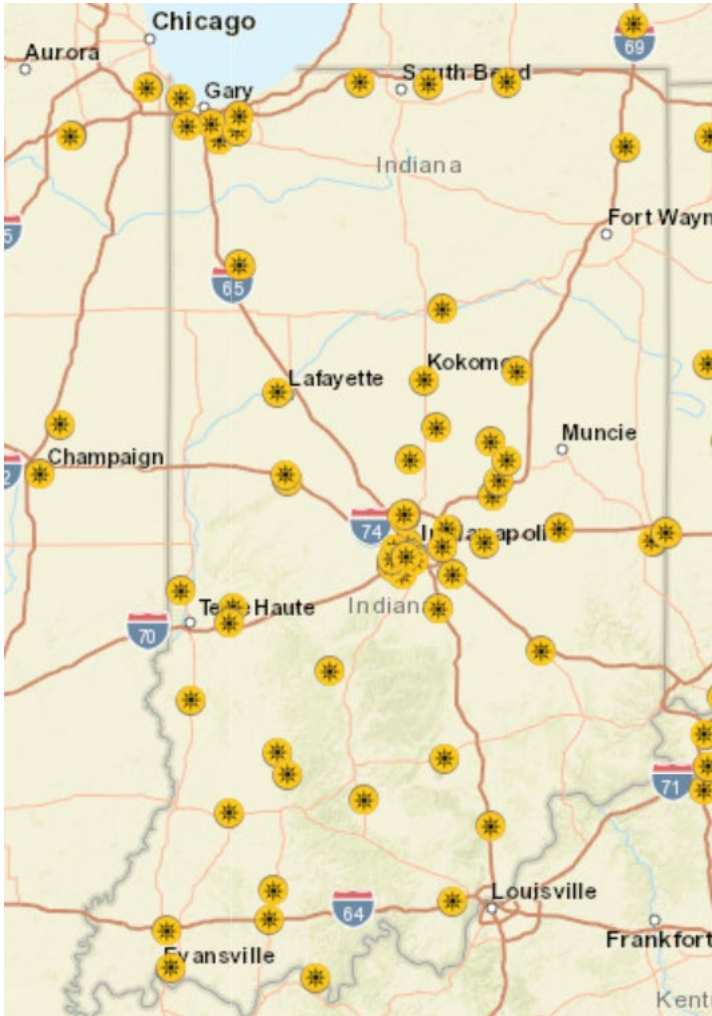
Two Creeks, WI, 800 acres

https://madison.com/wsj/business/construction-at-halfway-mark-for-wisconsins-first-large-scale-solar-farm/article_a3153d9a-e93e-5807-a975-036f241702ff.html

Lapeer, MI, 267 acres



Existing Utility-scale Solar 279 MW (342 MW more under construction)

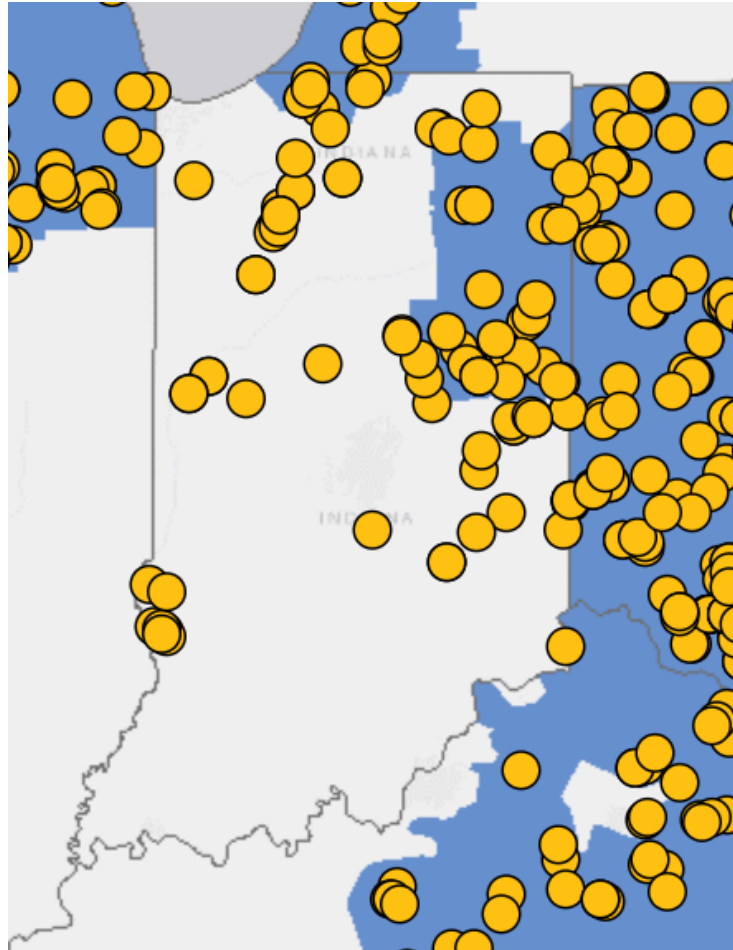
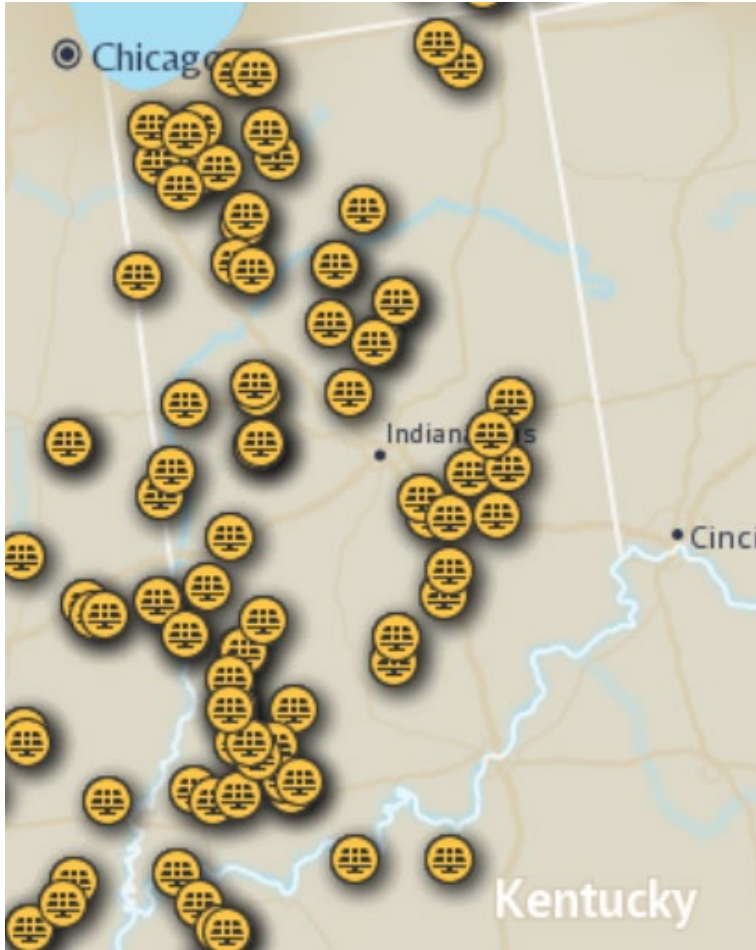


Average size
(built):
3.7 MW

Average size
(construction):
26 MW

Solar being considered in IN

14,700 MW (MISO) + 26,100 MW (PJM)



Average size:
161/199 MW

~1,000-2,000
acres each

Source: MISO Queue, PJM Queue, 12/10/2021

<https://api.misoenergy.org/PublicGiQueueMap/index.html> <https://www.pjm.com/planning/services-requests/interconnection-queues.aspx>

Not all—but lots—will be built

AEP Energy Secures PPA for Mammoth Solar Project

By Michael Bates - May 3, 2021



[AEP Energy](#), one of the largest electric energy wholesale and retail suppliers in the U.S., and [Global Energy Generation LLC](#) (Doral LLC), a developer of renewable energy projects, have signed a long-term renewable energy purchase agreement for the Mammoth Solar project in Indiana.

Mammoth Solar 1, a 480 MW DC solar energy project, is the first phase of the 1.65 GW DC Mammoth project being developed by Dora LLC. The Mammoth solar project covers more than 12,000 acres in Starke and Pulaski Counties in northern Indiana.

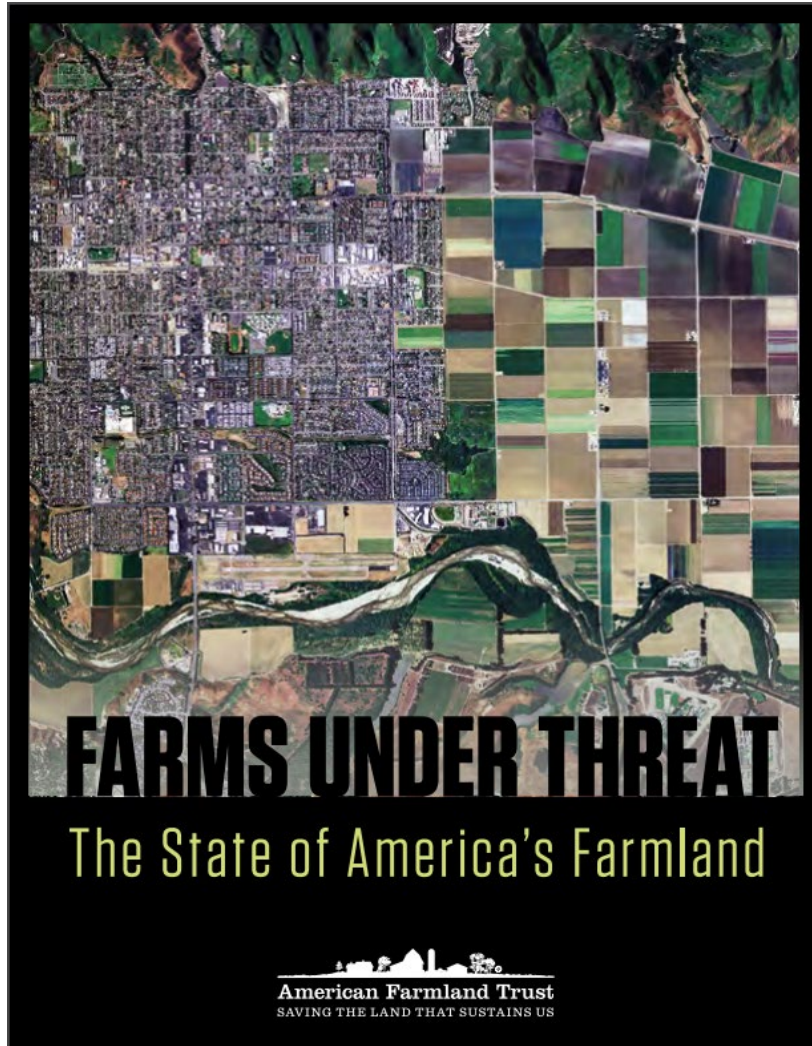
October 21, 2020

NIPSCO Announces New Indiana-Based Solar Projects to Power 270,000 Homes by 2023

Solar: New Threat or Opportunity?



Both?



“Renewable energy creates opportunities for farmers and landowners to earn new income

but also poses threats to farmland and local food systems.”

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
- Contribute to taxes
 - How much varies state to state

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-b0c0-559e-aad5-fcb561b20fb8.html

What are you trying to preserve?

- Urban boundary
- Rural vista
- **Habitat**
- Land for growing food
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<https://www.nature.org/en-us/about-us/where-we-work/united-states/north-carolina/stories-in-north-carolina/making-solar-wildlife-friendly/>

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Very niche
for
foreseeable
future



What are you trying to preserve?

- Urban boundary
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- Farm livelihoods
- Short-term vs. long-term?
- Do land use requirements limit “reversability”?

What are you trying to preserve?

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What are you trying to preserve?

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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

Solar & Farmland Preservation in other states

- **Utility-scale solar, very mixed**
 - CA, NY, VT = remove with penalty
 - OH (differential assessment) = remove
 - IA, HI, MD = similar to MI
 - Oregon = permitted
- **By comparison, utility-scale wind most often permitted**
- **On-farm solar, wind generally allowed**

NEW RESOURCE

extension.msu.edu/solarzoning

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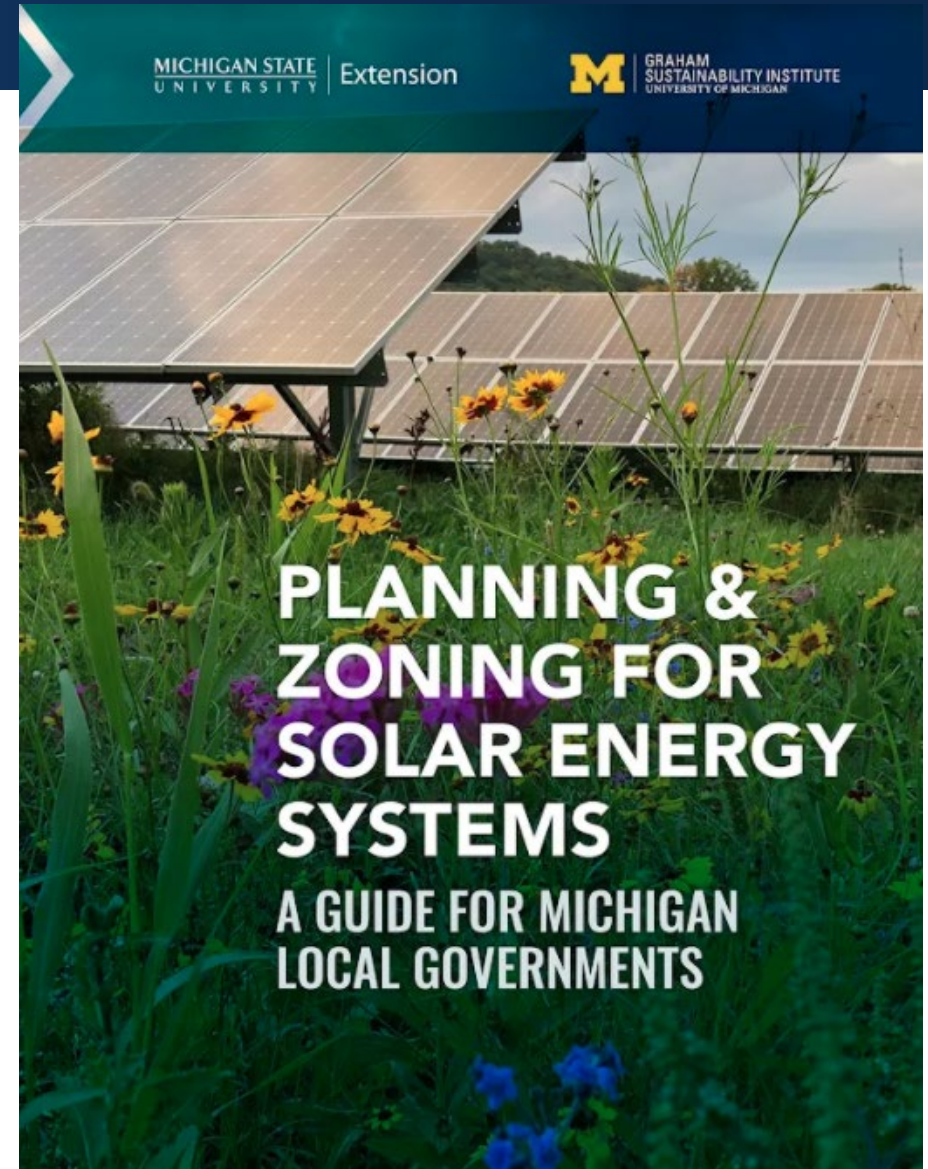
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Our advice to communities on solar and ag

- What does your community mean by farmland preservation?
- **Be consistent**
 - What else do you allow in ag district?
 - Golf course? Residential development?

Thank you & questions

Sarah Mills, PhD

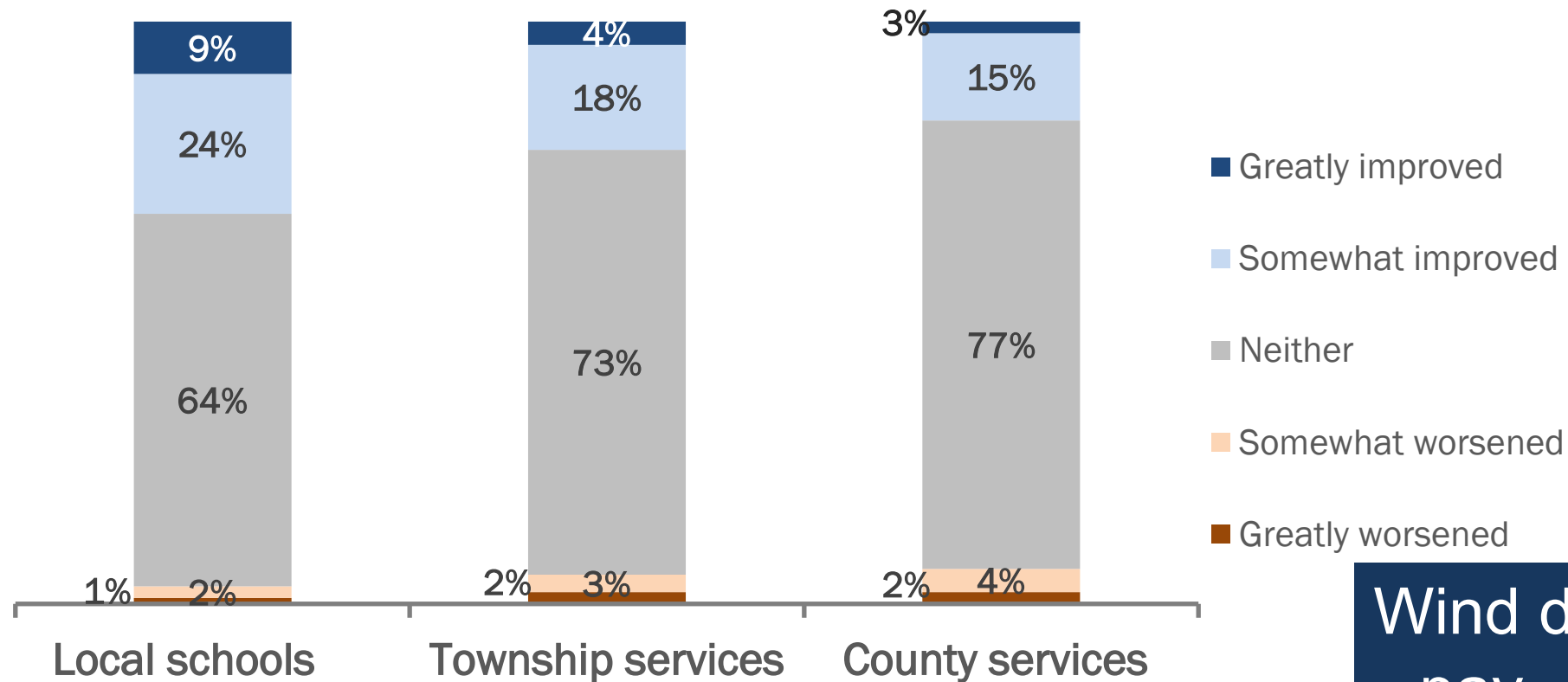
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Perceptions of Property Taxes

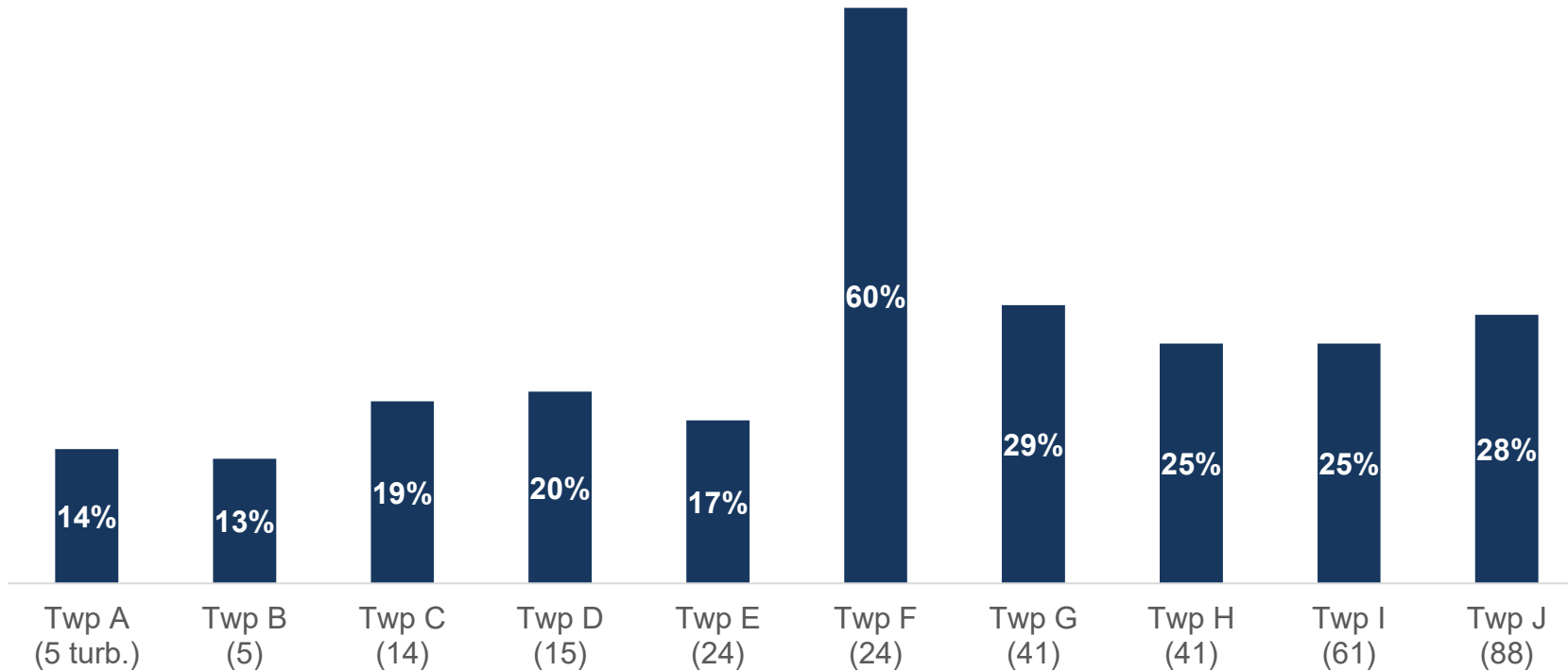


Source: Mills, S. (2017). [Views of Wind Development from Michigan's Windfarm Communities](#)

Wind developers
pay ~\$20M in
property taxes
each year

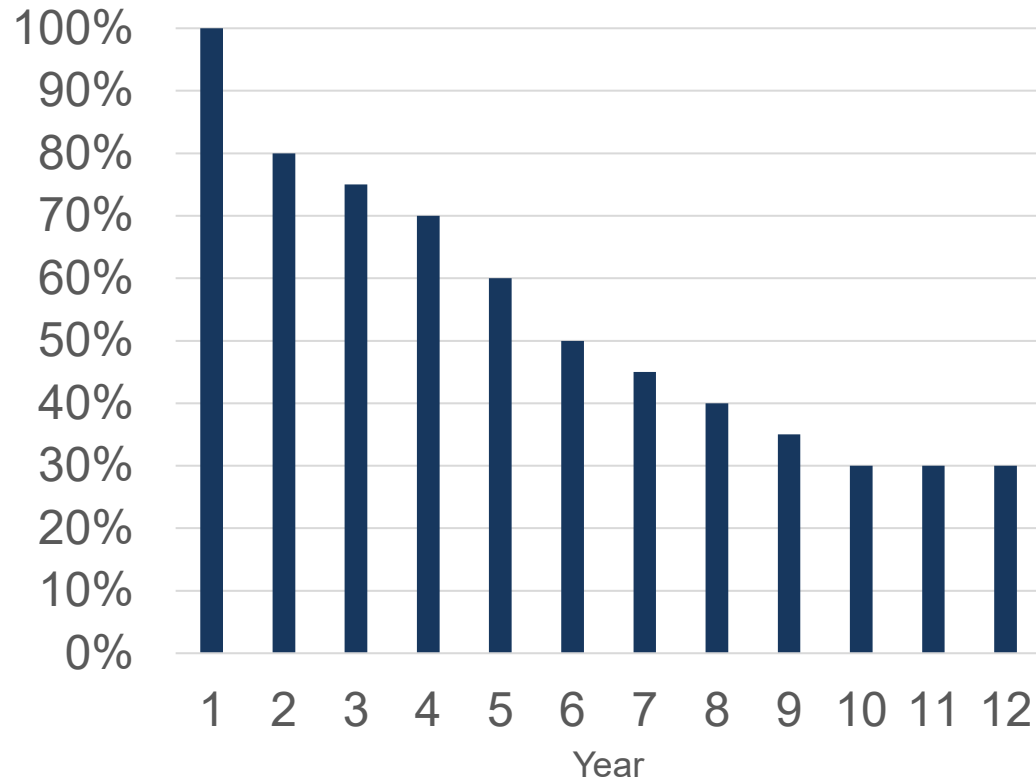
Perceptions of Property Taxes

% who said Township Services Improved from Wind Development



Perceptions of Property Taxes

STC Wind Multiplier Table



- Human nature
- Revenue decline over time
- Changes = Uncertainty