

**"AND JUSTICE FOR ALL"**

MSU is an affirmative-action, equal-opportunity employer. Michigan State University Extension programs and materials are open to all without regard to race, color, national origin, sex, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status or veteran status.

MICHIGAN STATE UNIVERSITY Extension

## Shining a Light on Agricultural Solar Energy Development

March 2018

MICHIGAN STATE UNIVERSITY | Extension

MICHIGAN STATE UNIVERSITY Extension

*Thank You to Our Sponsors!*






MICHIGAN STATE UNIVERSITY Extension

### Authors

- **M. Charles Gould**
  - MSU Extension Educator
  - Ag. Bioenergy and Energy Conservation
  - Based in Ottawa County
  - [gouldm@msu.edu](mailto:gouldm@msu.edu)
- **Brad Neumann, AICP**
  - MSU Senior Extension Educator
  - Government and Public Policy Team
  - Based in Marquette County
  - [neuman36@msu.edu](mailto:neuman36@msu.edu)



MICHIGAN STATE UNIVERSITY Extension

### Authors

- **Harmony Gmazel, AICP**
  - MSU Extension Educator
  - Government and Public Policy Team
  - Based in Washtenaw County
  - [gmazelh@msu.edu](mailto:gmazelh@msu.edu)
- **Dave Rowley, MPA, MAAO (3), MCPPE**
  - MSU Extension Educator
  - Government and Public Policy Team
  - Based in Isabella County
  - [rowleyd2@msu.edu](mailto:rowleyd2@msu.edu)

MICHIGAN STATE UNIVERSITY Extension

### Authors

- **Wendy K. Walker, Esq.**
  - MSU Extension Educator
  - Government and Public Policy Team
  - Based in Cass County
  - [walkerdy@msu.edu](mailto:walkerdy@msu.edu)
- **Wayne Beyea, J.D., AICP**
  - MSU Senior Extension Specialist
  - School of Planning, Design & Construction
  - Government and Public Policy Team
  - [beyea@anr.msu.edu](mailto:beyea@anr.msu.edu)

MICHIGAN STATE UNIVERSITY Extension

MICHIGAN STATE UNIVERSITY Extension

## Handouts

- PowerPoint handout
- Planning and zoning for solar energy readiness: A hot proposition. MSUE News. February 11, 2015.
- Solar power case study. MSUE News. Jan. 2, 2018.
- Solar power - Is it the right investment for you? MSUE News. November 27, 2017.
- Commercial Solar Facilities on PA 116 Land. MDARD.
- Solar Site Pollinator Habitat Form. MSU Dept. of Entomology. Rufus Isaacs and Logan Rowe. Feb. '18.
- Spartyville activity handouts
- Evaluation; Civil Rights sheet (please return)

7

MICHIGAN STATE UNIVERSITY Extension

## What We Will Cover

- Context for Solar Energy Development on Michigan Farmland
- Community Vision for Solar Energy
- Zoning Approaches
- Siting Considerations for Utility-Scale Solar
- Integrating Solar with Existing Ag Systems
- Understanding Solar Energy Lease Agreements
- Taxation Guidance including Impact on PA 116
- Additional Resources

8

MICHIGAN STATE UNIVERSITY Extension

## Disclaimer

**The information presented in this program is for EDUCATIONAL PURPOSES ONLY and should not be taken or interpreted as legal advice. Readers are encouraged to consult a private attorney for their individual legal questions.**

9

MICHIGAN STATE UNIVERSITY Extension

## A. Context for Solar Energy Development on Michigan Farmland




Photo Credit: Rufus Isaacs

10

MICHIGAN STATE UNIVERSITY Extension

## Reasons for Ag Solar Development Pressure

Five reasons why Michigan farms have attracted the attention of solar project developers:

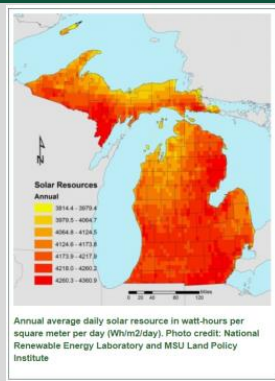
1. Michigan has adequate sunlight to produce electricity
2. Environmental benefits
3. Land availability and general proximity to power substations
4. Project costs have come down
5. New avoidance cost of electricity established

11

MICHIGAN STATE UNIVERSITY Extension

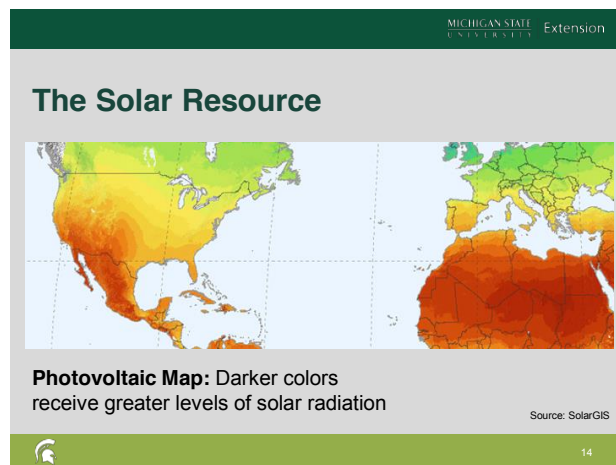
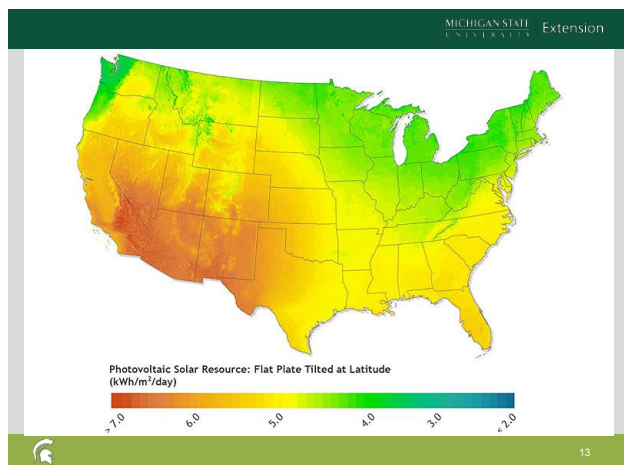
## Solar Radiation Strength

- **Radiation:** The electromagnetic energy that emanates from the sun.
- Harnessed to create heat and electricity.
- Siting is the key!



Annual average daily solar resource in watt-hours per square meter per day (Wh/m2/day). Photo credit: National Renewable Energy Laboratory and MSU Land Policy Institute

12



## Environmental Benefits

- No air or water pollution.
- No CO<sub>2</sub> emissions, therefore no impact on climate change.

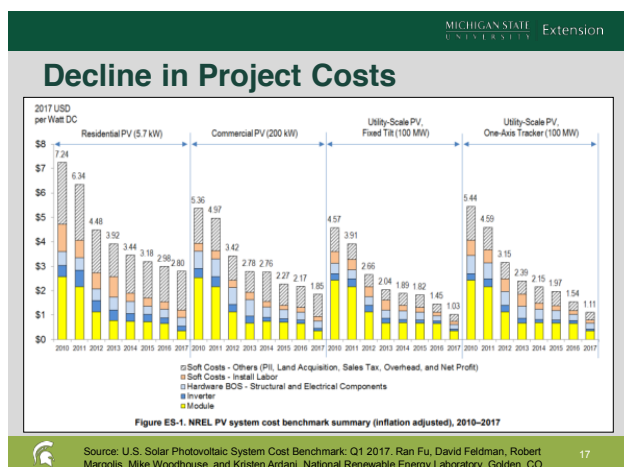
Source: Stephan Schmidt

## Land Availability

- How much marginal land is available in Michigan?
  - 11.3 M A available land
  - 6.8M A actively cropped
  - 4.5M A not actively cropped
- The most coveted land is closest to 3-phase power lines and power substations.

Photo Credit: Randy Jackson/GLBRC

Source: Dr. Kurt Thelen in a personal email to Charles Gould. Data referenced comes from the MSU Land Policy Institute.



## Avoided Cost of Electricity

- Nov. 21 MPSC issued a final order in a case setting the avoided cost rates for Consumers Energy. In Dec., another order was issued suspending the avoided cost implementation. In Feb., an order was issued limiting the full avoided cost payments to the first 150 MW of projects in the queue and reopening the case.
- What was the avoided cost and what is it now?
  - "Avoided cost" is defined as the cost equal to or below the cost for utilities to purchase or generate the power themselves. Previously, for Consumers Energy and DTE it was based on the cost of a coal plant. Now, the avoided cost is based on natural gas plant costs.
  - Now, for solar projects, the avoided cost is expected to be around \$0.095/kWh

MICHIGAN STATE UNIVERSITY Extension

## Avoided Cost of Electricity

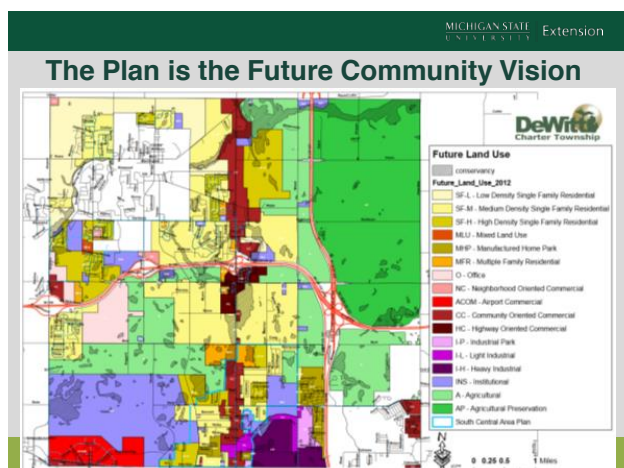
- Why is the solar avoided cost significant?
  - The avoided cost is high enough and solar costs have decreased enough so that solar projects may have favorable economics.
  - The maximum size of solar projects able to take service under the standard offer power purchase agreement (no negotiations needed) is increased from 100 kW to 2 MW (2,000 kW) and contract terms up to 20 years, giving them additional certainty.
  - Solar projects larger than 2 MW and up to 20 MW qualify for the avoided cost, but must negotiate some of the terms and conditions with the utility.

19

MICHIGAN STATE UNIVERSITY Extension

## B. Community Vision for Solar Energy

20



MICHIGAN STATE UNIVERSITY Extension

## The Local Master Plan – PA 33 of 2008

- Communities set the direction of solar in their policy documents, such as the Master Plan.
- Master plans can promote the potential for solar energy use, set goals for solar energy development, and provide solar-specific implementation strategies.
- Master Plans may outline important decisions related to solar access, solar easements, and solar siting.
- Multi-jurisdictional solar advisory committees can facilitate the creation of a region-wide master plan to guide future solar panel installation and regulation

22

MICHIGAN STATE UNIVERSITY Extension

## Understanding the Resource

- Project Specific Calculator for homeowners

http://pvwatts.nrel.gov

23

MICHIGAN STATE UNIVERSITY Extension

## Understanding the Resource

- Calculator for professionals

https://sam.nrel.gov/

24

MICHIGAN STATE UNIVERSITY Extension

## Proactive Planning vs. Reaction

- Like other community changes, solar has the potential to generate opposition if siting causes conflicts with surrounding land uses or interests.
- Planning ahead and engaging the public proactively to identify the best sites (utility-scale) will minimize conflict and opposition.

**County planners endorse solar moratorium**

Brenda Butler, Tribune Staff Writer Published 9:03 am, Friday, May 12, 2017

BAD AXE -- Before allowing commercial solar development in county-zoned townships, there are a few things officials need to sort out.

There must be an ordinance, the **Huron County Master Plan** needs to progress, and the taxation of solar development must be investigated.

25

MICHIGAN STATE UNIVERSITY Extension

## Planning for Solar

- First consider prioritizing solar on non-prime farmland:
  - Edges, transitional areas, steeper slopes, highly-erodible land, droughty soils, paved areas, etc.
- Marginal lands - a catch-all term for property that would make good sites for solar because of limitations on use, current condition, ownership, etc.
  - Brownfields, landfills, highway ROWs, airports, etc.

26

MICHIGAN STATE UNIVERSITY Extension

## Farm and Forestland Considerations

- Prime farm and forest land is already in a productive use
  - Not in transition to 'highest and best use'
- Other practical limitations:
  - PA 116 - Farmland and Open Space Preservation Program
  - Other state, federal programs providing tax benefits to retain land in undeveloped state

27

MICHIGAN STATE UNIVERSITY Extension

## Planning for Solar

- Understand the local political climate
- Incentivize, expedite for priority solar development areas
- More scrutiny for prime ag lands



Source: Google Images

28

MICHIGAN STATE UNIVERSITY Extension

## Physical Landscape Considerations

- Brownfield sites**
  - Phase I and II Environmental Site Assessments are required
  - Cleanup and trucking away of contaminating ground material
- Physical Obstructions**
  - Structures, trees, surface water, and slopes can affect solar placement and access

29

MICHIGAN STATE UNIVERSITY Extension

## Political Landscape Considerations

- Economic Barriers**
  - Appropriating tax dollars for solar projects can be a contentious battle
  - Large scale solar arrays often require new transmission infrastructure, which comes at a premium
- Legal Barriers**
  - Litigation over lease and easement agreements and circumventing restrictive covenants
  - Ground and mineral rights
- Local Opposition** - Local politicians, residents, and businesses may object to solar on aesthetic grounds

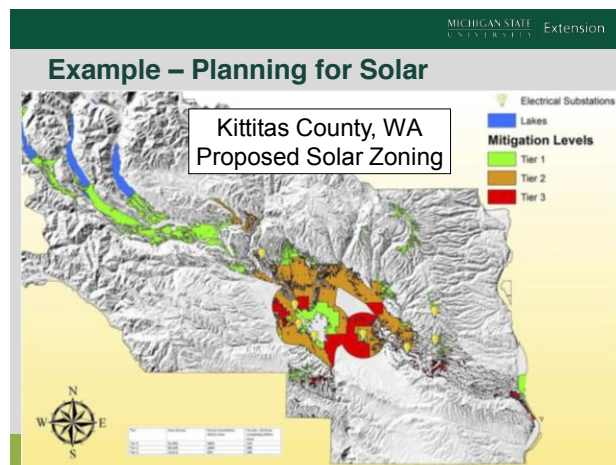
30

MICHIGAN STATE UNIVERSITY Extension

## Example – Planning for Solar

- Kittitas County, WA set criteria for solar facility placement, including:
  - Sites within three-mile radius of infrastructure,
  - Less than a 5 percent slope, and
  - Not in prime agriculture zoning.
- Analysis splits land into three levels:
  - Tier 1 (green): Meet all criteria
  - Tier 2 (orange): Meets some criteria
  - Tier 3 (red): Meets few or no criteria

31



MICHIGAN STATE UNIVERSITY Extension

## C. Zoning Approaches

6

MICHIGAN STATE UNIVERSITY Extension

## Principal Use vs. Accessory Use

- Adopt different standards for:
  - On-site use systems (accessory use of land)
  - Utility or community-based systems (principal use of land)

Marquette: Brad Neumann

34

MICHIGAN STATE UNIVERSITY Extension

## Principal Use vs. Accessory Use

- A principal use is the primary use or structure permitted on a property.
- Solar as a principal use on a property is generally a utility-scale array that occupies most of the property.

energy.utah.gov

35

MICHIGAN STATE UNIVERSITY Extension

## Principal Use vs. Accessory Use

- Accessory uses are uses or structures that offer an additional benefit to an accompanying principal use
- Many communities permit small-scale, ground- or roof-mounted solar systems as accessory uses in all districts

Photo Credit: Jim Surbrook

36

MICHIGAN STATE UNIVERSITY Extension

## Permitted Land Use (use by right)

- Within each zoning district, there will be a list of permitted uses.
  - Aka 'Use by Right'
- Owner can use the property in that way without special review and approval by the local government



Source: Google Images

37

MICHIGAN STATE UNIVERSITY Extension

## Special Land Use



- Generally compatible with other uses within a zoning district, but may not be appropriate in every location.
- Special land uses:
  - Typically require a public hearing and planning commission review.
  - Approved only when ordinance standards are met.



Source: Google Images

38

MICHIGAN STATE UNIVERSITY Extension

<h3>On-Site Use</h3> <p><b>Zoning Approach:</b></p> <ul style="list-style-type: none"> <li>Accessory, Permitted Use in all districts as appropriate</li> <li>Minimal review = expediency</li> </ul>  <p>Source: Google Images</p>	<p>vs.</p>	<h3>Utility-Scale</h3> <p><b>Zoning Approach:</b></p> <ul style="list-style-type: none"> <li>Principal, Special Land Use in certain districts as appropriate</li> <li>More review = siting based on standards</li> </ul>  <p>Source: Google Images</p>
--	------------	---

39

MICHIGAN STATE UNIVERSITY Extension

## Other Zoning Considerations for Solar

- Update Site Plan Review requirements;
- Amend subdivision regulations;
- Revise building code (if applicable);
- Streamline permitting processes;
- Modify inspection procedures;
- Adjust setbacks for solar to maximize solar input;
- Adopt solar access or solar easement provisions that define and protect property owners' rights to sun exposure.

40

MICHIGAN STATE UNIVERSITY Extension

## Solar Access

- Solar Access Rights - to access and harness sunlight so property owners can:
  - Grow crops, illuminate space, dry clothes, etc.... and operate solar collectors



Source: "Solar Planning 101: Opportunities and Obstacles" (webinar), American Planning Association, 9/11/17

41

MICHIGAN STATE UNIVERSITY Extension

## Solar Access Zoning Provisions

- Solar access provisions define and protect property owners' rights to sunlight
- Some municipalities require:
  - Solar Access Permits** to protect from prohibited interferences, i.e., vegetation and neighboring properties. Example: Tecumseh, MI
  - Solar Access Easements** are effectuated to protect solar skyline or a designated solar structure by forbidding activities, land uses, and structures that may interfere. Example: Milan, MI

42

MICHIGAN STATE UNIVERSITY Extension

## Other Sample Zoning Standards – Utility-Scale

- All applicable local, state, federal permits
- Comply with electrical and building codes
- Decommissioning plan
- Performance guarantee
- Height restrictions – the maximum height allowed in the district
- Lot coverage – waive for solar arrays
- Access – fencing surrounding
- Glare – not directed on roadways and neighbors
- Visual Impact - minimize adverse visual impact on historic structure, natural features, or neighborhood

43

MICHIGAN STATE UNIVERSITY Extension

## SPARTYVILLE

### Activity – A Matter of Local Public Policy

Read the scenario in your handouts. Then discuss the questions with a neighbor:

- What are your own thoughts about private property rights?
- Can zoning go too far in restricting property owners' rights?

44

MICHIGAN STATE UNIVERSITY Extension

## D. Siting Considerations for Utility-Scale Solar

45

MICHIGAN STATE UNIVERSITY Extension

## Utility-Scale - Defined


- *Commercial Solar Energy System (SES) shall mean any SES facility and accessory structures or use that is designed and built to exclusively provide electricity to the electric utility's power grid and is not accessory to any other use. The commercial SES is a principal use of property and may occupy the same property as another principal use.*
- Shiawassee County proposed zoning ordinance amendment to Section 21.2.G

46

MICHIGAN STATE UNIVERSITY Extension

## Concentrating Solar Power (CSP)

- Systems that use mirrors to focus light and heat a contained substance such as molten salts or water to create steam
- CSP unlikely in Michigan given levels of solar irradiance – a SW US technology for now.





NREL

47

MICHIGAN STATE UNIVERSITY Extension

## Utility-Scale Example - Lapeer Solar Parks

- Largest utility-owned installation in MI (DTE);
- 2 sites, 267 acres; 58MW; 200,000 panels that power 9,000 homes annually.

48

MICHIGAN STATE UNIVERSITY Extension

## What Solar Developers are Looking For

- Permissive Zoning
- Proximity to Transmission
- Suitable Land
- Irradiance
- Willing Landowner
- Site Conditions

49

MICHIGAN STATE UNIVERSITY Extension

## Permissive Zoning

- Most ordinances are written permissively:
  - “A permissive format states the permissive uses under the classification [zoning district], and necessarily implies the exclusion of any other non-listed use.”
    - *Independence Twp. v Skibowski*, 136 Mich App 178 (1984)
- So, if an ordinance doesn't say solar energy systems are allowed, they are not allowed.
  - i.e. If the ordinance is silent on it, it is not allowed

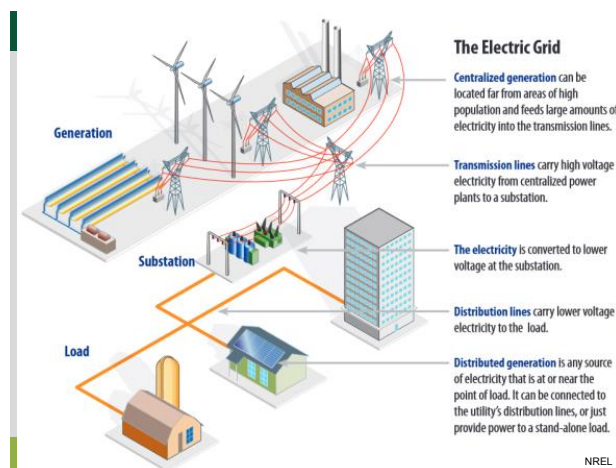
50

MICHIGAN STATE UNIVERSITY Extension

## Siting Considerations – The Grid

- Developers consider locations near grid infrastructure and whether a project will be able to successfully interconnect with the grid.
- If many sources feeding into the grid, it may not be possible to add new generation at a location.
- In other areas, where there is capacity in transmission lines, it will be more feasible to add a new solar project.

51



MICHIGAN STATE UNIVERSITY Extension

## Transmission, Sub-transmission, Distribution

up to 1000 kV    230 kV    138 kV    69 kV    7-13 kV

TRANSMISSION    SUB-TRANSMISSION    DISTRIBUTION

Source: www.samlexamerica.com

53

MICHIGAN STATE UNIVERSITY Extension

## Proximity to Transmission

- Utility-scale solar requires energy infrastructure within the area – ideally within 3 miles
  - Transmission lines, typically 69kV or greater, are needed for large solar projects of 20MW or more
  - Distribution lines as small as 8kV could support a small commercial solar project of 2MW
- Distributed, on-site solar is connected to distribution lines, typically 46kV lines and lower

54

MICHIGAN STATE UNIVERSITY Extension

## Transmission, Sub-transmission, Distribution

345 kV +

69 kV 138 kV <34.5 kV

Schindler Neumann Neumann

55

MICHIGAN STATE UNIVERSITY Extension

## Utility Infrastructure - Transmission

69 kV  
115 kV  
138 kV  
230 kV  
345 kV

ATC Transmission Network

56

MICHIGAN STATE UNIVERSITY Extension

## Transmission

**ITC**

**Michigan Thumb Loop Project**

- Approx. 140 miles of double-circuit 345,000 volt lines
- Four new substations
- Capable of supporting capacity of about 5,000 MW
- Targeted for completion by 2015

Huron, Bed Axe, Rapson, Sandusky, Banner, Port Huron, Fitz, Huron, Caro, Sandusky, Banner, Port Huron, Fitz, Huron, Caro, Sandusky, Banner, Port Huron, Fitz

57

MICHIGAN STATE UNIVERSITY Extension

## Transmission

- A project connected to transmission requires approval by the Midcontinent Independent System Operator (MISO)

MISO  
East-ATC, ITC & UP

58

MICHIGAN STATE UNIVERSITY Extension

## Suitable Land

- Generally flat or slopes within 20-30 degrees of due south
- Gradual slopes of 2-3% are ideal for PV systems, especially when constructed to face south, thereby increasing sunlight exposure

59

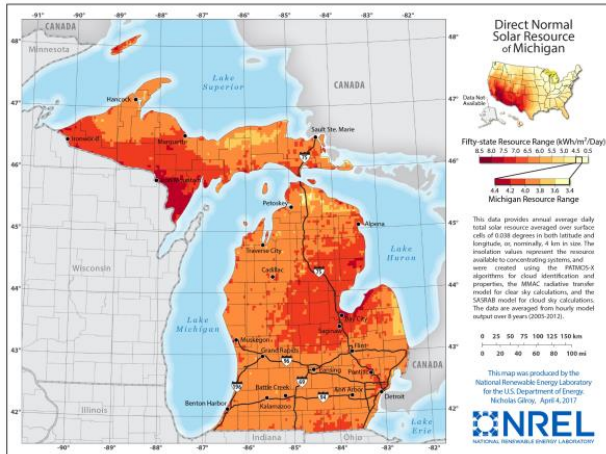
MICHIGAN STATE UNIVERSITY Extension

## Suitable Land

- Land of sufficient size for project to minimize land assembly
- Utility-scale solar requires approximately 5 acres per 1 MW
  - More important to be sized to capacity of transmission or distribution lines.

Source: DTE Energy

60



## Willing Landowner

- Regardless of anything else, solar development requires a willing landowner
  - Non-municipal utilities and developers do not have the power of eminent domain
- Development requires a land sale or signed lease.
  - Typically starts with an option, then assessment of the land, then a contract with a utility (up to 5 years), then a lease



Flickr user dhendrix73

62

## Site Conditions

- Wind loading**
  - Wind-induced loads are often inadequately addressed in local codes and must be considered in solar array design
- Geotechnical issues**
  - Soil composition, bearing capacity, groundwater level and surface water runoff
  - Site conditions will determine the appropriate foundation type, e.g., ballasts, ground-mounted, hybrid, etc.

63

## E. Integrating Solar with Existing Ag Systems



Photo Credit: Rob Davis



## When you think of a solar project, what comes to your mind?



Photo credit: E.ON Climate and Renewables

65

## When you think of a solar project, what comes to your mind?



Photo credit: Rob Davis



66

MICHIGAN STATE UNIVERSITY Extension

## Categories of low impact solar development

- Solar centric
  - Minimal changes to solar configuration.
  - Low-lying vegetation for ground cover and habitat.
- Vegetation centric
  - Minimal changes to vegetation design.
  - Large spacing in solar technologies.
- Co-location and Co-optimization
  - Solar and vegetation configurations are designed jointly for maximum dual output.

Source: Jordan Macknick, National Renewable Energy Laboratory.

67

MICHIGAN STATE UNIVERSITY Extension

## Solar Centric




Source: Macknick, Jordan, Brenda Beatty, and Graham Hill. 2013. *Overview of Opportunities for Co-Location of Solar Energy Technologies and Vegetation*. NREL/TO-6A20-60240, National Renewable Energy Laboratory.

68

MICHIGAN STATE UNIVERSITY Extension

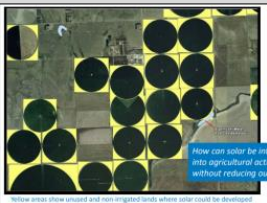
## Vegetation Centric



How can solar be integrated into agricultural activities without reducing output?

Sunflowers for oil production grown under panels in Wisconsin.

Milwaukee Journal Sentinel, 2011



How can solar be integrated into agricultural activities without reducing output?

Source: Roberts, B. 2011. *Potential for PV Installation in Non-Irrigated Corners of Center Pivot Irrigation Fields in the State of Colorado*. NREL/TP-6A20-51330. Golden, CO: National Renewable Energy Laboratory.

Source: Jordan Macknick, National Renewable Energy Laboratory.

69

MICHIGAN STATE UNIVERSITY Extension

## Co-location and Co-optimization



Source: Rob Davis, Center for Pollinators in Energy, Fresh Energy

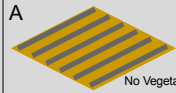
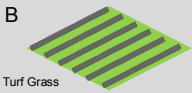
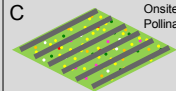
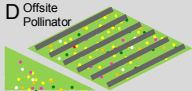
70

MICHIGAN STATE UNIVERSITY Extension

## InSPIRE: Innovative Site Preparation and Impact Reductions on the Environment

*The establishment of regional flowering plants such as milkweed and other wildflowers, and soil preparation methods, either within the solar facility footprint area (e.g., beneath PV panels) and/or in offsite areas adjacent to the solar facility, that attract and support insect pollinators by providing nesting areas and a source of food.*

- Interest in restoration of ecosystem services of solar sites
- What about pollinator services through maintenance of solar-pollinator habitat?

A No Vegetation 	B Turf Grass 
C Onsite Pollinator 	D Offsite Pollinator 

Source: Argonne National Laboratories, NREL, and USDOE.

71

MICHIGAN STATE UNIVERSITY Extension

## Making the Case for Solar-Pollinator Habitat

- Business case
  - Potential reductions in O&M costs with pollinator habitat (e.g., less mowing, risks)
    - SoCore Energy – “6x more expensive than turf but over the life of a 25 year project there is a 40% savings in O&M costs”.
- Ecosystem benefits
  - Increased biodiversity
  - Storm water and erosion control
  - Carbon storage
  - **Agricultural benefits (e.g., pollination services)**


Source: Argonne National Laboratories, NREL, and USDOE.

72


MICHIGAN STATE UNIVERSITY Extension

## Increased biodiversity

Ninety-six percent of **terrestrial** birds rear **their young on insects**  
...and insects thrive on native plants.



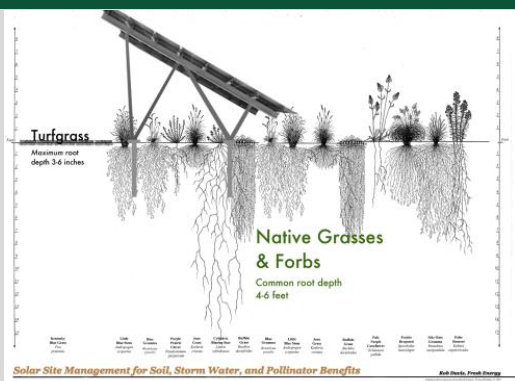
Lazuli Bunting feeds young - Jim Cruce



Source: Rob Davis, Center for Pollinators in Energy, Fresh Energy

73

MICHIGAN STATE UNIVERSITY Extension



**Turfgrass**  
Maximum root depth 3-6 inches

**Native Grasses & Forbs**  
Common root depth 4-6 feet

Solar Site Management for Soil, Storm Water, and Pollinator Benefits

Rob Davis, Fresh Energy


Source: Rob Davis, Center for Pollinators in Energy, Fresh Energy

74

MICHIGAN STATE UNIVERSITY Extension

## What constitutes “pollinator-friendly” in the context of a solar array?

- Percent wildflowers
- Percent native species
- Diversity of species
- # seasons flowering
- Nearby assets
- Management plan
- Insecticide use
- >100 points possible
- 70+ for “pollinator friendly”



Source: Rob Davis, Center for Pollinators in Energy, Fresh Energy

75

MICHIGAN STATE UNIVERSITY Extension

## Pollinator-friendly habitat vs CRP

Pollinator-friendly habitat in commercial scale solar projects are different than CRP because:

- Solar projects have a site permit with conditions.
- These conditions include management of noxious and invasive weeds.
  - “Vegetation shall be managed to prevent the spread of noxious weeds”
  - “Vegetation seed mix shall be designed and managed in ways to be beneficial to pollinators and wildlife”
- Solar projects generate electricity, which creates a revenue stream that is significantly greater than CRP revenue.
- Plantings will be actively managed.

Source: Rob Davis, Center for Pollinators in Energy, Fresh Energy

76

MICHIGAN STATE UNIVERSITY Extension

## Michigan Pollinator Initiative

- Questions/resources for pollinator planting.
- Meghan Milbrath
  - Coordinator, Michigan Pollinator Initiative
  - MSU Department of Entomology
  - Phone: 517-884-9518
  - Email: mpi@msu.edu

www.pollinators.msu.edu



Source: Rob Davis, Center for Pollinators in Energy, Fresh Energy

77

MICHIGAN STATE UNIVERSITY Extension

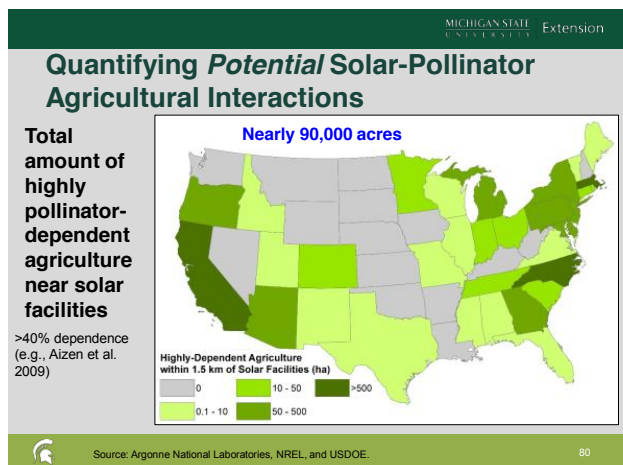
## Insurance against Federal intervention

- Once common Rusty-Patched Bumblebee.
- First-ever listing of a bee on the Endangered Species Act.
- If 2, then 3, then 5, then 10 insects species become endangered there could be Federal intervention in agricultural practices.
- Urgent need to create habitat at scale to insure against additional bee species becoming endangered.



Source: Rob Davis, Center for Pollinators in Energy, Fresh Energy

78



MICHIGAN STATE UNIVERSITY Extension

## Quantifying *Potential* Solar-Pollinator Agricultural Interactions

**Summary of highly-dependent crops near solar facilities**

*These crops near solar facilities have >40% benefit from insect pollination (e.g., Aizen et al. 2009)*

Crop Type	Total Hectares of USSE Foraging Zones Planted, All States	States with Greatest Crop Area Near USSE Facilities
Almonds	29,718	California (29,718 ha)
Cranberries	1,904	Massachusetts (1,885 ha), New Jersey (11 ha)
Melons (Cantaloupes, Honeydew, Watermelon)	1,287	California (1,013 ha), Maryland (106 ha), Arizona (61 ha), North Carolina (36 ha)
Apples	867	North Carolina (397 ha), Massachusetts (157 ha), New York (126 ha)
Blueberries	521	New Jersey (202 ha), Michigan (93 ha), North Carolina (77 ha), Georgia (44 ha)
Plums	477	California (473 ha), New York (2 ha)
Cherries	418	California (408 ha), Oregon (5 ha), Michigan (3 ha)
Pumpkins / Squash / Gourds	351	New Jersey (115 ha), Massachusetts (106 ha), North Carolina (24 ha)
Peaches	189	California (53 ha), Georgia (40 ha), New Jersey (27 ha), North Carolina (22 ha)
Cucumbers	100	North Carolina (35 ha), New Jersey (30 ha), Michigan (10 ha)

Source: Argonne National Laboratories, NREL, and USDOE.

81

- MICHIGAN STATE UNIVERSITY Extension
- ## Impact of flower plantings on pollination-dependent crops
- Pollination services from wild insects contribute to crop productivity around the world, but are at risk of decline in agricultural landscapes. Using highbush blueberry as a model system, we tested whether wildflower plantings established adjacent to crop fields would increase the abundance of wild pollinators during crop bloom and enhance pollination and yield.
  - Plantings were seeded in 2009 with a mix of 15 perennial wildflower species that provided season-long bloom and increased plant density and floral area during the subsequent 3 years.
  - Honeybees visiting blueberry flowers had similar abundance in enhanced and control fields in all 4 years of this study, whereas wild bee and syrphid abundance increased annually in the fields adjacent to wildflower plantings.
- Source: Blaauw, Brent R. and Rufus Isaacs. 2014. Flower plantings increase wild bee abundance and the pollination services provided to a pollination-dependent crop. *Journal of Applied Ecology* 2014, 51, 890-898.
- 82

- MICHIGAN STATE UNIVERSITY Extension
- ## Impact of flower plantings on pollination-dependent crops
- Crop pollination parameters including percentage fruit set, berry weight and mature seeds per berry were significantly greater in fields adjacent to wildflower plantings 3 and 4 years after seeding, leading to higher crop yields and with the associated revenue exceeding the cost of wildflower establishment and maintenance.
  - Synthesis and applications:** We suggest that provision of forage habitat for bees adjacent to pollinator-dependent crops can conserve wild pollinators in otherwise resource-poor agricultural landscapes. Over time, these plantings can support higher crop yields and bring a return on the initial investment in wildflower seed and planting establishment, also insuring against loss of managed pollinators.
- Source: Blaauw, Brent R. and Rufus Isaacs. 2014. Flower plantings increase wild bee abundance and the pollination services provided to a pollination-dependent crop. *Journal of Applied Ecology* 2014, 51, 890-898.
- 83

- MICHIGAN STATE UNIVERSITY Extension
- ## Wildflowers enhance natural enemies to insect pests
- A mix of native flowering plants were established to provide season-long resources for beneficial insects.
  - Higher natural enemy abundance was found in the flower plantings.
  - Over three years, natural enemy abundance increased in crop fields adjacent to the plantings.
  - Sentinel egg cards revealed similarly enhanced predation levels near the plantings.
  - Native wildflower plantings support natural enemies and the services they provide.
- Source: Blaauw, Brent R. and Rufus Isaacs. 2015. Wildflower plantings enhance the abundance of natural enemies and their services in adjacent blueberry fields. *Journal of Applied Ecology* 2014, 51, 890-898.
- 84

- MICHIGAN STATE UNIVERSITY Extension
- ## Assessing the value and pest management window provided by neonicotinoid seed treatments for management of soybean aphid in the Upper Midwestern U.S. (April 2017, *Pest Management Science*)
- BACKGROUND:** A 2-year, multi-state study was conducted to assess the benefits of using soybean seed treated with the neonicotinoid thiamethoxam to manage soybean aphid in the upper Midwestern USA and compare this approach with an integrated pest management (IPM) approach that included monitoring soybean aphids and treating with foliar-applied insecticide only when the economic threshold was reached. Concentrations of thiamethoxam in soybean foliage were also quantified throughout the growing season to estimate the pest management window afforded by insecticidal seed treatments.
  - RESULTS:** Both the IPM treatment and thiamethoxam-treated seed resulted in significant reductions in cumulative aphid days when soybean aphid populations reached threshold levels. However, only the IPM treatment resulted in significant yield increases. Analysis of soybean foliage from thiamethoxam-treated seeds indicated that tissue concentrations of thiamethoxam were statistically similar to plants grown from untreated seeds beginning at the V2 growth stage, indicating that the period of pest suppression for soybean aphid is likely to be relatively short.
- <https://www.ncbi.nlm.nih.gov/pubmed/28459234>
- 85

MICHIGAN STATE UNIVERSITY Extension

**Assessing the value and pest management window provided by neonicotinoid seed treatments for management of soybean aphid in the Upper Midwestern U.S. (April 2017, *Pest Management Science*)**

- **CONCLUSION:** These data demonstrate that an IPM approach, combining scouting and foliar-applied insecticide where necessary, remains the best option for treatment of soybean aphids, both in terms of protecting the yield potential of the crop and of break-even probability for producers. Furthermore, we found that thiamethoxam concentrations in foliage are unlikely to effectively manage soybean aphids for most of the pests' activity period across the region.


<https://www.ncbi.nlm.nih.gov/pubmed/28459234>

86

MICHIGAN STATE UNIVERSITY Extension

**Integrated pest management best option for treatment of soybean aphids**

- Financial savings from reduced pesticide use.
- A single ladybeetle may consume 5,000 aphids in its lifetime.
- Flowering meadows under and around solar arrays — paid for by the solar project — helps increase abundance of beneficial insects servicing adjacent crop fields.




<https://phys.org/news/2017-05-reveals-pest-option-treatment-soybean.html>

MICHIGAN STATE UNIVERSITY Extension

**Habitat Planning for Beneficial Insects**

- Published on Xerces.org.
- Includes case study by MSU's Dr. Rufus Isaacs.
- Includes list and photos of insect predators.



[http://www.xerces.org/wp-content/uploads/2016/10/Habitat-Planning-Beneficial-Insects\\_Feb2017\\_web.pdf](http://www.xerces.org/wp-content/uploads/2016/10/Habitat-Planning-Beneficial-Insects_Feb2017_web.pdf)

MICHIGAN STATE UNIVERSITY Extension

**Potential Benefits of Co-location of Solar and Agriculture/Vegetation**

Benefits to Land Owners	Benefits to Solar Developers
<ul style="list-style-type: none"> <li>• Self-generation of electricity and reduced energy bills.</li> <li>• Additional income stream and increased revenue security.</li> <li>• Compatible with grazing activities, provides shade and cover for livestock.</li> <li>• New market opportunities for shade tolerant crops.</li> <li>• Control of wind and erosion.</li> <li>• Protection of natural habitat.</li> <li>• Safeguarding soil health.</li> <li>• Improved habitat for pollinator species.</li> </ul>	<ul style="list-style-type: none"> <li>• Reductions in site preparation.</li> <li>• Reductions in O&amp;M costs.</li> <li>• Reduced need for dust suppression.</li> <li>• Reduction in litigation vulnerability.</li> <li>• Decreased permitting time.</li> <li>• Increased solar energy production from cooler air zone created under modules.</li> <li>• Reduction in environmental mitigation investments.</li> </ul>

*Research is being conducted to quantify these benefits.*


Source: National Renewable Energy Laboratory.

89

MICHIGAN STATE UNIVERSITY Extension

**Example 1**

Organic Valley launches community solar partnership to be 100 percent renewably powered by 2019



Farmer-owned cooperative will become the largest food company in the world to source all its electricity from renewable resources within the decade.

Additionally, the community solar partnership will adopt pollinator-friendly solar standards as part of Organic Valley's commitment to animals, people and the planet. Rather than being planted with turf grass or covered in gravel, the installations will incorporate pollinator-friendly habitat into the design.


Once complete, these meadows, filled with native flowering plants and grasses, will create as much bee and butterfly habitat as if 30,000 families were to each plant six-by-twelve-foot pollinator gardens.

90

MICHIGAN STATE UNIVERSITY Extension

**Example 2**

- Connexus Energy Performance Characteristics
  - Visual appeal
  - Maintenance free for existing grounds crew
  - No loss of solar performance
  - Ecological services highlighted in company marketing materials




Seeded and managed by Prairie Restorations, Inc.

91

MICHIGAN STATE UNIVERSITY Extension

### Example 3

- Solarama Crush - world's first Solar Honey Craft IPA.
- Example of how a premium ingredient - Solar Honey - is used in a retail product.
- Beer will be tapped on March 29 at 56 Brewing in Minneapolis.



MICHIGAN STATE UNIVERSITY Extension

MICHIGAN STATE UNIVERSITY Extension

## F. Understanding Solar Energy Lease Agreements

MICHIGAN STATE UNIVERSITY Extension

MICHIGAN STATE UNIVERSITY Extension

### Get Legal and Tax Advice

- With relevant experience
  - Real estate transactions
  - Solar projects
- **Understand what you're signing**



Kurt Schindler

MICHIGAN STATE UNIVERSITY Extension

MICHIGAN STATE UNIVERSITY Extension

### Research the Company


- View their website
- Look for a track record of projects
- Seek reviews, references, and ratings
- Should be member of industry associations
- Authorized to do business in Michigan
- Understand agency

MICHIGAN STATE UNIVERSITY Extension

MICHIGAN STATE UNIVERSITY Extension

### Document Types

- Letter of Intent
- Option
- Lease
- Right of First Refusal
- Purchase Agreement



MSUE

MICHIGAN STATE UNIVERSITY Extension

MICHIGAN STATE UNIVERSITY Extension

### Letter of Intent

- Landowner typically cannot solicit, negotiate with, or furnish info to others during the time covered
- **Important – Is it a legally binding contract?**
  - Maybe
    - If signed by landowner (accepted) AND
    - Includes key provisions - premises, term, rent
  - Probably not
    - If only starts good-faith negotiations AND/OR
    - Has clear language like “not to be interpreted as a binding contract”

MICHIGAN STATE UNIVERSITY Extension

MICHIGAN STATE UNIVERSITY Extension

## Option


- Company interested but unable to commit
  - Still completing due diligence
  - Considering other sites
  - Waiting for something, e.g., financing
- May use to provide details of proposed lease
- **Landowner bound, option holder may exercise**
- Key provisions
  - Time period
  - Compensation

98

MICHIGAN STATE UNIVERSITY Extension

## Due Diligence

- Surveying, inspections, environmental studies, zoning, title search
- Understand scope of access
- Know time period
- Right to plant
  - Usually OK with notice
  - Promise to pay must be in writing
- Provision to repair any damage



Kurt Schindler

99

MICHIGAN STATE UNIVERSITY Extension

## Lease

- Agreement by which a person or company has full possession and use of a parcel of real estate, a building, or portion of either for a stated period of time and pays periodic rent.
- Commercial leases are highly flexible and essentially limited only by negotiations of the parties.
- May contain a right of first refusal, an option to purchase, or a lease-purchase by the tenant.

100

MICHIGAN STATE UNIVERSITY Extension

## Right of First Refusal

- May be separate but typically within the lease
- When landowner receives a bona fide written offer from a 3rd party to purchase the property
  - If landowner intends to accept, must give solar company notice of such intent and the offer's terms
  - Solar company as holder of right has specified # of days to elect to purchase on same terms
- Key provisions
  - What property is included
  - Length of term (plus renewals or extensions)

101

MICHIGAN STATE UNIVERSITY Extension

## Purchase Agreement

- A legally binding contract for the sale and purchase of real estate
  - obligates the parties
  - provides the terms and conditions of the deal
- Some solar companies are purchasing property outright instead of leasing
- Seek legal and financial advice if you are a seller

102

MICHIGAN STATE UNIVERSITY Extension

## Lease – Parties

- Landowner
  - How is property titled? Who signs?
  - Any impact on your succession plans?
  - Can you sell subject to the lease?
- Tenant
  - Who is the entity?
  - Successors and assigns

103

MICHIGAN STATE UNIVERSITY Extension

## Lease – Property


- Identify property exactly for each purpose
  - Obtain survey from tenant
  - Preliminary vs. final and expansion areas
  - Tenant will record its interest
- Land Division Act
  - A division includes a lease of more than 1 year
  - Technically a new “parcel” if less than 40 acres or equivalent

104

MICHIGAN STATE UNIVERSITY Extension

## Lease – Term

- Development, construction, and operation phases
- Length - 20 to 30 years or more
- Renewals
  - May be automatic
  - May require notice




MSUE

105

MICHIGAN STATE UNIVERSITY Extension

## Lease – Rent

- Calculation
  - Per acre or per megawatt
  - Or % of power sales or revenue
  - Should include periodic escalator
    - flat amount of increase OR
    - % amount – as inflation or other measure increases
- Timing
  - Paid annually or semi-annually
  - Know when it begins



MSUE

106

MICHIGAN STATE UNIVERSITY Extension

## Lease – Existing Encumbrances

- Deed restrictions
- Mortgages
  - Lender permission, subordination
  - Assignment of rents
- Existing Easements
  - Access
  - Conservation
- Mineral and other subsurface rights

107

MICHIGAN STATE UNIVERSITY Extension

## Lease – Warranties & Representations


- Landlord's
  - Title, encumbrances, and restrictions
  - Hazardous and toxic substances
  - Environmental and other “sensitive” areas
  - Contracts impacting the property
- Tenant's
  - Will comply with all laws
  - Will not allow construction liens and will bond to remove

108

MICHIGAN STATE UNIVERSITY Extension

## Lease – Granting Easements

- For construction, operation, maintenance, and removal
  - Access - enter at any time without notice
  - Connect to grid
- Location
  - Should be shown on survey
  - Minimize impact on farming
  - Must be unobstructed
  - Understand exclusive



Kurt Schindler


109

MICHIGAN STATE UNIVERSITY Extension

### Lease – Landowner Restrictions

- Entry onto the premises
- Compatibility of uses
- Cannot impair solar access
- Right to otherwise encumber

Ryan Coffey



110

MICHIGAN STATE UNIVERSITY Extension

### Lease – Liability and Insurance

- Risks
  - Injuries – to workers or visitors
  - Property damage - tenant's or landowner's
- Insurance - spell out who obtains, who pays
- Indemnification should be reciprocal
- Understand duty to defend
- Consider additional insured provision

111

MICHIGAN STATE UNIVERSITY Extension

### Lease – Taxes

- Spell out who pays which taxes
  - Tenant should pay its personal property
  - Tenant should pay its share of real property
- Beware of uncapping and recapture
- Tenant may have right to contest taxes
- Understand each party's rights if taxes become delinquent

112

MICHIGAN STATE UNIVERSITY Extension

### Lease – Other Obligations

- Utilities
  - Tenant should pay own
- Maintenance and repairs
  - Spell out expectations and limitations
  - Easement areas may differ
- Notices - DO NOT OVERLOOK
  - Know when and where you must provide notice
  - Important to preserving your rights and avoiding bad consequences

113

MICHIGAN STATE UNIVERSITY Extension

### Lease – Termination


- Decommissioning
  - End of term
    - Tenant removes equipment
    - Tenant restores grade, soil, vegetation
  - Also upon failure to complete
  - Require financial assurances
- Event of default or bankruptcy

114

MICHIGAN STATE UNIVERSITY Extension

### Lease – Dispute Resolution

- Choice of law – should be Michigan
- Forum and venue – should be local
- ADR
  - Arbitration – binding
  - Mediation – non-binding
- Attorney fees
  - Reciprocal provisions
  - Prevailing party



Kurt Schindler

115

## Lease – Confidentiality

- Limit or eliminate if possible
- Applies to
  - Financial terms and payments
  - Site design and operation
- Exception for legal and financial advisors
- Survives termination



116

## SPARTYVILLE

### Activity – Becoming Familiar with a Solar Lease

Read the scenario and sample lease in your handouts. Then discuss the questions with a neighbor.



117

## G. Taxation Guidance including Impact on PA 116



### Michigan Property Taxation

The General Property Tax Act  
Public Act 206 of 1893

*The People of the State of Michigan enact:*  
Michigan Compiled Laws (MCL)

211.1 “That all property, real and personal, within the jurisdiction of this state, ***not expressly exempted***, shall be subject to taxation.”



119

### Expressed Agricultural Exemption

MCL 211.9j:

***“Property actually used in agricultural operations ... ‘agricultural operations’ means farming in all its branches, including cultivation of the soil, growing and harvesting of an agricultural, horticultural, or floricultural commodity, dairying, raising of livestock, bees, fur-bearing animals, or poultry, turf and tree farming, raising and harvesting of fish, collecting, evaporating, and preparing maple syrup ... and any practices performed by a farmer or on a farm as an incident to, or in conjunction with, farming operations, ...”***



120

### Michigan State Tax Commission Memo of June 11, 2013

“The State Tax Commission at their meeting on May 13, 2013, and affirmed again at their meeting on June 11, 2013, have determined that ***solar panels are to be considered industrial personal property*** and are to be reported on Table B – Machinery and Equipment on the personal property statement. This determination of the State Tax Commission supersedes any prior determinations.”



121

MICHIGAN STATE UNIVERSITY Extension

### STC Memo of February 13, 2018

The State Tax Commission at their meeting on February 13, 2018, ***rescinding their prior guidance dated May 13, 2013 as it relates to the treatment of residential solar panels***, and have determined that solar panels on a parcel classified as residential real property shall be assessed as component of the real property. ...

**This determination of the State Tax Commission is limited to solar panels on residential real property only.**

122

MICHIGAN STATE UNIVERSITY Extension

### MAE and MPSC February 2018 Memo

The MAE / MPSC memo suggests that solar panels may be exempt under the Small Business Property Tax Exemption. This exemption is discussed in MCL 211.9o and is provided for with Michigan Department of Treasury Form 5076

123

MICHIGAN STATE UNIVERSITY Extension

### What are the requirements of Treasury Form 5076? Small Taxpayer's Exemption

MCL 211.9o provides for an exemption of "eligible personal property"

"Eligible Personal Property" is required to meet three conditions / criteria in order to receive the exemption.

124

MICHIGAN STATE UNIVERSITY Extension

### "Eligible Personal Property"

- The personal property must be classified as industrial personal property or commercial personal property as defined in MCL 211.34c or would be classified as industrial personal property or commercial personal property if not exempt **and**
- The combined **true cash value** of all industrial personal property and commercial personal property owned by, leased by or in the possession of the owner or a related entity claiming the exemption is less than \$80,000 **in the local tax collecting unit and**
- The property is not leased to or used by a person that previously owned the property or a person that, directly or indirectly controls, is controlled by, or under common control with the person that previously owned the property.

125

MICHIGAN STATE UNIVERSITY Extension

### **The personal property must be classified as industrial personal property** or commercial personal property **as defined in MCL 211.34c**

MCL 211.34c provides that Industrial personal property includes

**All machinery and equipment**, furniture and fixtures, and dies **on industrial parcels**, and inventories not exempt by law.

126

MICHIGAN STATE UNIVERSITY Extension

### Industrial Parcels - MCL 211.34c(2)

Industrial real property includes the following:

- (i) Platted or unplatted parcels used for manufacturing and processing purposes, with or without buildings.
- (ii) Parcels used for utilities sites for generating plants, pumping stations, switches, substations, compressing stations, warehouses, rights-of-way, flowage land, and storage areas.
- (iii) Parcels used for removal or processing of gravel, stone, or mineral ores.

127

MICHIGAN STATE UNIVERSITY Extension

### Solar Panels May Fail to Meet Eligible Personal Property Criteria 1

- “Eligible Personal Property” is industrial personal property as defined in MCL 211.34c.
- Industrial Personal Property is to be located on “industrial parcels” as defined in MCL 211.34c
- Solar Panel projects located on agricultural land do not meet the definition of industrial personal property as defined in MCL 211.34c
- Therefore, Solar Panel projects may not meet the first criteria of “eligible personal property”

128

MICHIGAN STATE UNIVERSITY Extension

The combined true cash value of all industrial personal property and commercial personal property owned by, leased by or in the possession of the owner or a related entity claiming the exemption is less than \$80,000 in the local tax collecting unit and

The property is not leased to or used by a person that previously owned the property or a person that, directly or indirectly controls, is controlled by, or under common control with the person that previously owned the property.

129

MICHIGAN STATE UNIVERSITY Extension

### STC Bulletin No. 8 of 2002

Buildings on Leased Land are assessed to the owner(s) of the building and NOT to the owner of the land.

Example: freestanding communication towers, outdoor advertising signs and freestanding billboards located on leased land are all assessed to the owner of the tower, sign or billboard and not to the owner of the land.

**Solar Panel Projects on leased agricultural land may be treated the same way.**

130

MICHIGAN STATE UNIVERSITY Extension

### Review Your Lease to avoid a “transfer of ownership” and “uncapping” of the Taxable Value

MCL 211.27a(6): As used in this act, “**transfer of ownership**” means the conveyance of title to or a present interest in property, **including the beneficial use of the property**, the value of which is substantially equal to the value of the fee interest. **Transfer of ownership of property includes**, but is not limited to, ...

MCL 211.27a(6)(g): **A conveyance by lease if the total duration of the lease, including the initial term and all options for renewal, is more than 35 years or the lease grants the lessee a bargain purchase option.**

131

MICHIGAN STATE UNIVERSITY Extension

### Review Your Lease to avoid a “transfer of ownership” and “uncapping” of the Taxable Value

..., “bargain purchase option” means the right to purchase the property at the termination of the lease for not more than 80% of the property’s projected true cash value at the termination of the lease.

After December 31, 1994, the taxable value of property conveyed by a lease with a total duration of more than 35 years or with a bargain purchase option shall be adjusted under subsection (3) for the calendar year following the year in which the lease is entered into.

132

MICHIGAN STATE UNIVERSITY Extension

### Qualified Agricultural Property Exemption

As described by the State Tax Commission:

“The qualified agricultural property exemption is an exemption from certain local school operating millages for parcels that meet the qualified agricultural property definition.”

133

### Qualified Agricultural Property Requirements

A qualified agricultural property is either

A parcel classified as Agricultural on the current assessment roll

OR

A parcel with more than 50% of the acreage of the parcel dedicated to agricultural use as defined by MCL 324.36101 which is the Natural Resources and Environmental Protection Act (Public Act 451 of 1994)



134

### Other Qualified Ag Issues

1. Could a utility-scale solar panel installation on an Ag parcel result in a property reclassification?
2. The statutory definitions of agriculture use do not include any reference to solar panels. As commercial or industrial purposes are not entitled to the qualified agricultural property exemption, could solar panels be treated the same way?
3. Is there a utility-scale solar installation tax exemption?



135

### PA 116 Land

Michigan Department of Agriculture & Rural Development (MDARD) stated in May 2017 as follows:

***“A commercial solar panel operation is not permitted on land enrolled in a Farmland Development Rights Agreement under the PA 116 Program. The land use is not considered agricultural, and therefore, the land would need to be removed from the program prior to the construction of such a facility.”***



136

### Can You Split a PA 116 Parcel?

- Yes. MDARD provides that a parcel “may be split into smaller agreements as long as the request is consistent with the intent of the act.”
- Resulting parcels must meet one criteria:
  - ✓ 40 acres or larger or
  - ✓ 5 to 40 acres with a minimum of 51% of acreage devoted to ag use and producing an income of \$200 or more per tillable acre per year.



137

### Can a Parcel be Released from PA 116?

- Yes. MDARD provides that it is possible to release property. Partial release are possible due to:
  1. Pre-existing structure
  2. Residence for Someone Essential to the Farm
  3. Public Interest
- A prorated share of the tax credits taken during the last seven years, attributable to the parcel being released are required to be repaid.



138

### PA 116 Information

Direct questions to:

Michigan Department of Agriculture  
And Rural Development

P.O. Box 30449

Lansing, MI 48909

(517) 284-5663

[MDARD-PA116@Michigan.gov](mailto:MDARD-PA116@Michigan.gov)

[www.Michigan.gov/farmland](http://www.Michigan.gov/farmland)



139

### Summary of Today's Discussion

1. General Property Tax Act provides: all property is taxable unless “expressly exempted”.
2. Solar panels do not qualify for the expressed agricultural personal property exemption.
3. Commercial solar panels on all property except residential are to be treated and taxed as industrial personal property as per STC.



140

4. STC has offered no guidance as to whether the solar panels qualify for the Small Business Taxpayer Exemption.
5. Solar panels do not appear to meet the definition of “Eligible Personal Property” required for the Small Business Taxpayer Exemption.
6. Commercial solar panels on agricultural land NOT enrolled in a PA 116 program may be treated in a “building on leased land”.



141

7. Ag Land leased for a period of more than 35 years may constitute a “transfer of ownership” and cause an uncapping of a parcel's taxable value.
8. Commercial solar panels are not permitted on ag land enrolled in a PA 116 program as per MDARD unless such land is removed from the program. Seven years of past tax credits would have to be repaid to remove the parcel from the PA 116 program



142

### The Last Word

Unless the Michigan Legislature provides for an expressed exemption of commercial solar panels on ag land:

1. One should assume that commercial solar panel projects on Ag land will be fully taxable.
2. Always review all potential property tax issues, lease agreements and PA 116 proposals with your qualified legal counsel to protect your own interests.



143

### H. Additional Resources



### Additional Resources

- Solar Electric Investment Analysis Bulletin Series. Energize Ohio - Ohio State University Extension. Sept. 2016.
- <https://energizeohio.osu.edu/news/solar-electric-investment-analysis-bulletin-series>
  - Part 1: Estimating System Production
  - Part 2: Assessing System Cost
  - Part 3: Forecasting the Value of Electricity
  - Part 4: Understanding Incentives
  - Part 5: Conducting a Financial Analysis
  - Part 6: PV Solar Example



145

MICHIGAN STATE UNIVERSITY Extension

## Additional Resources

- Guide to Land Leases for Solar. *Solar Energy Industries Association*. July 2016.
  - <https://www.seia.org/research-resources/seia-guide-land-leases-solar>

146

MICHIGAN STATE UNIVERSITY Extension

## Additional Resources

Powering MI Agriculture Webinar Series:

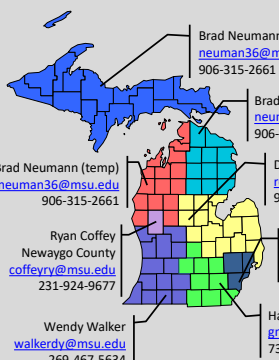
- Black Star Farm
  - [https://mediaspace.msu.edu/media/Powering+Michigan+Agriculture+Black+Star+Farm+2018\\_01\\_25/1\\_0vv\\_a600a](https://mediaspace.msu.edu/media/Powering+Michigan+Agriculture+Black+Star+Farm+2018_01_25/1_0vv_a600a)
- Grand Valley Farm
  - [https://mediaspace.msu.edu/media/Powering+Michigan+Agriculture+-+Grand+Valley+Farms+2018-02-08+/1\\_191csb7/](https://mediaspace.msu.edu/media/Powering+Michigan+Agriculture+-+Grand+Valley+Farms+2018-02-08+/1_191csb7/)

147

MICHIGAN STATE UNIVERSITY Extension

## Land Use Educators

Contact the MSU Extension land use educator closest to you with your planning and zoning questions.



- Brad Neumann  
[neuman36@msu.edu](mailto:neuman36@msu.edu)  
906-315-2661
- Brad Neumann (temp)  
[neuman36@msu.edu](mailto:neuman36@msu.edu)  
906-315-2661
- David Rowley  
[rowleyd2@msu.edu](mailto:rowleyd2@msu.edu)  
989-317-4079
- Crystal Wilson  
[cwilson2@msu.edu](mailto:cwilson2@msu.edu)  
313-309-1674
- Harmony Gmazel  
[gmazelh@msu.edu](mailto:gmazelh@msu.edu)  
734-222-3832
- Wendy Walker  
[walkerdy@msu.edu](mailto:walkerdy@msu.edu)  
269-467-5634
- Ryan Coffey  
Newaygo County  
[coffeyry@msu.edu](mailto:coffeyry@msu.edu)  
231-924-9677

148

MICHIGAN STATE UNIVERSITY Extension

## Find other MSUE experts at:

MICHIGAN STATE UNIVERSITY EXTENSION Michigan State University Extension helps people improve their lives by bringing the vast knowledge resources of MSU directly to individuals, communities and businesses.

Find an Expert

To reach an MSU Extension county office, call toll free 1-888-678-3464 and follow the prompts (this number will not link callers with offices on the MSU campus or MSU AgBioResearch field sites) or go to your local county page.

If you are looking for someone who can respond to questions concerning home horticulture, gardening, etc., please call the MSU Extension Lawn and Garden Hotline at this toll free number: 1-888-678-3464 and follow the prompts.

Last Name  First Name

County  Topic

4-H  Agriculture

Search

msue.msu.edu

149

MICHIGAN STATE UNIVERSITY Extension

# Thank you!

# Questions?

MSU is an affirmative-action, equal-opportunity employer, committed to achieving excellence through a diverse workforce and inclusive culture that encourages all people to reach their full potential. Michigan State University Extension programs and materials are open to all without regard to race, color, national origin, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status or veteran status. Issued in furtherance of MSU Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Jeff Dwyer, Director, MSU Extension, East Lansing, MI 48824. This information is for educational purposes only. Reference to commercial products or trade names does not imply endorsement by MSU Extension or bias against those not mentioned.

150