

What you always wanted to know about Wind and Solar Farms

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Bay City Garden Club
May 20, 2019

Overview

- Why think about renewable energy?
- Pros & cons of wind
- Pros & cons of solar
- Why zoning matters?

My Background

- PhD in rural land use planning
 - Investigate claims of wind as farmland preservation tool
 - City of Ann Arbor Planning Commissioner
- Research on attitudes about energy, energy policy
- Presentations around Michigan
 - Provide state-based data
 - Neutral broker
 - Funding through Michigan Energy Office

MICHIGAN
Energy Office

Why think about renewable
energy?
...

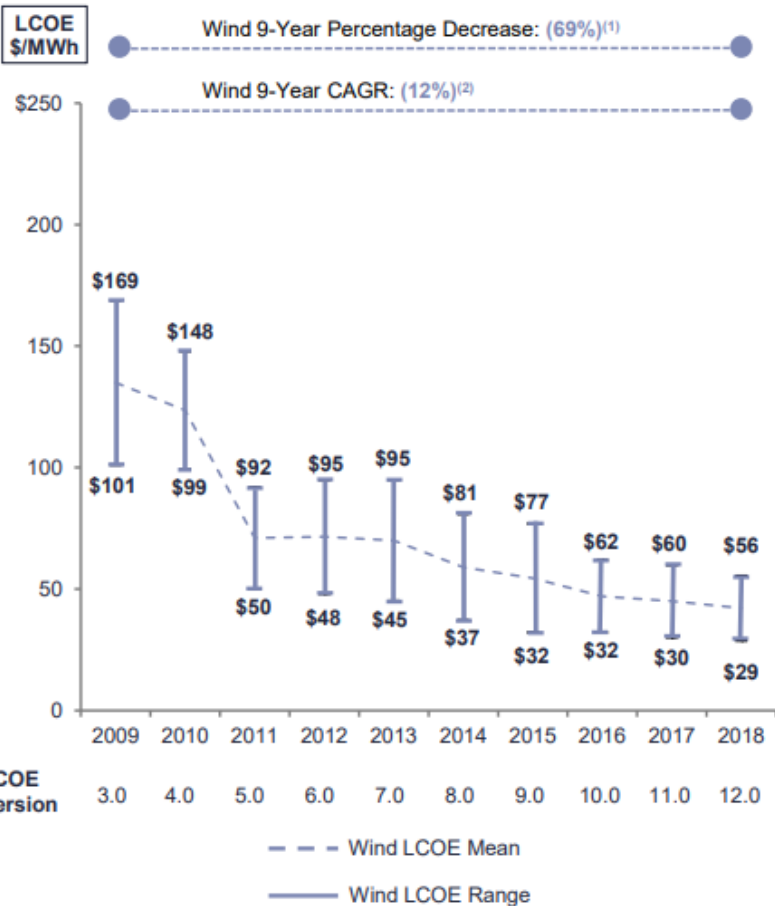
Why talk about renewables?

1. Costs are falling; utilities are looking for host communities

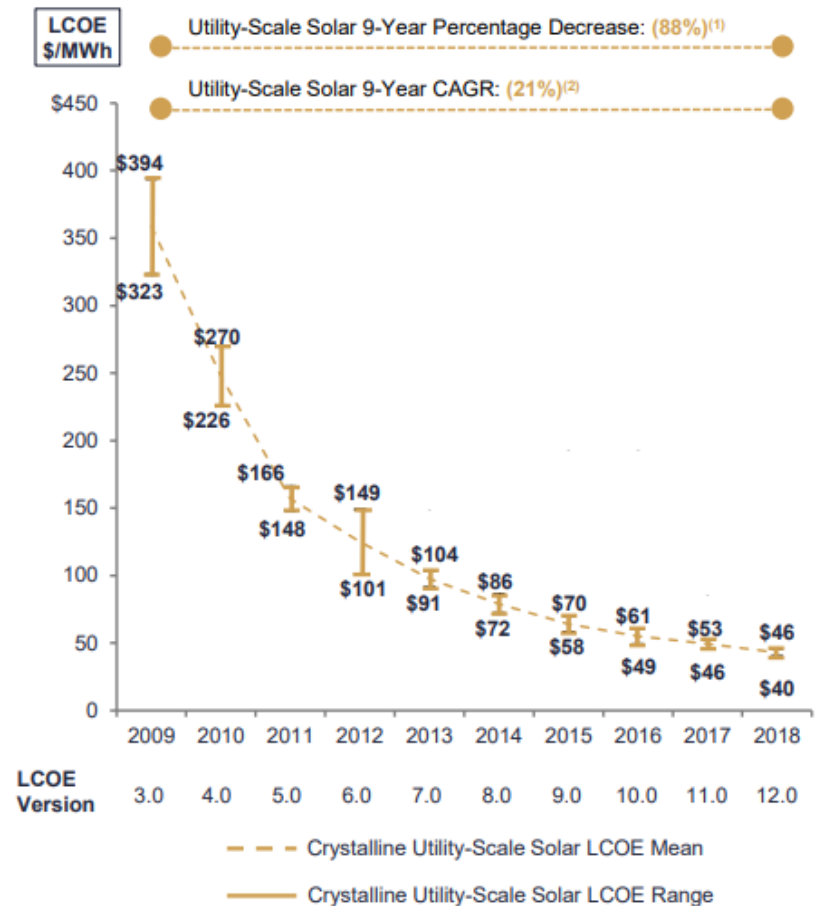


Costs of Wind and Solar Declining

Unsubsidized Wind LCOE

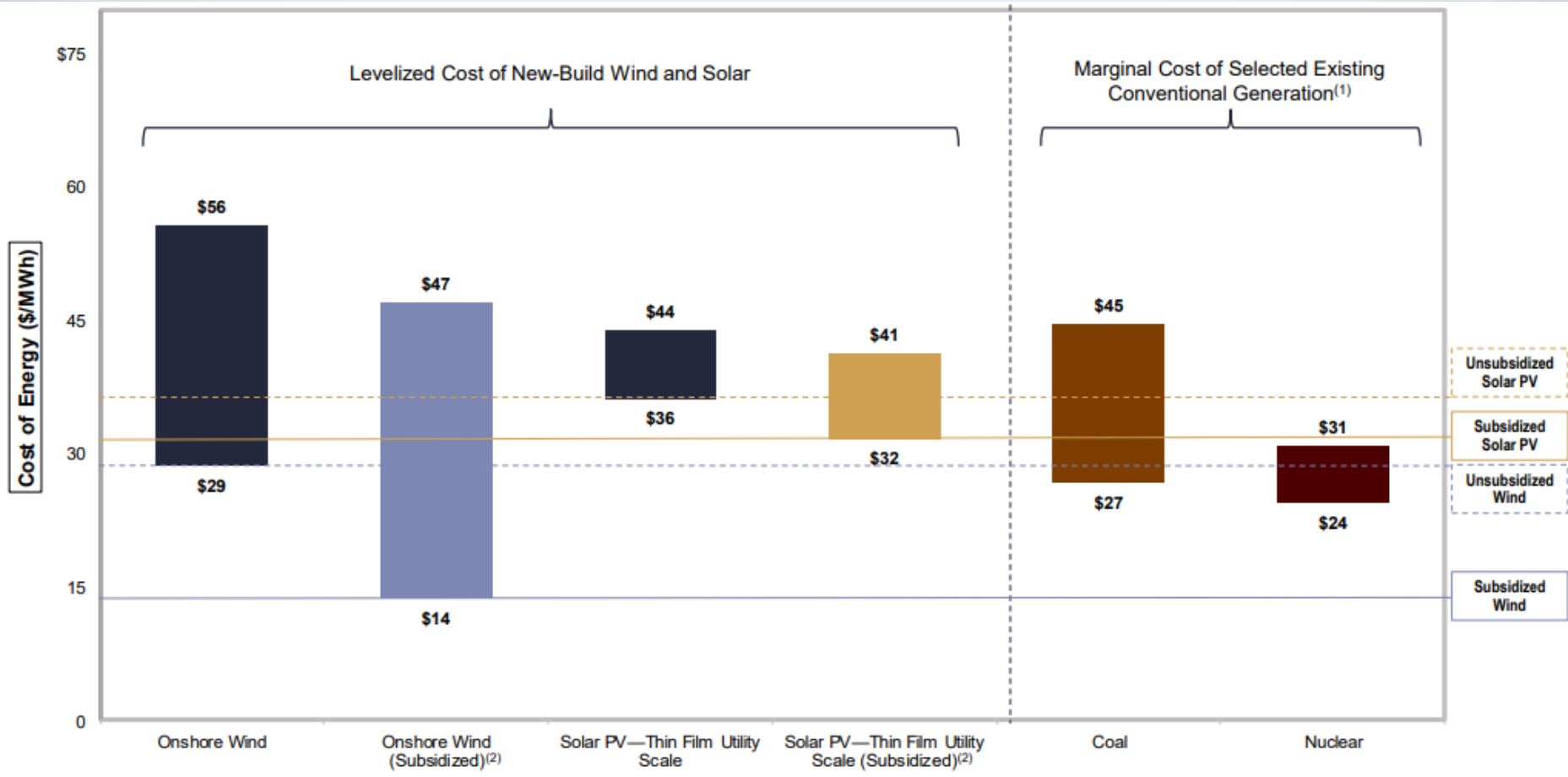


Unsubsidized Solar PV LCOE



Source: <https://www.lazard.com/media/450784/lazards-levelized-cost-of-energy-version-120-vfinal.pdf>

Some wind, solar cheaper than keeping existing plants open



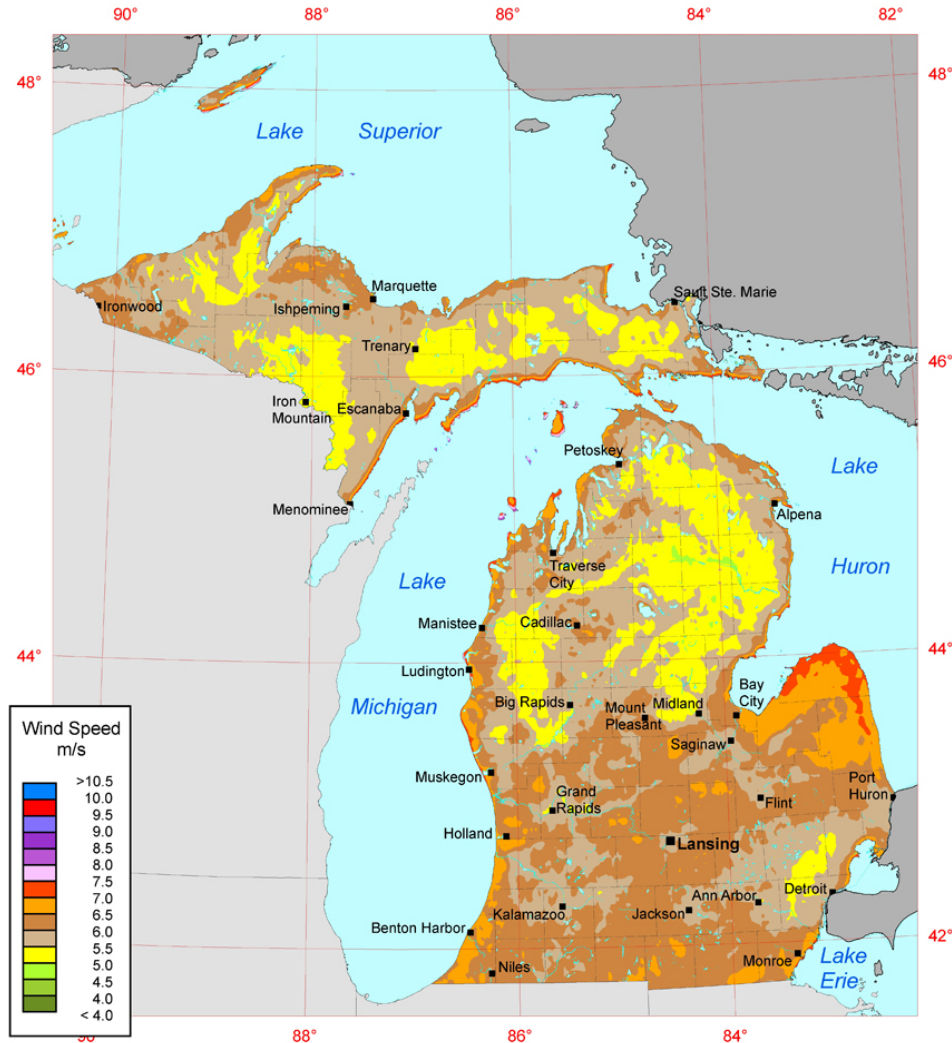
Source: <https://www.lazard.com/media/450784/lazards-levelized-cost-of-energy-version-120-vfinal.pdf>

Why talk about renewables?

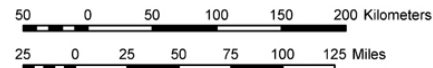
1. Costs are falling;
utilities are looking
for host communities
2. Technology making
wind development
and solar possible
statewide
 - Bay County is
particularly windy &
sunny



Michigan - Annual Average Wind Speed at 80 m



Source: Wind resource estimates developed by AWS Truepower, LLC for windNavigator®. Web: <http://www.windnavigator.com> | <http://www.awstruepower.com>. Spatial resolution of wind resource data: 2.5 km. Projection: UTM Zone 16 WGS84.

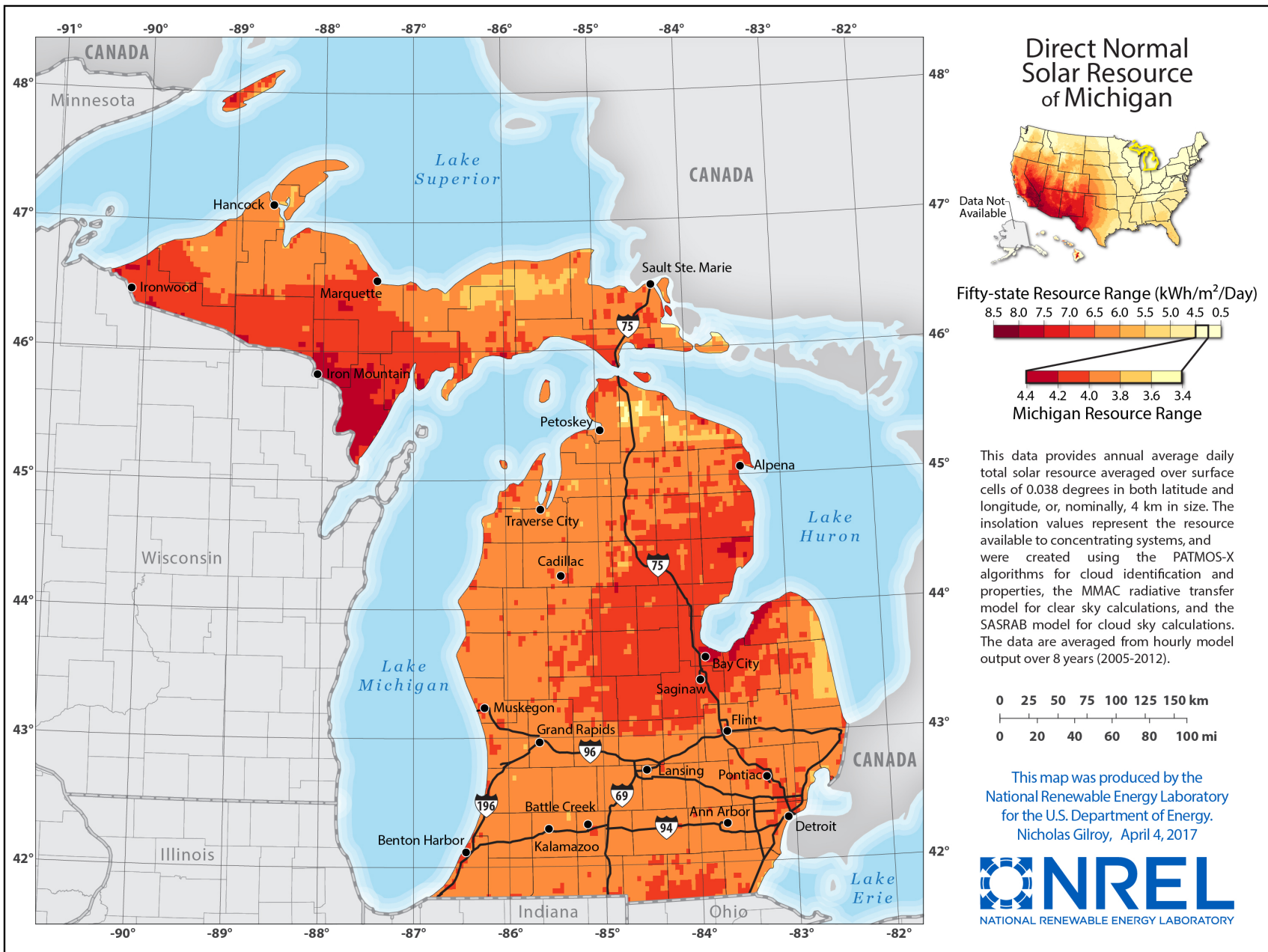


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NATIONAL RENEWABLE ENERGY LABORATORY
18-OCT-2010 1.1.1

FORD SCHOOL



Why talk about renewables?

1. Technology making wind development and solar possible statewide
2. Costs are falling – so utilities are looking for host communities
3. **Impacts of climate change will increasingly be felt; fossil fuel electricity part of the problem**



Michigan already feeling climate impacts; impacts will increase

- Heavier rain events
- Warming lakes
- Warmer average temperatures
 - Longer growing seasons



Source: <https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-mi.pdf>

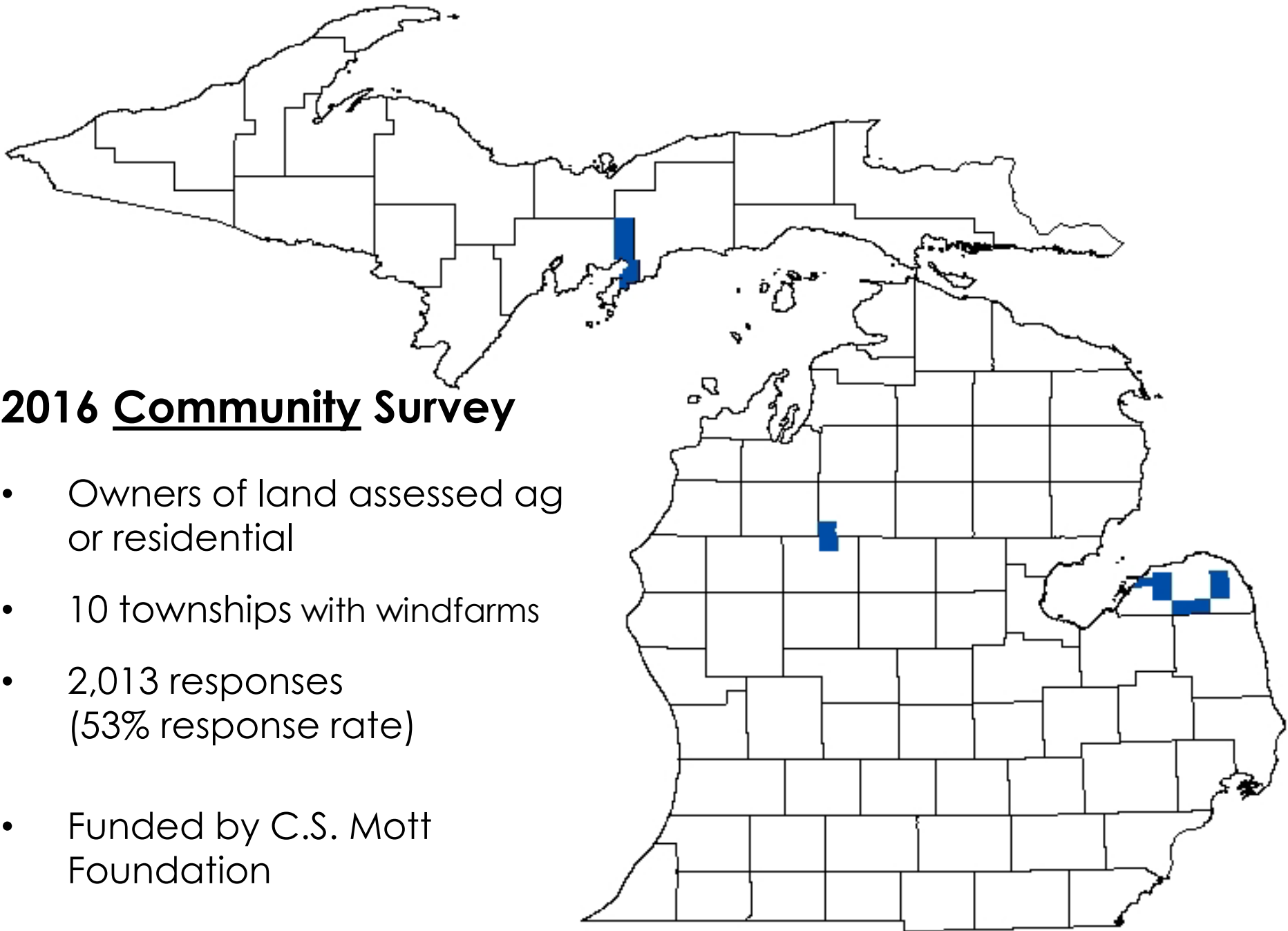
Why talk about renewables?

1. Costs are falling – so utilities are looking for host communities
2. Technology making wind development and solar possible statewide
3. Impacts of climate change will increasingly be felt; fossil fuel electricity part of the problem

Communities need to decide if renewables are right for THEIR community

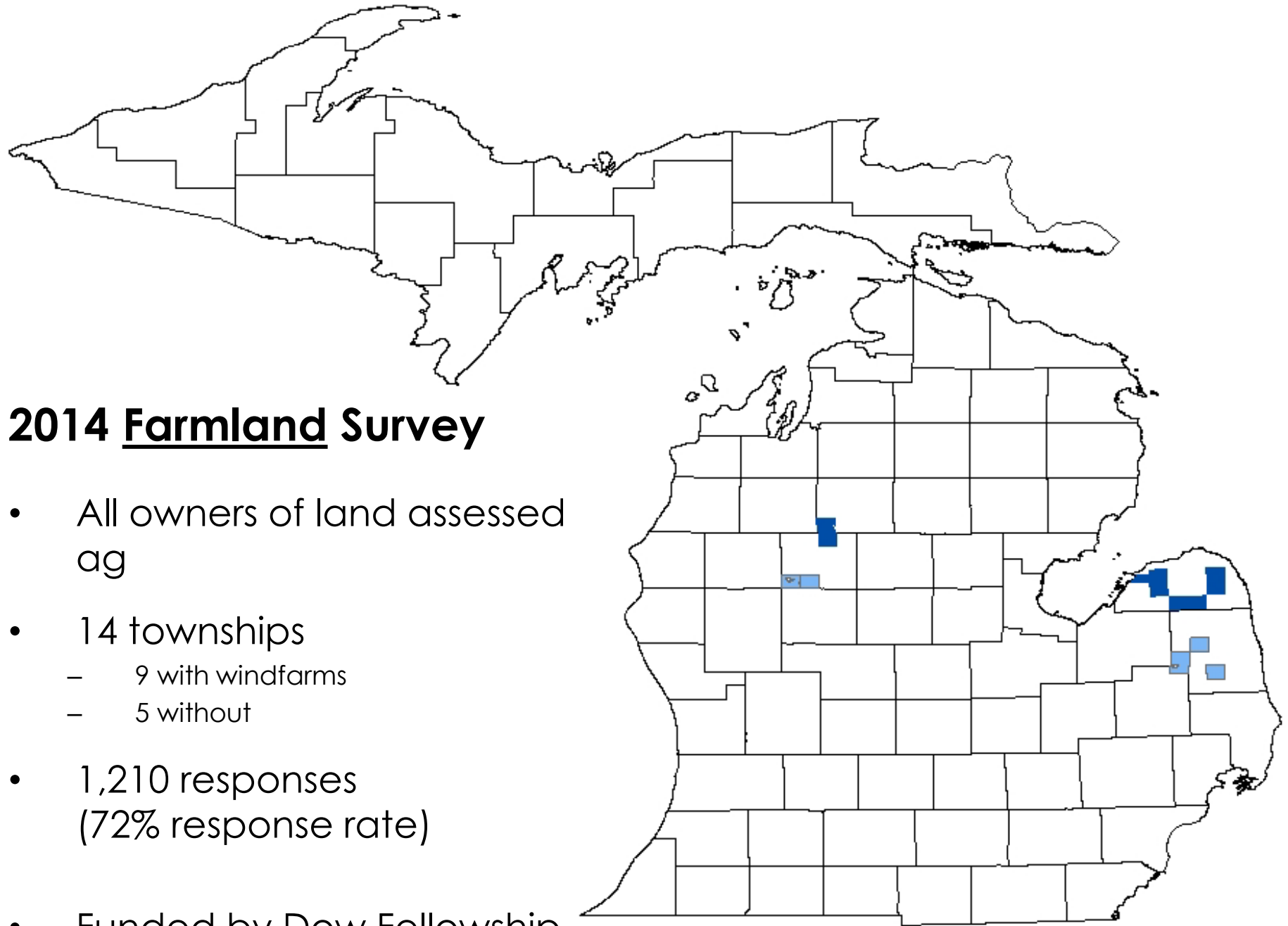


Impacts of wind energy on host communities ...



2016 Community Survey

- Owners of land assessed ag or residential
- 10 townships with windfarms
- 2,013 responses (53% response rate)
- Funded by C.S. Mott Foundation



2014 Farmland Survey

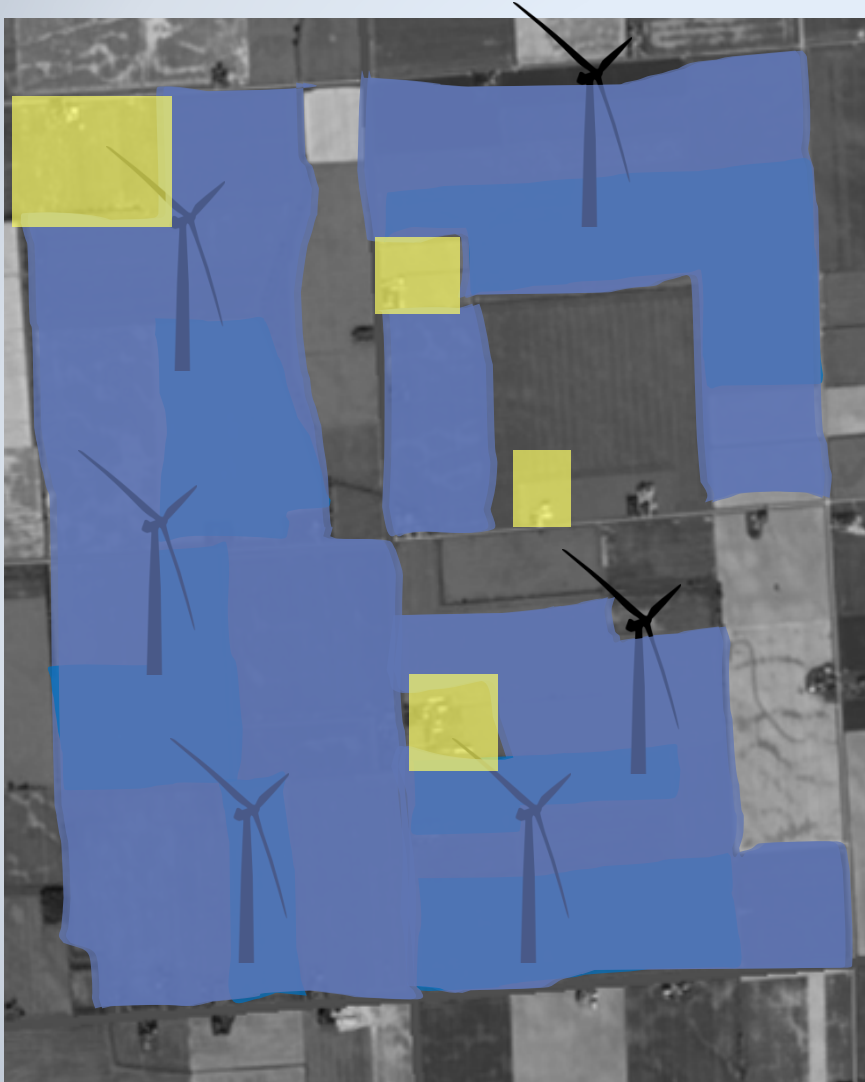
- All owners of land assessed ag
- 14 townships
 - 9 with windfarms
 - 5 without
- 1,210 responses
(72% response rate)
- Funded by Dow Fellowship

Impacts of Wind Energy

Local Benefits

- Landowner payments
 - Farm succession
 - Farm reinvestment
 - Not JUST farmers

Direct Benefits to Others



- Old Model: Winner takes all
 - Disturbance
 - Royalty
- Newer Model: Pooled Royalties
 - Usually per-acre
- Newest Model: Includes Smaller Parcels
- **Direct benefit to others depends on model**

Impacts of Wind Energy

Local Benefits

- Landowner payments
- Tax payments to local government
 - Benefits counties, townships, fire services, libraries
 - Impact on schools depends

Impacts of Wind Energy

Local Benefits

- Landowner payments
- Tax payments to local government
- **Jobs (maybe)**
 - During construction
 - Fewer long-term

Impacts of Wind Energy

Local Benefits

- Landowner payments
- Tax payments to local government
- Jobs (maybe)

Local Concerns

- **Noise**
 - Annoyance, not hearing loss
 - Attitudes split

Impacts of Wind Energy

Local Benefits

- Landowner payments
- Tax payments to local government
- Jobs (maybe)

Local Concerns

- Noise
- **Human health**
 - Annoyance, stress
 - Flicker

Impacts of Wind Energy

Local Benefits

- Landowner payments
- Tax payments to local government
- Jobs (maybe)

Local Concerns

- Noise
- Human health
- **Property values**
 - **Perceptions: 54% say yes – linked to farm vs. non-farm**
 - **Studies: Nothing specific to Michigan; US studies say no**

Impacts of Wind Energy

Local Benefits

- Landowner payments
- Tax payments to local government
- Jobs (maybe)

Local Concerns

- Noise
- Human health
- Property values
- **Visual impacts**
 - Day vs. night; technology to turn off red light
 - Attitudes split

Impacts of Wind Energy

Local Benefits

- Landowner payments
- Tax payments to local government
- Jobs (maybe)

Local Concerns

- Noise
- Human health
- Property values
- Visual impacts
- **Wildlife**
 - **Environmental orgs encourage “right” siting**

Summary of Wind Impacts

Local Benefits

- Landowner payments

- Tax pay
governm

- Jobs (maybe)

Local Concerns

- Noise

Wind energy = Economic
Development Opportunity

Fits better in some communities
than others

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

Impacts of solar energy on host communities

...

That's a much better option, right?

Comparative Impacts of Solar Energy

Local Benefits

- Landowner payments
Fewer landowners, more \$
- Tax payments to local government
Probably, but not sure
- Jobs (maybe)
Same

Local Concerns

- Noise
Much less
- Human health
n/a
- Property values
Concern, but few studies
- Visual impacts
Concern, but easier to screen
- Wildlife
Primarily Construction

Impacts of Solar Energy

- Large land requirements
 - Developers looking for ~20 acres or ~600+ acres
- Good use of farmland?
 - Opportunity for pollinator habitat, improve water quality
 - What impact on rental land rates, farm economies?



Bottom Line on Solar

- Solar = economic development
- Where land is ample or of marginal quality, **no-brainer**
- Where ag-based economy, think more carefully through pros/cons

Why planning & zoning matter ...

Step 1: Plan first!

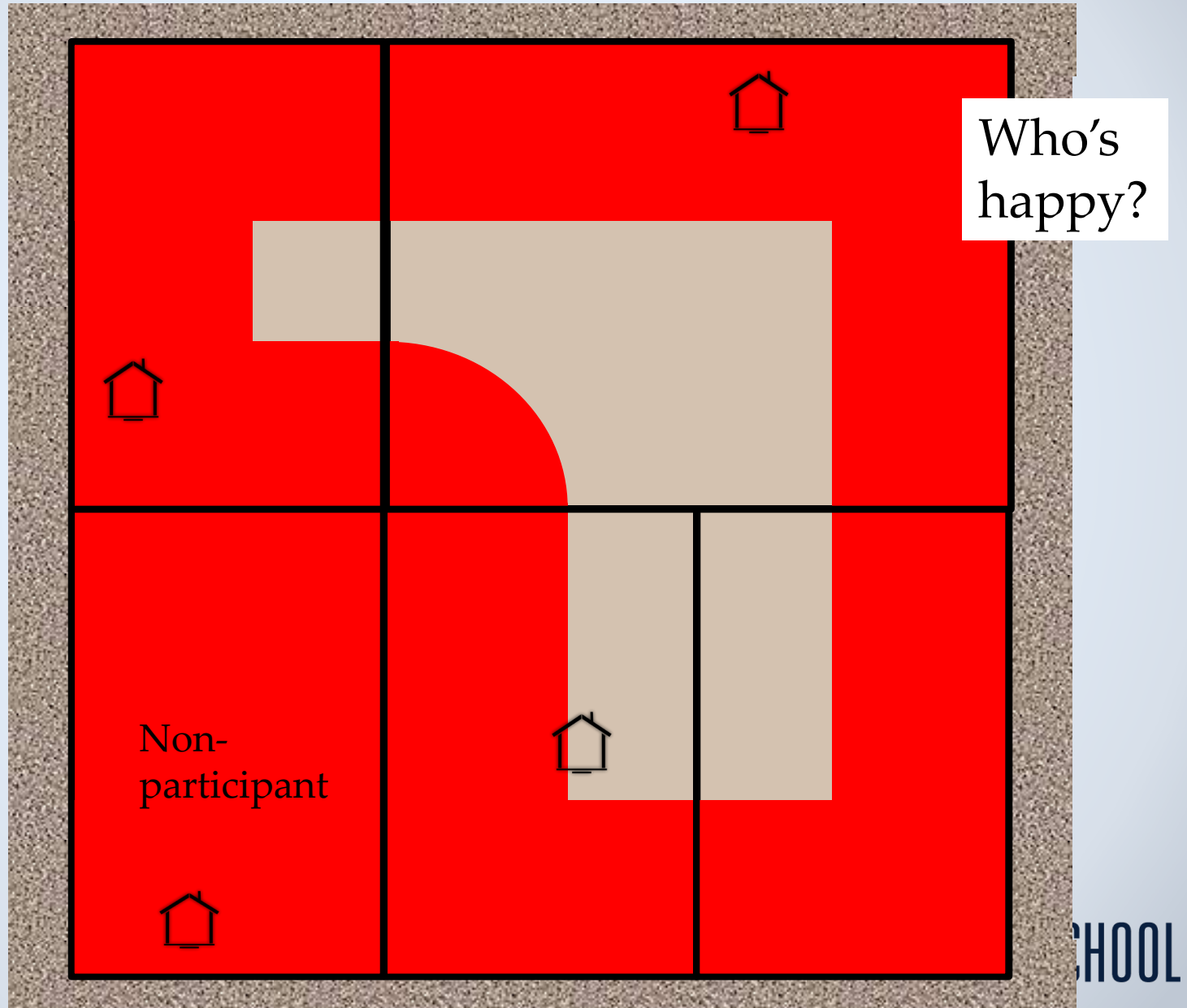
- Land use planning helps communities set vision, navigate land use conflicts
- How does energy fit with your long-term plan?
 - For economic development
 - For land use
- What sort of energy, and in which part of township?

Step 2: Zoning should match the plan

- Zoning ordinances set rules to implement the plan
- Possible to create a legitimate zoning ordinance that minimizes or maximizes opportunities for turbines
 - Directs wind/solar development to particular areas
 - Provides/limits opportunities through setbacks, noise, other requirements
- Difficult / impossible to please everyone

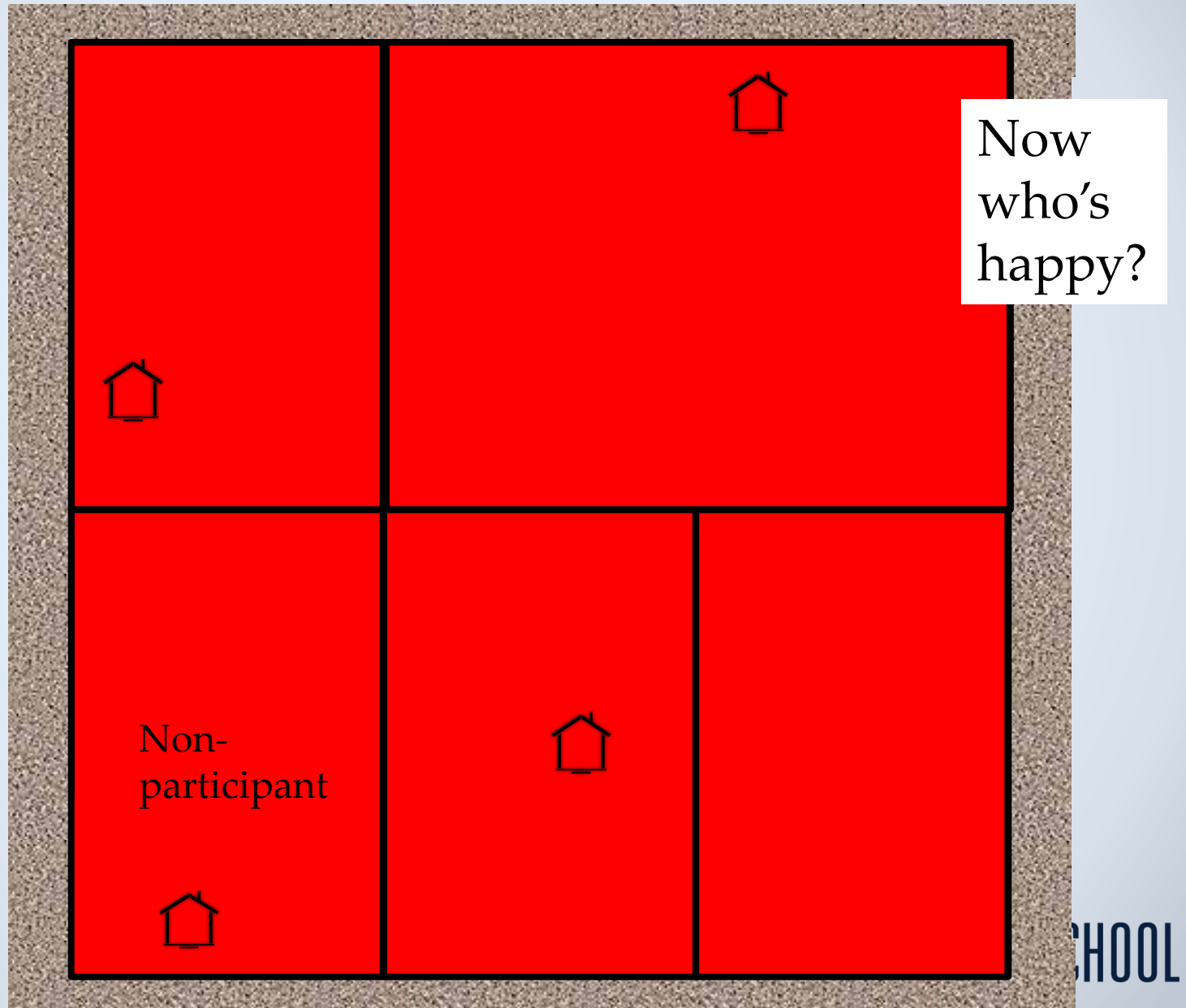
Example of Impact of Setback

1000' from road, non-participating



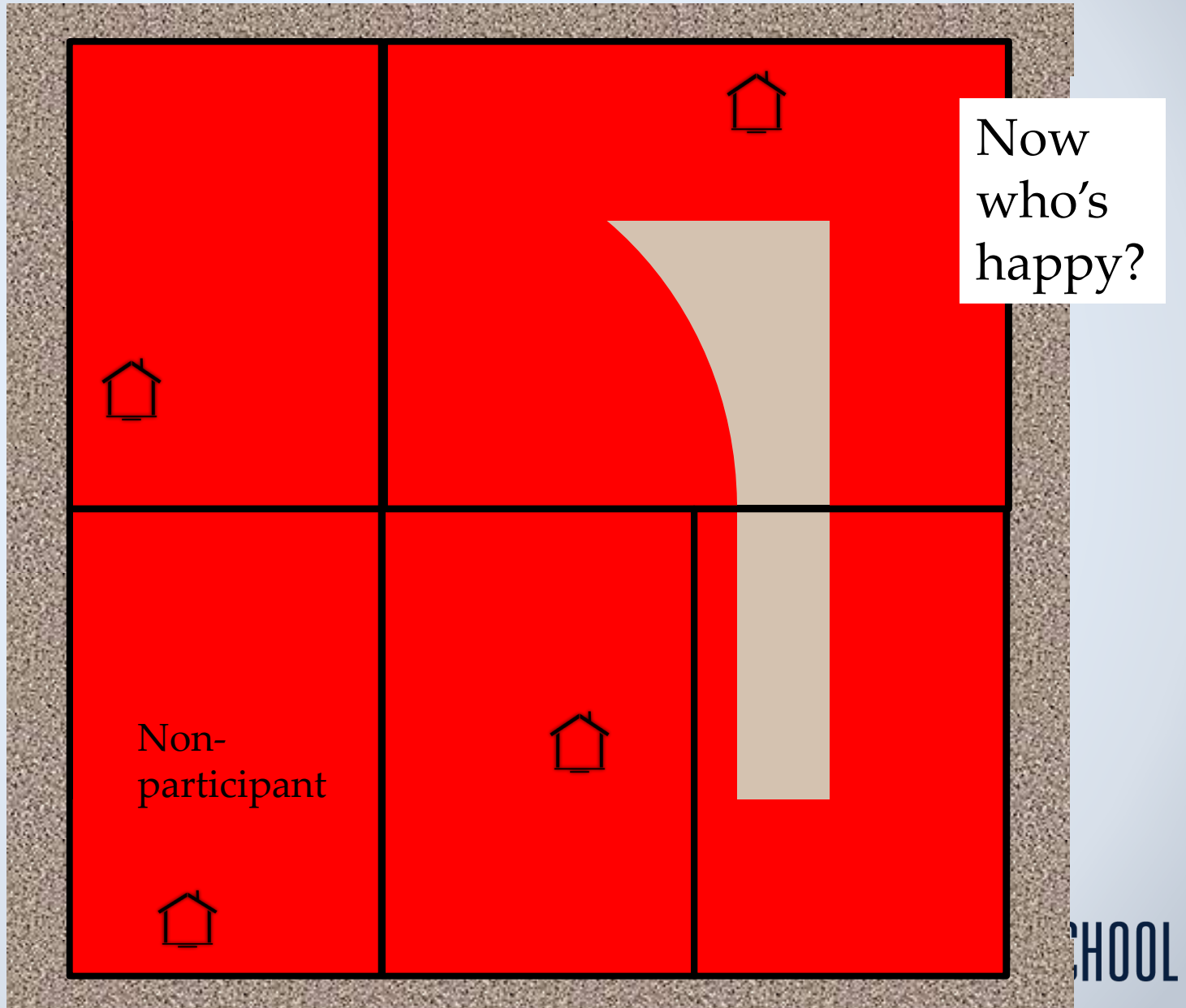
Double setback?

2000' from road, non-participating



Happy medium?

1000' from road, 2000' non-participating

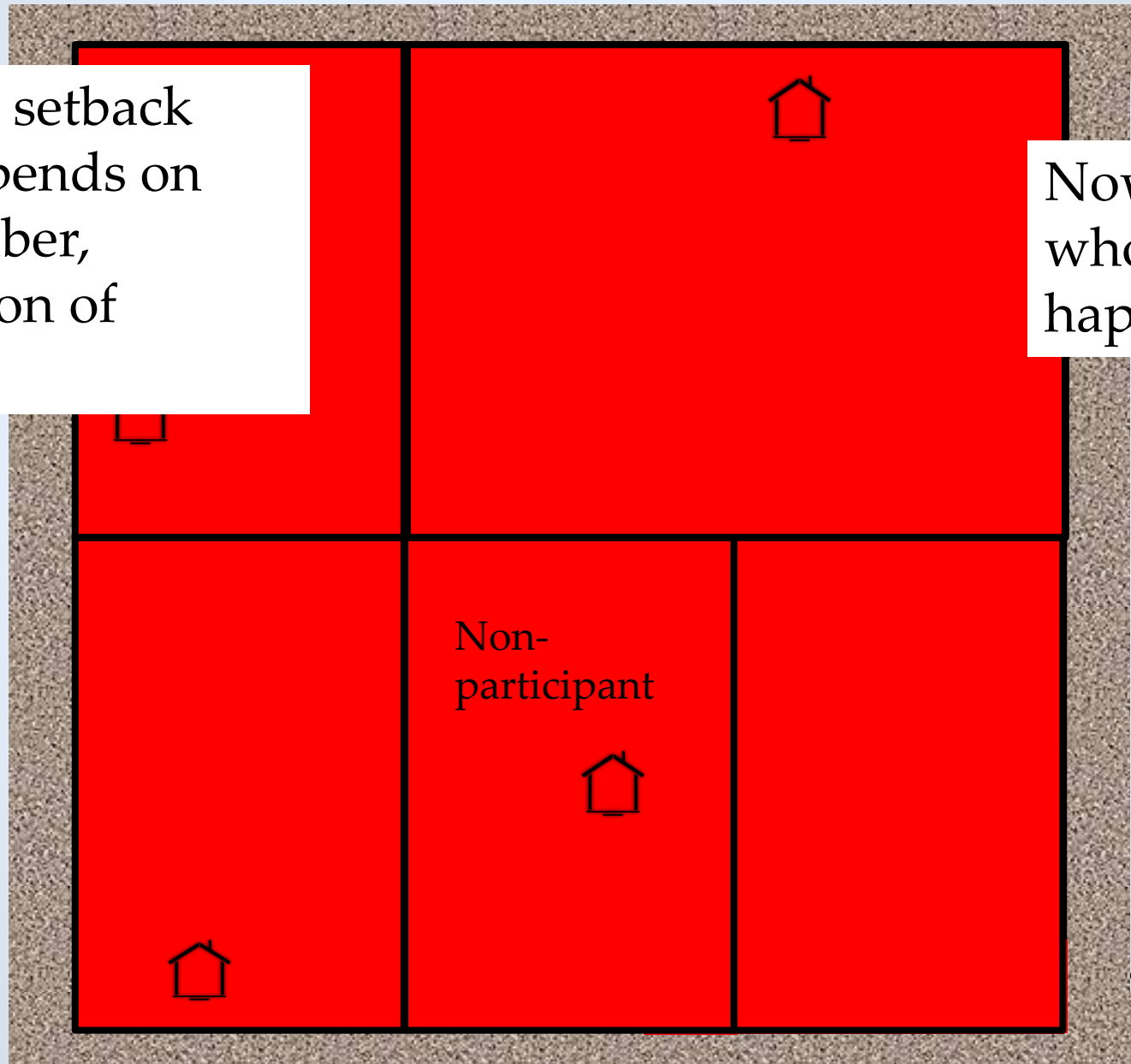


Happy medium?

1000' from road, 2000' non-participating

Impact of setback
really depends on
size, number,
distribution of
parcels

Now
who's
happy?



SCHOOL

Closing thought: Planning Process Critical to Public Acceptance



Photo: <https://www.uppermichiganssource.com/content/news/Friends-of-the-Huron-Mountains-not-in-favor-of-wind-turbine-project-in-LAnse-489183491.html>

- Need to talk it out; “what is our township/county’s long-term vision?”
- Best before proposal is on the table
 - Time
 - Control
 - What’s rational

Thank you!

Questions?

Sarah Mills

Phone: (734) 615-5315

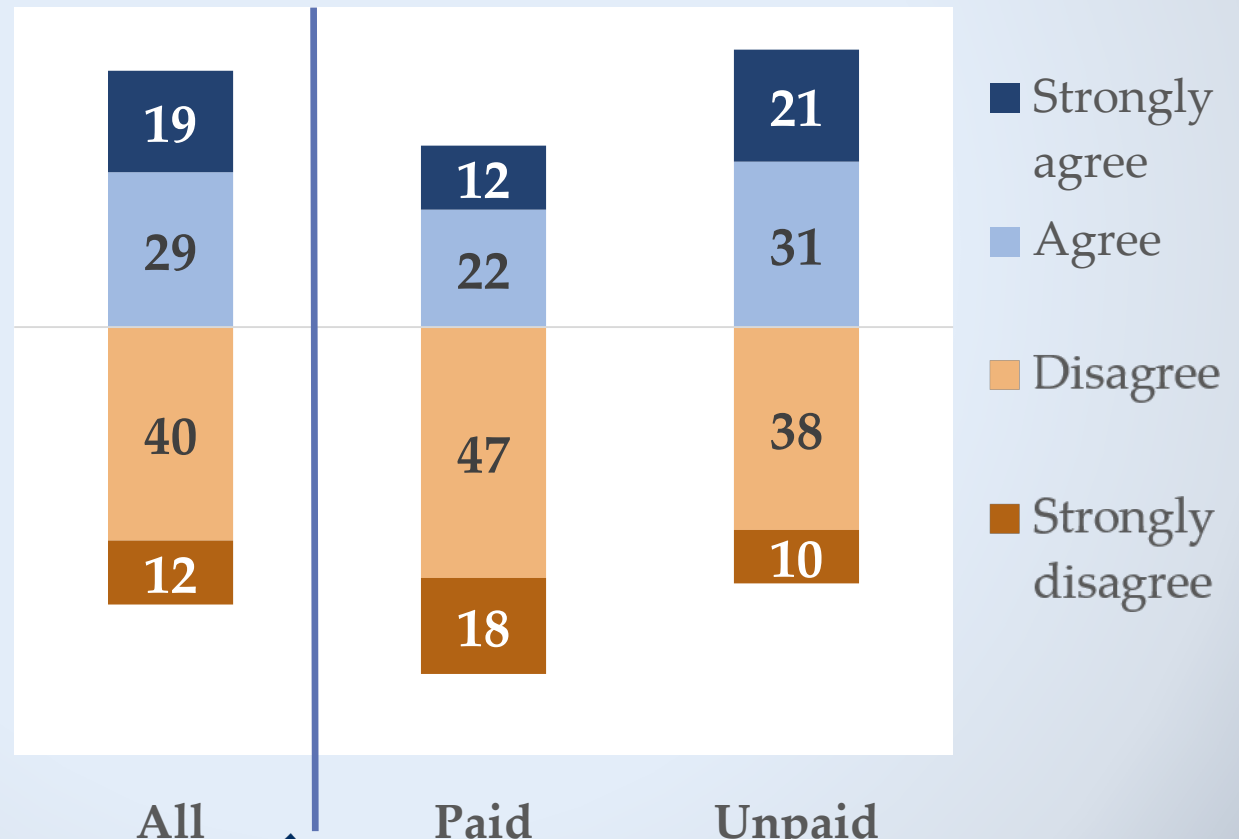
Email: sbmills@umich.edu

Web: www.closup.umich.edu/wind

Individual-level Impacts

- **Noise**
- Visual
- Health
- Property value
- Farm income
- Farm succession

Turbines create noise pollution



Individual-level Impacts

Turbines create visual/aesthetic problems

- Noise
- **Visual**
- Health
- Property value
- Farm income
- Farm succession

