



Portside Solar  
Special Land Use Permit and Final Site Plan  
Planning Commission Meeting

November 8, 2023



FOUNDED IN 2017

# Ranger Power Experience

Led by an experienced team of developers with a **proven track record of community-supported renewable energy**, including operating clean energy products across the United States.

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Ranger has successfully permitted over 2,400 MWs of projects and executed over 2,400 MW of utility-scale power agreements throughout the Midwest, including in Nebraska, Indiana, Wisconsin, Michigan, Illinois, and Missouri.

Many of these represented the largest utility-scale solar investments to be permitted in their respective states at the time.

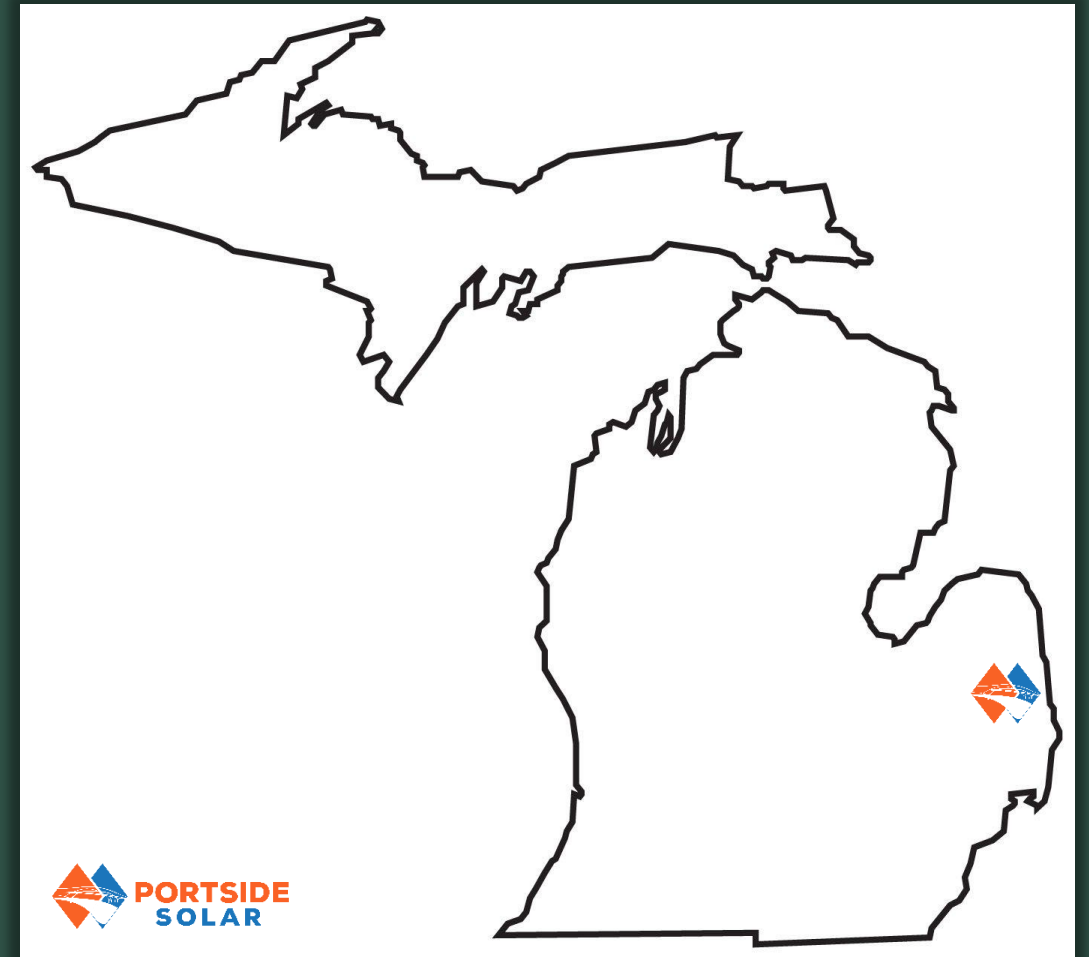
Ranger is currently developing a portfolio of approximately 10 GW of active development projects ranging in size from to 20-400 MW across the country, including in Michigan, Illinois, Indiana, Missouri, Oregon, and New York.

We pride ourselves on working closely with local communities to develop projects in a collaborative manner.

**The Portside Solar Project is being developed by Ranger Power**

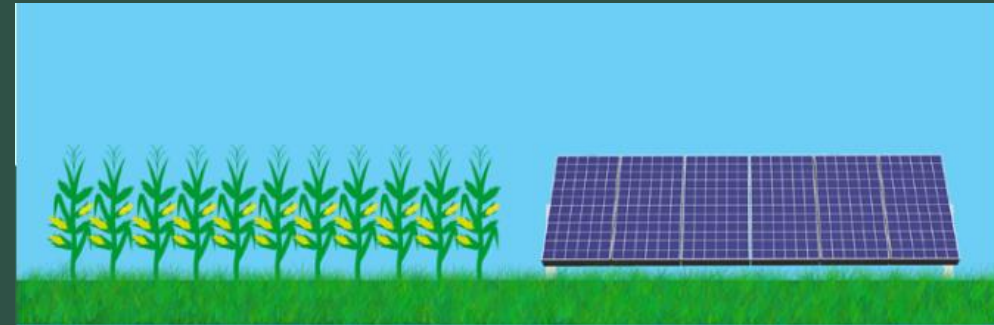
# Project Details: Site Selection Process

- Portside Solar utilizes existing transmission infrastructure and resources
- The Project is compiled of voluntary agreements. No eminent domain.
- Close to large load centers like Port Huron and Detroit



# Solar Energy at a Glance

- Photovoltaic panel tracking systems (“PV trackers”) are currently the most economical solar technology available
- PV trackers operate without producing air or ground pollution or greenhouse gases
- Major equipment includes solar panels, steel I-beam posts, racking, electrical collector lines, inverters, access roads, and fencing
- Solar panels contain no toxic elements or materials and all contents are naturally occurring



With the panels positioned to catch the morning or evening sun, the height of panels will be similar to that of full-grown corn.

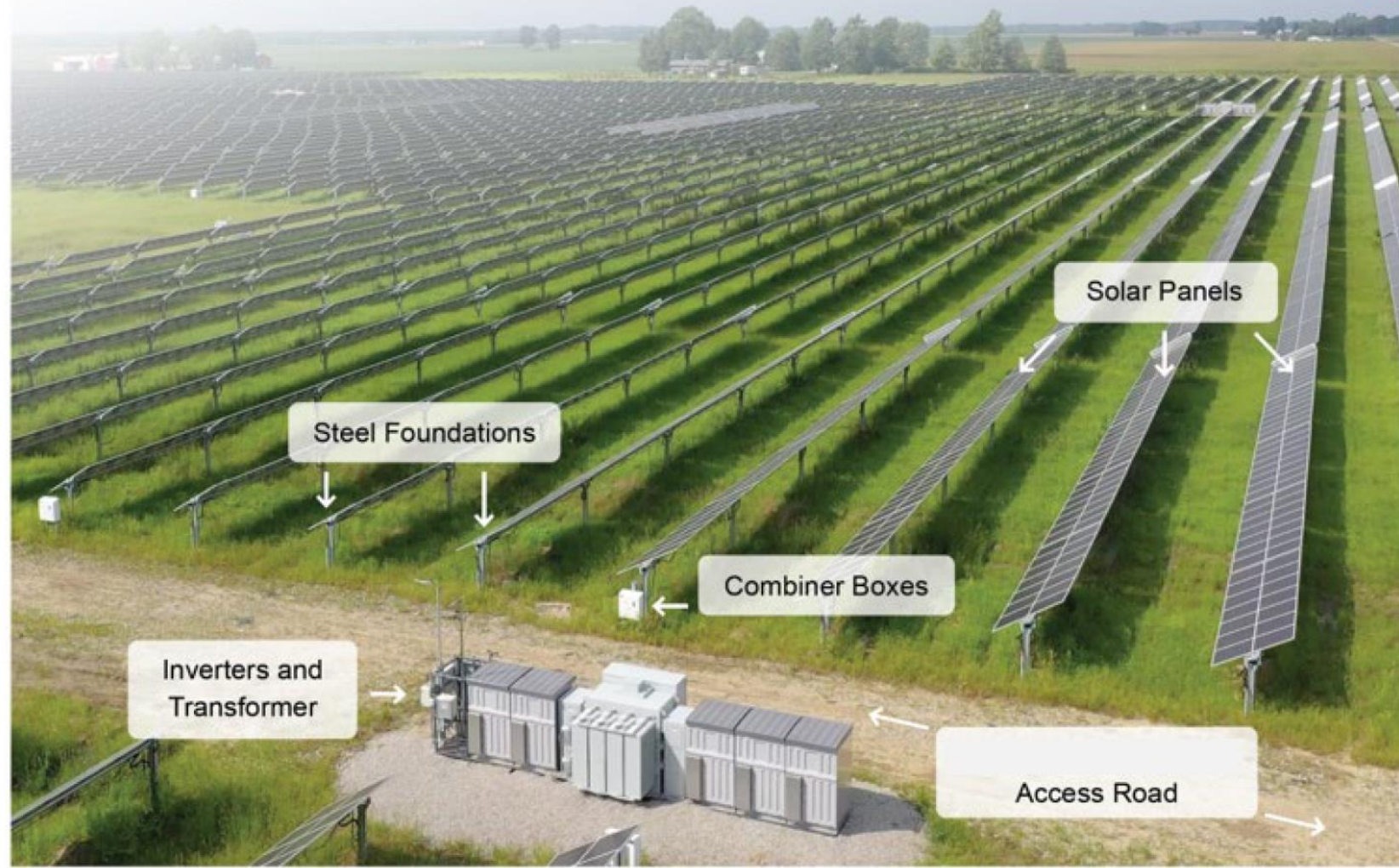


When panels are flat at midday, they will be well below the height of full-grown corn.



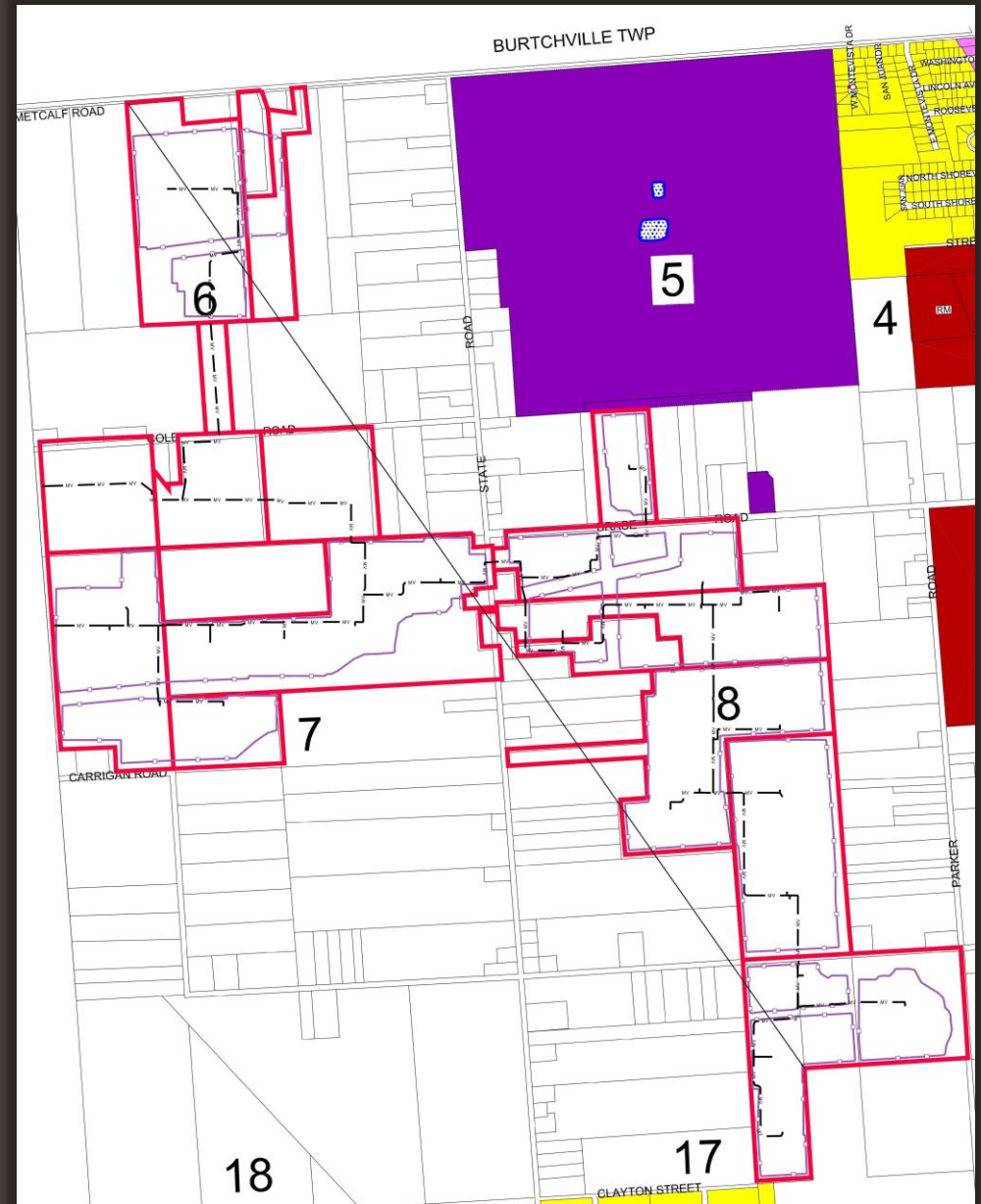


## Solar Diagram



# Portside Solar Overview

- The Portside Solar Project is a 100MW solar project located in Fort Gratiot and Clyde townships sited on approximately 900 acres of privately owned land. Portside is proposing approximately 527 acres that include land with project panels in Fort Gratiot.
- The Portside Solar Project will interconnect into an existing substation located in Clyde Township.
- The Project will provide much needed domestic electricity to Michiganders
- The Project is sited on suitable land of interested participants.
- Portside Solar keeps land agricultural that is currently zoned as agricultural.



# Decommissioning

- ❖ Solar energy systems are passive land uses and easily decommissioned
- ❖ Topsoil retained on site during and after project construction as required by ordinance
- ❖ A Decommissioning Plan including a financial security **guaranteeing removal to be posted before construction** is included in the application in accordance with Chapter 38-639 (14) of the Fort Gratiot Solar Energy Systems Ordinance
- ❖ Michigan Department of Agriculture and Rural Development **requires a security** to be posted **before construction** for all participating land enrolled in PA 116
- ❖ All agreements between Portside Solar and landowners **require project decommissioning**
- ❖ The Project is responsible for **all costs of decommissioning**

# Environmental Benefits



- Project specific studies show no sound, glare, or chemicals
- Improves air quality by reducing regional reliance on fuel-burning generation
  - No air emissions
  - No water emissions
- Vegetation management
  - Plant pollinator habitat
  - Improve soil and water quality
  - Reduce storm water runoff
  - Reduce soil erosion
- At the end of project life, land will be restored and available for agricultural use, as required by agreements between Portside Solar and participating landowners, local township, and Michigan Department of Ag and Rural Development



# Wildlife Benefits



# Promotes Environmental Health and Safety

- Solar panels are made almost entirely of glass and aluminum
- As cited by the Michigan Department of Environment, Great Lakes, and Energy and research from Dr. Annick Anctil, Michigan State University: “No studies have shown the presence or leaching of PFAS from PV panels – either while they are in active use or end of their life (e.g., in a landfill)”
- Rainwater panel runoff testing at Assembly Solar project in Shiawassee County, MI showed no risk of leaching.
- Tier 1 solar panels, expected to be used by Portside Solar, are subject to highest testing standards.
- Pollinator vegetation has deeper roots
- “Over the long run the pollinator habitat builds up the soil and allows for better infiltration and reduced runoff” David Mulla, PhD, University of Minnesota, Larson Endowed Chair in Soil and Water Resources
- Solar panels are recyclable
- “Solar energy does not in any way shape or form cause any harm to the soil or to groundwater” – Jeff Lake, PhD, Plant Biologist, Adrian College
- “According to the Department of Energy there is not a single instance of a solar farm ever polluting groundwater” – Joshua Pearce, PhD, Michigan Tech University

## Portside Solar will provide:

1. Approx. \$140mm of additional investment in St. Clair County.
2. Additional electricity to power approx. 25,000 homes.
3. Stable diversified income for more landowners while **protecting and preserving** agricultural land for future generations
4. Millions of dollars in additional tax revenue to help fund local schools, fire departments, and other infrastructure and services.
5. Clean, domestic energy generation and long-term stable energy prices
6. Local well-paying jobs during construction



# Community Focus

# Jonesville Community Schools Grant Program

*"We are grateful for Heartwoods' commitment to enriching the education of our students."*

- Erik Weatherwax, JCS Superintendent



Ranger Power's Heartwood Solar Project partnered with the Hillsdale County Community Foundation to fund school programs & initiatives

- The grant program will receive **annual contributions of \$12,000** until Heartwood reaches commercial operations, at which point the grant program will transition to a long-term endowment fund, beginning with a **\$300,000 principal donation**.
  - 75% of funding will support Jonesville Schools' teachers & classrooms and 25% will support a local food pantry
- The new biannual grant program will be open to educators at all grade levels, and will aim to support and enrich educational programs and other projects to aimed at enhance creative and innovative opportunities within the district
  - The first batch of grants will go towards a new robotics program and meal preparation course at Jonesville High School
- Representing a **\$150 million investment**, Heartwood Solar is projected to generate \$17 million in tax revenue to Hillsdale County (including \$2 million in its first year of operation) over the project's lifetime

# Hawkeye Solar Project Endowment Fund

*“Ranger Power launches new charitable funds for Grand Mound, two school districts”*

- Clinton Herald

The Hawkeye Solar Project Endowment Fund was voluntarily established after the project had been permitted, in partnership with the LincolnWay Community Foundation in Clinton County

- The endowment is permanently invested and a percentage of earnings will pay out annually to support projects that fit the mission of the fund, which consists of annual contributions of \$20,000 until the project’s completion, at which time an additional \$500,000 will be invested into the fund.
- The fund will facilitate projects in and around Grand Mound, benefitting the local community and students in the Central DeWitt and Calamus-Wheatland school Districts
- Additionally, Ranger Power has set up a fund with cash resources that are immediately available to satisfy these needs before the endowment’s annual payouts begin.



# Headland Solar Community Scholarship Fund

Ranger Power's Headland Solar Project established the Headland Solar Community Scholarship Fund for Fowlerville High School as part of the Community Foundation for Livingston County

- In 2023, the three recipients were awarded a one-time, \$5,000 scholarship to study at various universities in Michigan
  - Similar scholarships will be awarded annually, and the Fund will become permanently endowed upon Headland Solar reaching COD.
- The Fund is intended to support students pursuing post-secondary educational programs focused on agricultural science, agricultural business management, natural resources management, environmental sustainability, renewable energy science, engineering, or construction.
- The Headland Solar Project is located within the boundaries of the Fowlerville School District in Livingston County, Michigan.

*"The Community Foundation is honored to assist Headland Solar in making an impact in the future of Fowlerville's students."*

- Randy Ross, Community Foundation  
VP of Donor Services



# Compliant with Regulations

Portside Solar has been designed to **meet or exceed** all of the township zoning requirements, including:

- ❖ Decommissioning
- ❖ Setbacks
- ❖ Sound and Glare
- ❖ Landscape Buffering
- ❖ Pollinator Planting
- ❖ General Aesthetics
- ❖ Master Plan Goals
- ❖ Future Land Use Plan Goals

# Committed to Community

- ❖ Ranger is committed to working closely with landowners and communities to bring investment and clean energy
- ❖ Since beginning work in Fort Gratiot township in 2020, Ranger Power has held **over 200 meetings** with residents, stakeholders, and government officials sharing contact information and project details
- ❖ Ranger Power is committed to being **available and transparent** throughout the development process. This includes scheduling flexible **in-person meetings and answering any questions asked**



# We thank you for your time!

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**Portside Solar Project**  
**Special Land Use Permit Application Narrative**

Prepared for:  
**Fort Gratiot Township**

Prepared by:  
**Portside Solar, LLC**

Submittal Date:  
September 2023  
Updated 10/25/2023

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## I. PROJECT INTRODUCTION

On behalf of Portside Solar, LLC (Portside, or the Applicant), Atwell, LLC (Atwell) has prepared this application for a Special Land Use Permit and Site Plan for the Portside Solar Project (the Project) within Fort Gratiot Township, St. Clair County, Michigan. The Project is proposed for development by Ranger Power, LLC (Ranger Power, or Ranger). A checklist summarizing all requirements for the Special Land Use Permit and Site Plan and their location within the application package is included as **Appendix A** and **Appendix B**. In addition, the Fort Gratiot Township Application for Special Land Use Permit form is included as **Appendix C**.

### 1) APPLICANT INFORMATION

**Project Developer:**

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**Portside Solar:**

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Ranger Power is a utility-scale renewable energy development company headquartered in Chicago, Illinois, focused on bringing well-sited, community-supported solar energy to states in the Midwest. Ranger Power has a development portfolio of approximately 10 GW of active projects ranging in nameplate capacity from 50 MW to 400 MW.

Since 2017, Ranger has permitted more than 2,600 MW and executed over 2,600 MW of utility-scale Power Purchase and Build-Own-Transfer agreements with leading power providers throughout the region. This represents some of the largest volumes of solar development in the Midwest.

Over 1,100 MW of solar projects developed by Ranger have moved into construction, 586 MW of which are now commercially operating--many of these projects represent the largest solar projects operating in their respective states. By the end of 2023, Ranger anticipates that nearly 1 GW of projects developed by Ranger Power will be in commercial operation, delivering on our sustained value and trust to our partners.

Some examples of Ranger's leadership in the market include the recently completed construction on all three phases of the 239 MW Assembly solar project in Shiawassee County, Michigan, which is the largest operational solar project in the State. The Ranger-developed 149 MW River Fork project started construction in 2021. Dressor Plains, Prairie State, and Big River are all Ranger developed projects in Illinois, collectively 347 MW. Prairie State and Dressor Plains became operational in 2Q 2021 and are the largest operating solar projects in the state. Big River became operational in 3Q 2022.

Ranger is led by one of the most experienced teams in the renewable energy space. Their time-tested approach to development, which separates Ranger from the competition, involves working closely with landowners and communities to gain their support when bringing new investment and clean energy to the region.

Ranger Power is an industry leader because of the commitment to work closely with communities to ensure projects are a win-win. Ranger Power projects represent a significant investment and a new clean energy resource

that benefits local residents, business owners, and stakeholders through bringing new investment and tax base, employment opportunities, and educational opportunities.

## 2) PROJECT SUMMARY

The Project will include up to 100 MW (megawatts) of photovoltaic solar panels located in Clyde and Fort Gratiot townships, St. Clair County, Michigan. Of the 100 MW capacity generated by the Project, approximately 75 MW is proposed within Fort Gratiot Township. There are seventeen participating parcels proposed in Fort Gratiot, totaling approximately 881 acres. Of this, **solar panels have been sited within a fenced-in area of approximately 527 acres (Project Area)**. Four of the seventeen participating parcels only contain a proposed underground collection line and will not be used for project panels. Land use within the Project Area is primarily agriculture and undeveloped woodlots. The Project Area was selected based on land use, interest from landowners, and proximity to existing electrical grid infrastructure.

The Applicant has acquired the rights to develop, construct, and operate an up to 100-MW alternating current (AC) solar project on seventeen parcels of land owned by five private landowners located in Fort Gratiot Township. These land rights are granted by easement agreements or by purchase option agreement. A list of participating parcels in Fort Gratiot Township is included in **Appendix D**.

The Project will consist of solar panels and inverters arranged in photovoltaic (PV) arrays. Associated facilities include the Project substation, overhead transmission line to point-of-interconnection, underground electrical cables to collect the generated power and transmit it to the Project substation, perimeter fencing, and gravel access roads to each PV array. The Project substation is proposed within Clyde Township and will not be discussed further in this document. The proposed locations of the solar arrays, inverters, collection lines, access roads, fencing, and other Project improvements within Fort Gratiot Township are shown in the Site Plan in **Appendix B**.

As demonstrated throughout this application narrative, Ranger Power made a comprehensive and diligent effort in designing and siting a facility that meets or exceeds the requirements of the Fort Gratiot Township Zoning Ordinance and Solar Energy Systems Ordinance. As sited, the Project optimizes efficient use of land to generate solar power, while avoiding impacts to natural resources or existing land uses. Additionally, as designed, the Project avoids impacts to wetlands and floodplains. In addition, the Project will utilize setbacks that meet or exceed the setback requirements set forth in the Fort Gratiot Township Zoning Ordinance and will install landscape screening in areas adjacent to non-participating residential parcels, where adequate screening does not already exist. The Project plans to coordinate with stakeholders and township officials throughout Project permitting, construction, and operation, and has received wide-ranging support from community members.

The Applicant is coordinating a power purchase agreement (PPA) for the purchase of the power generated by Project. Construction is expected to begin in 2025, with commercial operation anticipated in 2026. Exact construction and operation dates are dependent on receipt of necessary permits, equipment, and approvals.

Ranger Power is fortunate to present a project that community members, local stakeholders, and job seekers alike can be proud of.

## II. SOLAR ENERGY SYSTEMS ORDINANCE

Pursuant to the Fort Gratiot Township Solar Ordinance, the Project is defined as large principal-use solar energy system (SES). Large principal-use solar energy systems (SES) are a special land use in the AG, O-1, O-2, C-1, C-2, M-1, AND M-2 zoning districts. The Project is sited entirely within the agricultural (AG) zoning district of Fort Gratiot Township. Refer to the Zoning Map in **Appendix B: Site Plan Sheet 02**.

### 1. GENERAL PROVISIONS

Section 38-117, *General Provisions Regarding Solar Energy Systems*, of the Fort Gratiot Charter Township Zoning Ordinance No. 226, states the requirements for large principal-use solar energy systems (SES), which the Project will be designed to accommodate.

- 1. Total height for a large principal-use SES shall not exceed the maximum allowed height in the district in which the system is located.**

A height of 35 feet shall not be exceeded by Project infrastructure. The height of the solar array at maximum tilt will not exceed the height requirements set forth for the Agricultural District in accordance with that district's schedule of regulations.

Refer to Solar Details in **Appendix B: Site Plan Sheet 17**.

- 2. Setback distance shall be measured from the property line or road right-of-way to the closest point of the solar array at minimum tilt or any SES components and as follows:**
  - a. In accordance with the setbacks for principal buildings or structures for the zoning district of the project site.**
  - b. 100 feet from any existing dwelling unit on a non-participating lot.**

The project meets all applicable setback requirements. An additional setback of 100 feet from any solar panels to any existing dwelling unit on a non-participating lot will be followed.

Refer to Setback Tables in **Appendix B: Site Plan Sheets 4 - 13**.

- 3. A large principal-use SES may be secured with perimeter fencing to restrict unauthorized access. If installed, perimeter fencing shall be a maximum of 6' feet in height. Fencing is not subject to setbacks.**

Perimeter fencing will be installed around all proposed panels with a maximum height of 7' to restrict unauthorized access and to meet standards of the National Electric Safety Code (NESC) and Institute of Electrical and Electronics Engineers (IEEE) guidelines, which the Project will be built in compliance with. Refer to Proposed Conditions in **Appendix B: Site Plan Sheets 4 - 13** and Security Details in **Appendix B: Site Plan Sheet 14**.

- 4. A large principal-use SES shall follow the screening and/or landscaping standards for the zoning district of the project site. Any required screening and landscaping shall be placed outside the perimeter fencing. Screening/landscaping detail shall be submitted as part of the site plan that identifies the type and extent of screening for a large principal-use SES, which may include plantings, strategic use of berms, and/or fencing.**

Vegetative screening is proposed along all non-participating residential and public uses where existing screening is not adequate. All proposed screening will be placed outside the perimeter fencing.

Refer to the Landscaping Plan in **Appendix B: Site Plan Sheet 12** and to the Landscaping & Vegetation Details in **Appendix B: Site Plan Sheet 16**.

5. **A large principal-use SES shall include the installation of ground cover vegetation maintained for the duration of operation until the site is decommissioned. The applicant shall include a ground cover vegetation establishment and management plan as part of the site plan. Vegetation establishment must include invasive plant species and noxious weed control. The following standards apply:**
- a. **Sites bound by a Farmland Development Rights (PA 116) Agreement must follow the Michigan Department of Agriculture and Rural Development's Policy for Allowing Commercial Solar Panel Development on PA 116 Lands.**
  - b. **Ground cover at sites not enrolled in PA 116 must meet one or more of the four types of Dual Use defined in this ordinance.**
    - i. **Pollinator Habitat: Solar sites designed to meet a score of 76 or more on the Michigan Pollinator Habitat Planning Scorecard for Solar Sites.**
    - ii. **Conservation Cover: Solar sites designed in consultation with conservation organizations that focus on restoring native plants, grasses, and prairie with the aim of protecting specific species (e.g., bird habitat) or providing specific ecosystem services (e.g., carbon sequestration, soil health).**
    - iii. **Forage: Solar sites that incorporate rotational livestock grazing and forage production as part of an overall vegetative maintenance plan.**
    - iv. **Agrivoltaics: Solar sites that combine raising crops for food, fiber, or fuel, and generating electricity within the project area to maximize land use. Project sites that are included in a brownfield plan adopted under the Brownfield Redevelopment Financing Act, PA 381 of 1996, as amended, that contain impervious surface at the time of construction or soils that cannot be disturbed, are exempt from ground cover requirements.**
  - c. **Project sites that are included in a brownfield plan adopted under the Brownfield Redevelopment Financing Act, PA 381 of 1996, as amended, that contain impervious surface at the time of construction or soils that cannot be disturbed, are exempt from ground cover requirements.**

Construction and implementation of the Project will include the installation of ground cover vegetation maintained for the duration of operation until the site is decommissioned.

Refer to the Vegetation Plan in **Appendix B: Site Plan Sheet 13** and Landscaping & Vegetation Details in **Appendix B: Site Plan Sheet 16** for ground cover vegetation establishment and management activities.

- a) *Parcels in the Project Area bound by a PA 116 agreement will follow MDARD'S Policy for Allowing Commercial Solar Panel Development on PA 116 Lands.*
  - b) *Ground cover in the Project Area not enrolled in PA 116 will meet the Pollinator Habitat dual use type defined in the Fort Gratiot Township Solar Ordinance.*
  - c) *Not Applicable*
6. **A large principal-use SES shall not count towards the maximum lot coverage or impervious surface standards for the district.**

The Applicant understands that large principal-use SES shall not count towards the maximum lot coverage or impervious surface standards for the district.

7. **Land disturbance or clearing shall be limited to what is minimally necessary for the installation and operation of the system and to ensure sufficient all-season access to the solar resource given the**

**topography of the land. Topsoil distributed during site preparation (grading) on the property shall be retained on site.**

Land disturbance or clearing prior to construction of the Project will be limited to what is minimally necessary for the installation and operation of the system and to ensure sufficient all-season access to the solar resource given the topography of the land. Topsoil distributed during site preparation and grading will be retained on site.

The final site design will include grading and elevations after final engineering. Localized grading will be necessary to meet equipment tolerances and for maintaining drainage. A final grading and soil erosion control plan will be developed by the Engineering, Procurement, and Construction (EPC) contractor upon final electrical design.

Refer to Proposed Conditions in **Appendix B: Site Plan** on Sheets 4 - 13 for topographic contours and existing structures, and to the Landscaping Plan in **Appendix B: Site Plan** Sheet 12 for details on planned disturbance.

- 8. New access drives within the SES shall be designed to minimize the extent of soil disturbance, water runoff, and soil compaction on the premises. The use of geotextile fabrics and gravel placed on the surface of the existing soil for the construction of temporary drives during the construction of the SES is permitted, provided that the geotextile fabrics and gravel are removed once the SES is in operation.**

Access roads constructed for the Project will be designed to minimize the extent of soil disturbance, water runoff, and soil compaction on the premises. 16' wide gravel access roads are designed for the Project from public roads to inverter pads. Access drives will be constructed to allow stormwater to sheet across and prevent puddling. Refer to Proposed Conditions in **Appendix B: Site Plan** Sheets 4 - 13 for locations of planned access roads and Crossing & Access Road Details in **Appendix B: Site Plan** Sheet 15 for dimensions and specifications.

- 9. SES wiring (including communication lines) may be buried underground. Any above-ground wiring within the footprint of the SES shall not exceed the height of the solar array at maximum tilt.**

Any aboveground wiring within the footprint of the SES will not exceed the height of the solar array at maximum tilt. Refer to **Appendix B: Site Plan** Sheet 17.

- 10. Large principal-use SES lighting shall be limited to inverter and/or substation locations only. Light fixtures shall have downlit shielding and be placed to keep light on-site and glare away from adjacent properties, bodies of water, and adjacent roadways. Flashing or intermittent lights are prohibited.**

The proposed substation is not sited within Fort Gratiot Township and lighting will not be used at panel inverters. Therefore, lighting is not proposed for the Project within Fort Gratiot Township. Additionally, the project will not produce glare on adjacent properties, bodies of water, and adjacent roadways. Refer to **Appendix G: Glint/Glare Study**.

- 11. Signage may be at the project site, with the maximum area signage allowed per the requirements of 38-5 Schedules A, B, C and D. Any signage shall meet the setback, illumination, and materials/construction requirements of the zoning district for the project site.**



Signage relating to the Project will comply with the maximum area signage allowed per the requirements of the agricultural zoning district, meeting all setback, illumination, and materials/construction requirements for that district. Refer to **Appendix B: Site Plan Sheet 14.**

- 12. The sound pressure level of a large principal-use SES and all ancillary solar equipment shall not exceed 45 dBA at the property line of an adjoining non-participating lot. The site plan shall include modeled sound isolines extending from the sound source to the property lines to demonstrate compliance with this standard.**

The Project has been designed to minimize audible sound at neighboring residences and buildings. According to the Project's Sound Modeling Study, the sound pressure level emanating from the Project and supporting infrastructure once constructed sound levels is not anticipated to exceed 45 A-weighted decibels (dBA). Refer to **Appendix E: Sound Modeling Study.**

- 13. In addition to repairing or replacing SES components to maintain the system, a large principal-use SES may at any time be repowered, without the need to apply for a new special land-use permit, by reconfiguring, renovating, or replacing the SES to increase the power rating within the existing project footprint. a. A proposal to change the project footprint of an existing SES shall be considered a new application, subject to the ordinance standards at the time of the request. Expenses for legal services and other studies resulting from an application to modify an SES will be reimbursed to Fort Gratiot Charter Township by the SES owner in compliance with established escrow policy.**

The Applicant understands that in addition to repairing or replacing SES components to maintain the system, a large principal-use SES may at any time be repowered, without the need to apply for a new special land-use permit, by reconfiguring, renovating, or replacing the SES to increase the power rating within the existing project footprint.

- 14. A decommissioning plan is required at the time of application.**

**a. The decommission plan shall include:**

**i. The anticipated manner in which the project will be decommissioned, including a description of which above-grade and below-grade improvements will be removed, retained (e.g. access drive, fencing), or restored for viable reuse of the property consistent with the zoning district,**

**ii. The projected decommissioning costs for removal of the SES (net of salvage value in current dollars) and soil stabilization, less the amount of the surety bond posted with the State of Michigan for decommissioning of panels installed on PA 116 lands,**

**iii. The method of ensuring that funds will be available for site decommissioning and stabilization (in the form of surety bond, irrevocable letter of credit, or cash deposit), and**

**b. A review of the amount of the performance guarantee based on inflation, salvage value, and current removal costs shall be completed every 5 years, for the life of the project, and approved by the board. An SES owner may at any time:**

**i. Proceed with the decommissioning plan approved by the or Planning Commission and remove the system as indicated in the most recent approved plan; or**

**ii. Amend the decommissioning plan with Zoning Administrator approval and proceed according to the revised plan.**

**c. Decommissioning an SES must commence when the soil is dry to prevent soil compaction and must be complete within 12 months after abandonment. An SES that has not produced electrical energy for 12 consecutive months shall prompt an abandonment hearing.**

At the end of the Project's operational life, it will be decommissioned and can be returned to agricultural use. The project will meet all decommissioning requirements. Refer to **Appendix F: Project Decommissioning Plan**.

### III. SPECIAL LAND USES [ORDINANCE SEC. 38]

In accordance with Article IV, Section 38-483 of the Fort Gratiot Township Zoning Ordinance, Ranger Power has provided the Planning Commission with this application package, which provides the data required for a Special Land Use Permit (SLUP) application. Refer to the Special Land Use / Site Plan Review Checklist in Appendix A for a summary of SLUP and Site Plan Requirements and where they can be found in this SLUP application package and Site Plan.

#### PERMIT STANDARDS

##### GENERAL STANDARDS/REQUIREMENTS FOR APPROVAL FOR SPECIAL LAND USE PERMIT

Ranger Power understands that all solar energy systems, whether ground mounted or roof mounted, are subject to the following general requirements set forth in Section 38-486 of the Fort Gratiot Township Zoning Ordinance:

**1) Will be in accordance with the general objectives, intent, and purposes of this chapter.**

**a. Will be consistent with maintenance of the public health, safety, and welfare.**

The Project will not generate traffic, noise, smoke, fumes, glare, or odors detrimental to health, safety, or general welfare of the community during operations. The Project is implementing setbacks from non-participating properties, public roadways, and residences that meet or exceed the requirements set forth in the Fort Gratiot Zoning Ordinance. Construction of the Project will produce a minor increase in local traffic; however, this small increase will be temporary, and measures will be put in place to ensure traffic safety. During operation, vehicular traffic will not increase in association with the Project.

The Project has been designed to minimize audible sound resulting from Project inverters including a voluntary 350' setback from residences. As demonstrated by the Project's Sound Modeling Study (**Appendix E**), sound levels at neighboring residences will comply with all Ordinance requirements.

Operation of a PV solar energy system does not generate emissions, smoke, fumes, or odors. Solar panels are constructed of layered glass, aluminum, and crystalline silicon. Crystalline silicon is a common mineral found naturally within the earth's crust, as well as in sand, stone, concrete, and mortar. As such, the Project will not disturb or be hazardous to any surrounding uses permitted within the adjacent zoning districts or produce any hazardous by-products, as the panels are chemically inert. Furthermore, at the end of its operational life, the Project will be removed in accordance with the Decommissioning Plan provided in **Appendix F**, and land may be returned to its current use.

The Project will not result in glint/glare that would impact neighboring properties or vehicles on the road. The solar panels that will be used for the Project have been designed with an anti-glare coating. A glare hazard analysis did not predict glare to be reflected to any residences or businesses. Refer to the Glint/Glare Study in **Appendix G** for details.

**b. Will be of such location, size, and character that it will be in harmony with all applicable regulations of the zoning district in which it is to be located.**

Located in the Agricultural District (AG) of Fort Gratiot Township, the Project is designed and will be constructed, operated, and maintained to be harmonious with and in appearance with the rural character of the surrounding area. The Project will maintain the area's low density and will not increase area road traffic once constructed. With the panels positioned to catch the morning or evening sun, the height of the panels will be similar to that of full-grown corn. Perennial vegetative groundcover will be planted and maintained throughout the Project area similar to cover crops in typically agricultural operations or land enrolled in the U.S. Department of Agriculture (USDA) Farm Service Agency Conservation Reserve Program. Refer to the Vegetation Plan in **Appendix B: Site Plan Sheet 12** and the Landscaping & Vegetation Details in **Appendix B: Site Plan Sheet 16**.

The Project is sited exclusively on property zoned as Agricultural District (AG) land, the majority of which is currently used for agriculture. Refer to the Zoning Map in **Appendix B: Site Plan Sheet 2**. The Project will preserve the agricultural character and visual appeal of adjacent properties through design measures such as the perimeter fencing that will be constructed with wooden posts and woven fiber, as opposed to standard chain-link fencing; setbacks from roads and residences; landscape buffering; and planting a perennial vegetative ground cover throughout the site. Refer to the Proposed Conditions in **Appendix B: Site Plan Sheets 4 - 13** and Security Details in **Appendix B: Site Plan Sheet 14**.

The Applicant has committed to seeding the Project Area with a mix of pollinator-friendly and other vegetation determined to be appropriate for the region that will be compatible with the surrounding landscape. Pollinator-friendly vegetation planted within the project area will decrease erosion, increase stormwater control, increase biodiversity within the project area, and maintain the character of the surrounding area. Refer to the Vegetation Plan in **Appendix B: Site Plan Sheet 13** and the Landscaping and Vegetation Details in **Appendix B: Site Plan Sheet 16**. Overall, the Project is designed to be harmonious and compatible with the general agricultural vicinity and, at the end of the Project's operational life, it will be decommissioned and can be returned to agricultural use. Refer to the Project Decommissioning Plan included in **Appendix F**.

**(2) Will be served adequately by essential public facilities and services such as highways, streets, police and fire protection, drainage structures, refuse disposal, or that persons or agencies responsible for establishment of the proposed use shall be able to provide adequately any such service; will be of a nature that will make vehicular and pedestrian traffic no more hazardous than is normal for the district involved, taking into consideration vehicular turning movements in relation to routes of traffic flow, proximity and relationship to intersections, adequacy of sight distances, location and access of off-street parking and provisions for pedestrian traffic with particular attention to minimizing child-vehicle contacts in residential districts.**

The Project does not include any new public roadways and solar panels will be set back from public road rights-of-way (ROWs). During operation, the Project will not generate vehicular or pedestrian traffic. Access roads have been designed to provide safe and efficient ingress and egress points for maintenance crews or emergency vehicles. Refer to the Crossing and Access Road Details in **Appendix B: Site Plan Sheet 15**.

The Project will be served adequately by the existing streets and highways for the construction of the Project. Transportation and installation of the components will not require special accommodations of the existing infrastructure. Workforce and component delivery routes will follow designated and approved routes, and the Project will coordinate with the St. Clair County Road Commission to document road conditions before and after construction to ensure no damage to public roadways has occurred as a result of the Project. Refer to Crossing & Access Road Details in **Appendix B: Site Plan Sheet 15**.

In addition, the Project will comply with all applicable regulations of the St. Clair County Drain Commission. The Applicant will notify the Port Huron Fire Department prior to construction so they can visit during construction to obtain an on-the-ground understanding of the Project layout and emergency access points.

While in operation, the Project will require a staff of 3-6 personnel. The Project will coordinate with local utilities to arrange suitable electric, water, trash disposal, and septic services for the facility. The Project will obtain all building, electrical, plumbing, and other permits required by the St. Clair County Building Inspection and

Environmental Services Department prior to construction. As such, the Project and its use are expected to be served adequately by existing public services and facilities.

In addition, not only will the Project avoid any negative impacts to schools or community, but taxes generated by the Project are anticipated to contribute to community schools, including payments towards school debt. The Project is not expected to require any additional local police or fire department resources and, in fact, will increase local tax revenue benefiting local fire departments. Refer to the Project Property Tax Impact Report in **Appendix H** and the Real Estate Adjacent Property Value Impact Report in **Appendix I**.

**(3) Will be compatible with adjacent uses of land and the natural environment.**

The Michigan Department of Agriculture & Rural Development (“MDARD”) now recognizes the need to install solar arrays on agricultural land, including land enrolled in PA116. Agricultural land is compatible for land use for solar development as the land generally consists of large acreage conducive to low-intensity development such as solar. The Project will serve to supplement farming incomes and allow for nutrient and land recharge while supporting native vegetation and pollinator habitat species. Giving soil rest can help maintain soil quality and contribute to biodiversity of agricultural land to increase nutrient levels and enable the land to revert back to agricultural uses at the end of the operational life for solar installations. The solar arrays will be mounted on piles, minimizing disturbance to the land. Grasses and other vegetation will be allowed to grow underneath and between panels and will be maintained against overgrowth. Refer to the Vegetation Plan in **Appendix B: Site Plan Sheet 13** and Landscaping & Vegetation Details in **Appendix B: Site Plan Sheet 16**.

Presence of pollinator-friendly species has been shown to increase production of pollinator-dependent crops, such as soybeans. In addition, pollinator-friendly species tend to have deeper root systems, which filter and store more water, thereby decreasing runoff and increasing groundwater storage, and these species tend to require less chemical fertilizer and herbicide, therefore also decreasing pollutants entering surface waters and groundwater. Additionally, soil removal and topographic modifications will be completed in accordance with site-specific construction best management practices (BMPs) and the stabilization of the site will be managed to prevent soil erosion. Refer to the Landscaping Plan in **Appendix B: Site Plan Sheet 12**, Vegetation Plan in **Appendix B: Site Plan Sheet 13**, and Landscaping & Vegetation Details in **Appendix B: Site Plan Sheet 16**.

The Project has been designed to prioritize the preservation of significant natural features such as steeper slopes, wetlands, surface water features, floodplains, sensitive cultural and archaeological sites, and other unique or significant natural areas to the extent practicable. In addition, the Project will utilize 25' voluntary setbacks around natural resources where applicable. As part of the due diligence for the Project, the Applicant contracted Atwell to complete environmental assessments for the Project including a biological habitat assessment, wetland delineation, and cultural resource review. The results of these surveys were used to inform Project design and reduce potential impacts to significant natural features. U.S. Fish and Wildlife Service (USFWS) -recommended BMPs will be used to minimize impacts to potential threatened or endangered species (TES) and their habitat during the construction of the Project.

**a. Will be of such location, size and character that it will be in harmony with the appropriate and orderly development of the surrounding neighborhood.**

Use of the Project Area for a solar energy system is compatible with surrounding uses and will be harmonious with the appropriate development of the surrounding properties. Uses surrounding the Project include agricultural/croplands, single-family residential and farmsteads, undeveloped woodlots, and access roads. The Project will not impede appropriate and orderly development of the surrounding properties. Refer to the Zoning Map in **Appendix B: Site Plan Sheet 2** and to the Real Estate Adjacent Property Value Impact Report in **Appendix I**.

**b. Will be designed such that the location, size, intensity, site layout and periods of operation of any such proposed use shall eliminate any possible nuisance emanating therefrom which might be noxious to the**

**occupants of any other nearby permitted uses, whether by reason of dust, noise, fumes, vibration, smoke, or lights.**

The Project will include vegetative screening between the areas containing panels and adjacent land uses. The Project will not result in sound or glare impacts to the surrounding properties. Refer to **Appendix E: Sound Modeling Study** and **Appendix G: Glint/Glare Study**.

**c. Will be designed such that the proposed location and height of buildings or structures and location, nature and height of walls, fences and landscaping will not interfere with or discourage the appropriate development and use of adjacent land and buildings.**

The Project is designed such that it will not interfere with or discourage appropriate development and use of surrounding properties. Specifically, landscape buffering will be implemented along adjacent, non-participating residential and public uses. In addition, in accordance with the Project's ground cover vegetation establishment and management plan, the fenced in areas of the Project will be planted with a seed mix appropriate for the region. The perimeter fencing will be constructed with wooden posts and woven fiber, as opposed to standard chain-link fencing. Refer to the Landscaping Plan in **Appendix B: Site Plan Sheet 12**, Vegetation Plan in **Appendix B: Site Plan Sheet 13**, and Landscaping & Vegetation Details in **Appendix B: Site Plan Sheet 16**.

**d. Will not cause substantial injury to the value of other property in the neighborhood in which it is to be located.**

The Project will not cause injury to the value of other property in the neighborhood in which it is located. As described in the Real Estate Adjacent Property Value Impact Report, solar facilities of similar size and in similar rural areas in Michigan and across the Midwest have consistently been shown to have no measurable impact on property values in the surrounding area or neighborhood. Refer to the Project Property Tax Impact Report in **Appendix H** and the Real Estate Adjacent Property Value Impact Report in **Appendix I**.

**(4) Will promote the use of land in a socially and economically desirable manner; will relate harmoniously with the physical and economic aspects of adjacent land uses as regards prevailing shopping habits, convenience of access by prospective patrons, continuity of development, and need for particular services and facilities in specific areas of the township.**

Located in the Agricultural District (AG) of Fort Gratiot Township, the Project is designed and will be constructed, operated, and maintained to be harmonious with and in appearance with the rural character of the surrounding area. The Project will maintain the area's low density and will not increase area road traffic once constructed. With the panels positioned to catch the morning or evening sun, the height of the panels will be similar to that of full-grown corn. The Project is implementing setbacks from non-participating properties, public roadways, and residences that meet the requirements set forth in the Fort Gratiot Zoning Ordinance. Perennial vegetative groundcover will be planted and maintained throughout the Project area similar to cover crops in typically agricultural operations or land enrolled in the U.S. Department of Agriculture (USDA) Farm Service Agency Conservation Reserve Program. The Project is sited exclusively on property zoned as Agricultural District (AG) land, the majority of which is currently used for agriculture. Refer to the Zoning Map in **Appendix B: Site Plan Sheet 2**.

The Project will preserve the agricultural character and visual appeal of the Project from the adjacent properties through design measures such as the perimeter fencing that will be constructed with wooden posts and woven fiber, as opposed to standard chain-link fencing; landscape buffering along adjacent, non-participating residential parcels, if requested by the parcel owner; and planting a perennial vegetative ground cover throughout the site. Refer to the Proposed Conditions in **Appendix B: Site Plan Sheets 4 - 13** and Security Details in **Appendix B: Site Plan Sheet 14**.

The Applicant has committed to seeding the Project Area with a mix of pollinator-friendly and other vegetation determined to be appropriate for the region that will be compatible with the surrounding landscape. Pollinator-friendly vegetation planted within the project area will decrease erosion, increase stormwater control, increase

biodiversity within the Project area, and maintain the character of the surrounding area. Refer to the Landscaping Plan in **Appendix B: Site Plan Sheet 12**, Vegetation Plan in **Appendix B: Site Plan Sheet 13**, and Landscaping & Vegetation Details in **Appendix B: Site Plan Sheet 16**.

Overall, the Project is designed to be harmonious and compatible with the general agricultural vicinity and, at the end of the Project's operational life, it will be decommissioned and can be returned to agricultural use. Refer to the Project Decommissioning Plan included in **Appendix F**.

Not only will the Project avoid any negative financial impacts to the community, but taxes generated by the Project are anticipated to contribute to community schools, infrastructure, and services in Fort Gratiot. Refer to the Project Property Tax Impact Report in **Appendix H**.

The Project promotes the use of land within Fort Gratiot Township in a socially and economically desirable manner by providing renewable energy to communities in Michigan through a low-profile, strategically sited solar project designed to maintain and protect the land's historical usage for agricultural production. Solar energy generation in St. Clair County will contribute to the stability and availability of energy resources in Michigan.

#### IV. ZONING ORDINANCE SEC. 38-46

The Applicant has prepared a site plan (**Appendix B**) in accordance with the requirements of Sec. 38-46(1) of the Fort Gratiot Charter Township Zoning Ordinance, which states that a site plan is required for any building or use requiring special approval. Refer to the Special Land Use / Site Plan Review Checklist included with **Appendix A**. The Site Plan includes maps showing the physical features and land uses of the Project Area, both before and after construction of the proposed project.

##### SITE PLAN REVIEW PROCESS

Per Sec. 38-46(2) of the Fort Gratiot Charter Township Zoning Ordinance, a request may be filed for site plan review by the planning commission by filing with the township clerk the complete application upon the forms furnished by the clerk. At least 11 copies of a site plan will be included.

##### REQUIRED DATA

In accordance with Sec. 38-46(3) Fort Gratiot Charter Township Zoning Ordinance, the site plan will adhere to the following requirements:

- a. The site plan shall be of a scale not greater than one-inch equals 20 feet, and not less than one inch equal 200 feet, and of such accuracy that the planning commission can readily interpret the site plan, and shall include more than one drawing when required for clarity.
- b. The property shall be identified by lot lines and location, including dimensions, angles, and size, and correlated with the legal description of such property. Such plan shall further include the name and address of the property owner, and developer. The site plan shall bear at least one or more seals of an architect or professional engineer licensed to practice in the state.
- c. The site plan shall show scale; north point; boundary dimensions; topography (at least two-foot contour intervals); and natural features, such as woodlots, streams, rivers, lakes, drains, and similar features.
- d. The site plan shall show existing manmade features, such as buildings; structures; high tension towers; pipelines; and existing utilities, such as water and sewer lines, excavations, bridges, culverts, drains, and easements; and shall identify adjacent properties and their existing uses.
- e. The site plan shall show the location, proposed finished floor and grade line elevations, size of proposed principal and accessory buildings, their relation one to another and to any existing structures on the site, the height of all buildings, and square footage of floor space. Site plans for residential development shall include a

density schedule showing the number of dwelling units per net acre, including a dwelling schedule showing the unit type and number of each unit type.

f. The site plan shall show the proposed streets, driveways, sidewalks, and other vehicular and pedestrian circulation features within and adjacent to the site; also, the location, size, and number of parking spaces in the off-street parking area, and the identification of service lanes and service parking.

g. The site plan shall show the proposed location, use, and size of open spaces; and the location of any landscaping, fences, or walls on the site. The site plan shall further show any proposed location of connections of existing utilities and proposed extension thereof.

h. A vicinity map shall be submitted showing the location of the site in relation to the surrounding street system.

Refer to **Appendix A: Special Land Use / Site Plan Review Checklist** for a summary of required documents and their locations within the Project Special Land Use Permit Application and Site Plan. The above-listed requirements are included in the Site Plan in **Appendix B** and the Fort Gratiot Charter Township Special Land Use Permit Application in **Appendix C**. Design drawings and engineering calculations have been certified by a Professional Engineer licensed in the State of Michigan.

## V. ADDITIONAL INFORMATION

### 1) CERTIFICATIONS

The Applicant will comply with all applicable federal, state, and local laws and regulations and will obtain all required federal, state, and local approvals, licenses, permits or variances for the proposed large solar energy system prior to the start date of construction. The Applicant ensures their projects are sited in an environmentally responsible manner and in compliance with all applicable local, state, and federal laws and regulations.

The following list represents some of the permits and approvals to be reviewed as part of this project:

AGENCY	DESCRIPTION	STATUS
EGLE-WRD	Potential NREPA permits/approvals include: <ul style="list-style-type: none"> <li>● Part 31 Floodplains</li> <li>● Part 301 Watercourses</li> <li>● Part 303 Wetlands</li> </ul>	Application Anticipated
St. Clair County	Soil Erosion and Sedimentation Control Permit	Application Anticipated
DTE Energy	Electrical Line Easement Crossing Agreements	Application Anticipated
Michigan Department of Transportation	Driveway Crossing Agreements	Application Anticipated

### 2) CONSTRUCTION CODES AND INTERCONNECTION STANDARDS

Applicant will comply with all applicable state construction and electrical codes and St. Clair County building permit requirements, as well as all applicable utility, Michigan Public Service Commission, and Federal Energy Regulatory Commission interconnection standards.

### 3) CONSTRUCTION SCHEDULE

Upon approval of the SLUP application, the below table depicts an anticipated construction schedule outlining major project milestones.

Portside Solar Milestones	
Mobilization	Q2 2025
Start of Construction	Q2 2025
Commercial Operation Date	Q4 2026

## VI. CONCLUSION

This submission and its attachments demonstrate the Applicant’s compliance with the Fort Gratiot Township Zoning Ordinance. Upon approval of the Special Land Use Permit, Ranger Power looks forward to the opportunity to construct the Project. The Project will supply clean renewable energy to the state and will operate in compliance with all applicable local, state, and federal regulations.



## Planning

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**From:** Toby Valentino <toby@rangerpower.com>  
**Sent:** Friday, October 13, 2023 6:19 PM  
**To:** Planning; Robert Buechler  
**Subject:** Additional Information Following 10/10 Public Hearing - Attendee Maps  
**Attachments:** T22005894\_MeetingAttendeesAC.pdf; Fort Gratiot Planning Commission Meeting Attendees .xlsx

Hello,

Following the large turnout at this week's Planning Commission public hearing, I had our consultants create a map outlining the address of every attendee. I excluded any of the Portside Solar project landowners, and I also excluded any attendee who I had been in direct communication with prior to the meeting. I found this map very helpful, and think the Planning Commission may like to see it.

It is important to note, due to difficulties reading handwriting, it is possible mistakes in this map or spreadsheet were included. It is also critical to note, we condensed all duplicate attendees (family or friends with the same address on sign in sheets). Additionally, some folks may not have signed in.

Regardless of attendees' and their support or opposition to the proposed project, It is clear to us that the majority of attendees at the Public Hearing that do live in relative proximity to the project area will not be able to see the project. We will show this with a revised map next week showing clearly the existing treelines and proposed screening areas. The vast majority of those that do live adjacent to the project area that attended will be living adjacent to parcels that will continue to be farmed, with the sole use of underground transmission and no panels located on them (see blue parcels on the map).

Please reach out with any questions.

Best,  
Toby

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**Toby Valentino**

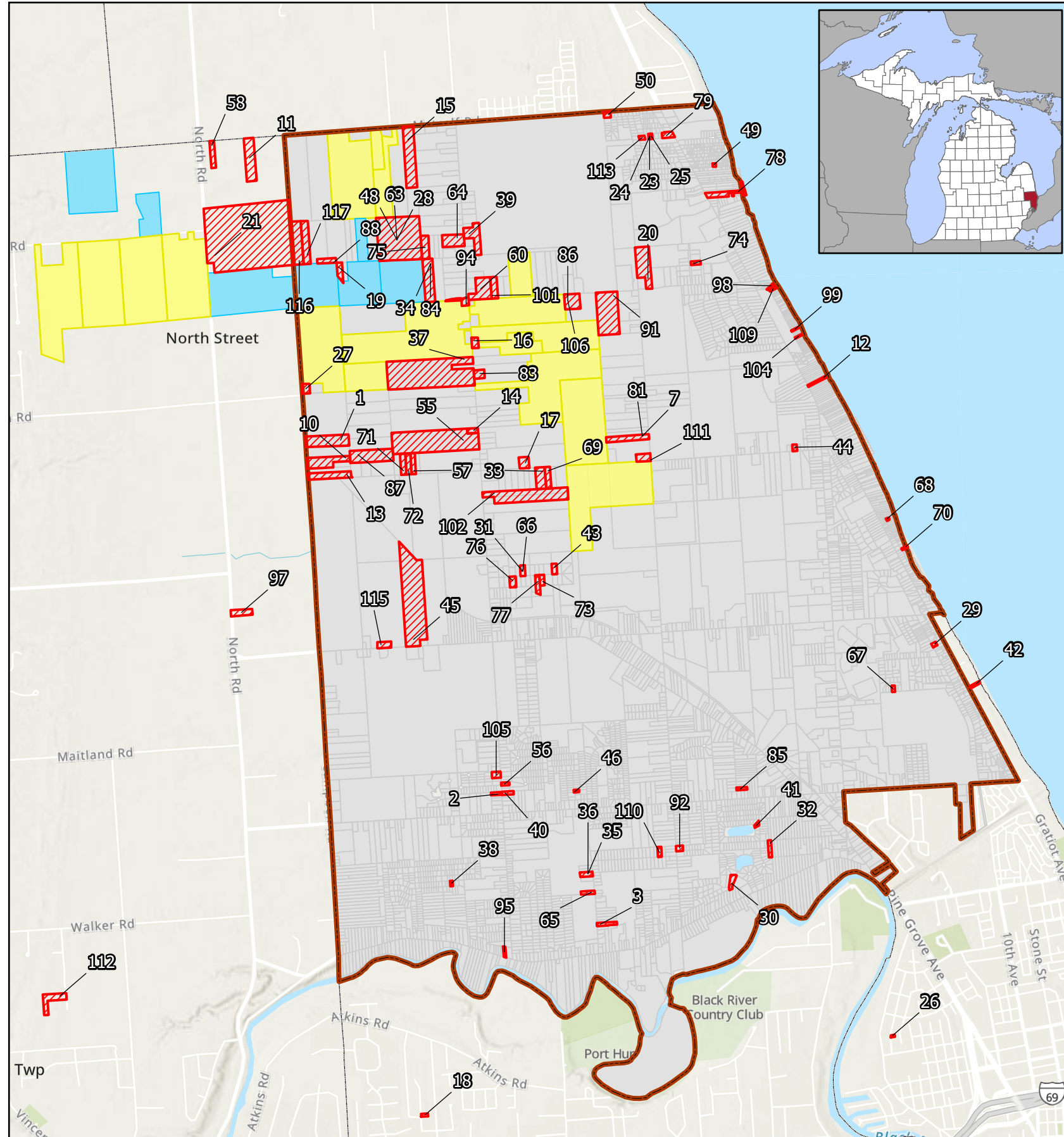
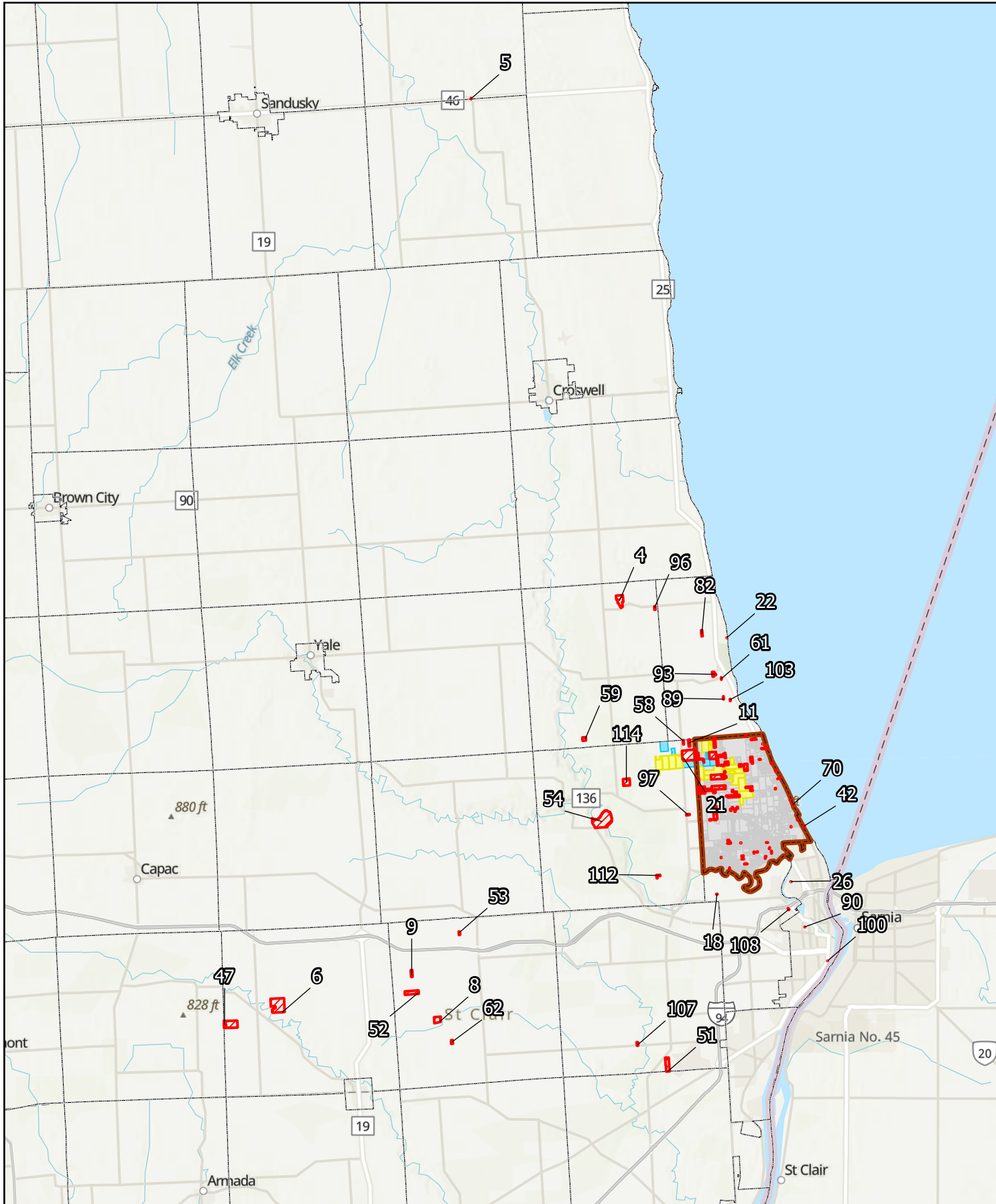
Development Manager | Ranger Power LLC

(734) 474-1623 | [toby@rangerpower.com](mailto:toby@rangerpower.com)

[www.rangerpower.com](http://www.rangerpower.com)

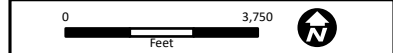
MapID	Name	Address	Zip	Parcel(s)
1	Hastings, David	4347 Carrigan Rd	48059	74-20-007-4016-000
2	Banas, Robert	4055 State Rd	48059	74-20-019-3010-000
3	Koehler, Errol	3570 Pollina Ave	48059	74-20-630-0011-000
4	Richardson, Ashley	5664 Jeddo Rd	48032	74-21-003-3001-000
5	Faulk, Mikel	3967 E Chandler St	48419	
6	Rushing, David & Sally	12618 Masters Rd	48041	74-29-017-3001-000
7	Defrain, Angela	5045 Parker Rd	48059	74-20-008-3010-000
8	Minor, John H	9640 Lambs Rd	48027	74-31-020-3001-000
9	Glass, Kevin R	10106 Hill Rd	48027	74-31-007-3003-200
10	Beebe, Sarah	4331 Carrigan Rd	48059	74-20-007-4014-010
11	Barto, Jill & Chris	4607 Metcalf Rd	48049	74-15-001-2001-800
12	Smith, Barry L	5186 Lakeshore Rd	48059	74-20-750-0010-000
13	Swinson, Ben & Mary	4303 Carrigan Rd	48059	74-20-007-4012-000
14	Campbell, Laura & Tom	5131 State Rd	48059	74-20-007-3003-000
15	Dobrowolski, Dan	4125 Metcalf Rd	48059	74-20-006-2001-300
16	Goryl, Casey & Jenny	5370 State Rd	48059	74-20-008-1006-000
17	Barber, Brent & Tamie	3860 Carrigan Rd	48059	74-20-008-4003-100
18	Loshaw, Tom & Wendy	3160 Elecia Dr	48060	74-28-950-0008-000
19	Brown, Diane	4375 Cole Rd	48059	74-20-006-4003-000
20	Norris, David & Cheryl	3478 Brace Rd	48059	74-20-004-4038-100
21	Pickard, Delores	5668 North Rd	48049	74-15-001-2003-001
22	Klinesteker, David & Gloria	3671 Ferndale Dr	48059	74-11-710-0002-000
23	Sterosky, Leonora	3140 Roosevelt Ave	48059	
24	Waddell, Ed	3140 Roosevelt Ave	48059	74-20-615-0039-000
25	Wile, Cindy	3136 Roosevelt Ave	48059	74-20-615-0038-000
26	Habalewsky, Martin J	2848 Monticello Dr	48060	74-06-531-0021-000
27	Hamilton, Mike	4450 Carrigan Rd	48059	74-20-007-1006-000
28	Richardson, Sandra	4126 Cole Rd	48059	74-20-006-3001-000
29	Galbraith, Bill & Donna	4430 Fairway Dr	48059	74-20-756-0016-500
30	Falk, Mark & Karen	3310 Lomar Dr	48059	74-20-496-0006-000
31	Novosel, Joseph	3894 Spartan Dr	48059	74-20-326-0032-012
32	Champenoy, Jane	3183 Simpson Rd	48059	74-20-028-2039-000
33	Lessie, Connie	3825 Carrigan Rd	48059	74-20-017-1002-000
34	Dysinger, Ross	4091 Cole Rd	48059	74-20-006-3011-000
35	Havens, Regan	3775 Pollina Ave	48059	74-20-029-1015-000
36	Richardson, Travis & Shane	3775 Pollina Ave	48059	74-20-029-1015-000
37	Wessel, Bob	5325 State Rd	48059	74-20-007-2004-000
38	Angerbrandt, Karen	4164 Quaker Hill Dr	48059	74-20-589-0030-000
39	Long, James	5684 State Rd	48059	74-20-005-4010-000
40	Zimmerman, Stanley & Barb	4050 State Rd	48059	74-20-020-4019-000
41	Force, Dale & Sue	3881 Loton Dr	48059	74-20-465-0013-000
42	Force, Dale & Sue	4280 GRATIOT AVE	48059	74-06-574-0005-000
43	Edington, Don & Marie	3802 Spartan Dr	48059	74-20-326-0034-200
44	Martin, Michael & Susan	3066 Carrigan Rd	48059	74-20-009-3022-000
45	Sherwood/Palmateer, Sharon	4214 Keewahdin Rd	48059	74-20-018-3001-000
46	Montgomery, Rob	4065 Lancaster Dr	48059	74-20-991-0072-000
47	Holett, Diane	1292 Miller Rd	48041	74-29-019-1005-000
48	Richardson, Vance & Logan	4126 Cole Rd	48059	74-20-006-3001-000
49	Beebe, John D	3038 Woodland Dr	48059	74-20-297-0044-000
50	Goodman, Sonia	5995 W Montevista	48059	74-20-263-0020-000
51	Miller, Brad	5500 YAGER RD	48074	74-25-034-3003-002
52	Master, Liz	1629 Fox Rd	48027	
53	Tannehill, Sandra	9219 WEBB RD	48027	74-31-004-3001-500
54	Wolce, Margaret	Clyde Twp		
55	Delange, Mike	5093 State Rd	48059	74-20-007-3004-000
56	De Frain, Lori & Ed	4072 State Rd	48059	74-20-020-4023-000
57	Moran, Jodie & Jim	4186 Carrigan Rd	48059	74-20-007-3008-000
58	Heering, Todd	4677 Metcalf Rd		74-15-001-2001-400

59	Burch, Dave	6157 Gibbons Rd	48032	74-21-032-3002-000
60	Cameron, Steven & Cheryl	5514 State Rd	48059	74-20-005-4004-000
61	Bugaiski, Janet & Greg	3917 Burtch Rd	48059	74-11-020-4005-001
62	Slate, Tracy & Gary	9464 Marquette	48027	74-31-028-1008-000
63	Richardson, Austin	4126 Cole Rd	48059	74-20-006-3001-000
64	Modrich, Jason & Julie	5679 State Rd	48059	74-20-006-3005-000
65	Henion, Rachel	3691 Pollina Ave	48059	74-20-029-1017-000
66	Novosel, Teresa	3894 Spartan Drive	48059	74-20-090-0018-000
67	Sharp, Diana	4291 Greenview Cir	48059	74-20-965-0011-000
68	Wade, Jacob	2673 Courtney Dr	48059	74-20-190-0004-000
69	Lessie, Tony	3805 Carrigan Rd	48059	74-20-017-1003-000
70	Peterson, Darlene	4661 Desmond Beach Rd	48059	74-20-220-0031-000
71	Smith, Cynthia	4194 Carrigan Rd	48059	74-20-007-3010-000
72	Heimbach, Janice	4190 Carrigan Rd	48059	74-20-007-3009-000
73	Ahearn, Karen	3837 Spartan Dr	48059	74-20-326-0033-120
74	Owen, Dan	5574 Tice Rd	48059	74-20-004-4014-000
75	Mayes, Michael	4086 Cole Rd	48059	74-20-006-3004-100
76	Sattelberg, Tammy	3927 Spartan Dr	48059	74-20-326-0032-014
77	Massad, Mandy & Fred	3853 Spartan Dr	48059	74-20-326-0033-110
78	Betts, David M	5730 Lakeshore Rd	48059	74-20-004-1029-500
79	Grenier, Steven & Debbie	5931 Lakeshore Rd	48059	74-20-615-0006-000
80	Coqsetti, Dan			
81	Defrain, Trevor	5045 Parker Rd	48059	74-20-008-3010-000
82	Kivel, Melissa	4223 Harris Rd	48059	74-11-018-2001-000
83	Jones, Jay Ann	5280 STATE RD	48059	74-20-008-1004-000
84	Dysinger, Terry	4091 Cole Rd	48059	74-20-006-3011-000
85	Northrop, Don & Debbie	4028 Bonisteel Rd	48059	74-20-150-0032-000
86	Dear, Dave	3705 Brace Rd	48059	74-20-008-2001-000
87	Jett, W	4300 Carrigan Rd	48059	74-20-007-4007-000
88		92 Cole Rd	48059	
89	Morello, Dona	3840 Race Rd	48059	74-20-005-4004-300
90	Middleton, Alexis	36 15th St	48060	74-06-761-0024-000
91	Burgett, Bob	3515 Brace Rd	48059	74-20-008-2003-000
92	Orts, Scott	3850 Parker	48059	74-20-028-1044-100
93	Warshefski, Karl	7085 State Rd	48059	74-11-019-2001-100
94	Stuewer, John	5493 State Rd	48059	74-20-007-2001-000
95	Dreyer, Kathleen	4010 N River Rd	48059	74-20-091-0079-000
96	Matthews, Mark	5057 Jeddo Rd	48032	74-21-011-2003-001
97	Prouty, Ryan & Taylor	4646 North Rd	48049	74-15-013-3006-000
98	Barton, Michelle	5454 Lakeshore Rd	48059	74-20-175-0007-000
99	Polack, Marc	5328 Lakeshore Rd	48059	74-20-175-0038-000
100	Ravasdy, Marilyn S	2132 Military St	48060	74-06-620-0005-100
101	Chojnacki, Dennis & Diane	3872 Brace Rd	48059	74-20-005-4004-100
102	Mason, Dave & Lesli	4926 State Rd	48059	74-20-017-1006-001
103	Tyler, Kyle & Heidi	3651 Myrtle Rd	48059	74-11-515-0038-000
104	Martinek, Randy	5308 Lakeshore Rd	48059	74-20-175-0044-000
105	Feher, Louis & Elissa	4105 State Rd	48059	74-20-019-3008-000
106	Dear, Billy	3705 Brace Rd	48059	74-20-008-2001-000
107	Nowicki, David	6110 Smiths Creek Rd	48074	74-25-028-3016-000
108	Cantanzaro, Jacob	1750 Yeager St	48060	74-28-174-0007-000
109	McNeill, Murry & Bev	5444 Lakeshore Rd	48059	74-20-175-0009-000
110	Erickson, Jonathan	3550 Dykeman Rd	48059	74-20-230-0009-000
111	Wilton, Mike & Judy	5050 Parker Rd	48059	74-20-009-4003-001
112	Neruda, Franz	3549 White Tail Ln	48049	74-15-026-4007-400
113	Dennis, Thomas	3176 Roosevelt Ave	48059	74-20-264-0004-000
114	Thrushman, Amy	5810 Carrigan Rd	48049	74-15-010-1002-000
115	Garcia, Geneva	4320 Keewahdin Rd	48059	74-20-018-4001-000
116	Heering, Andrea	4490 Cole Rd	48059	74-20-006-4006-000
117	Warner, James & Danielle	4476 Cole Rd	48059	74-20-006-4001-000



Portside Solar, LLC  
 Portside Solar  
 22005894  
 October 13, 2023

- Meeting Attendees
- Participating Project Area Boundary (PV Array)
- Participating Project Area Boundary (Underground Collection Only)
- Fort Gratiot Township



**Meeting Attendee Map**  
 Sections 1-2, 11, T7N R16E; Sections 5-8, 17, T7N R17E;  
 Sections 35-36, T8N R16E; Section 31, T8N R17E  
 Burtchville, Clyde, Fort Gratiot, and Grant Townships  
 St. Clair County, Michigan

Imagery Source: 2014 National Geographic Society, i-cubed  
 1:24000 Scale USGS Topographic Quadrangles:  
 RUBY (1961), LAKEPORT (1961)



# Portside Solar Q&A

Toby Valentino – Development Manager – Ranger Power  
10/16/2023

Answering questions we have heard in the community!

## 1. Do townships and counties actually see tax revenue from solar projects?

- a. Yes! See Ranger Power's Assembly Solar tax projections sheet, showing real dollars received by the townships hosting our Assembly Solar project. This document includes real tax revenue with solar, as well as tax projections for the years 2020 – 2022.

## 2. Do solar projects displace wildlife?

- a. Absolutely not
- b. Solar projects create new habitat for wildlife through grasses and pollinators planted. A few examples from our Dressor Plains solar project in Illinois include **sheep grazing, apiaries, and families of foxes** traveling throughout the project. Please see the video and photo package I've shared!
- c. At our Assembly solar project, we have seen deer traveling throughout the site, we have seen an influx of birds and other critters. The fences **do not prevent travel** of wildlife, and they increase available habitat for wildlife to flourish!
- d. Additionally, stormwater runoff and soil erosion are reduced as a result of the vegetation planted throughout the project area.

## 3. Do solar projects result in the loss of agricultural land?

- a. No. Solar projects actually protect against the loss of agricultural land by preserving its use for future generations and ensuring that it will not be developed of another use, such as residential housing, which is the greatest threat contributing to the loss of agricultural land.
- b. According to the USDA's St. Clair County Agricultural Census included in this informational package, there are over 182,000 acres of agricultural land in St. Clair County alone. Since 2012, farmers in St. Clair County have seen a net income loss of 48%. Due to increasing crop market volatility as well as increasingly unpredictable weather, farming today has become extremely difficult. Solar is a way for farmers to stabilize their income, while continuing to farm. It is also a way to ensure agricultural land stays agricultural, and does not turn to subdivisions, or large commercial property. Projects will be decommissioned, per the township's ordinance, and PA116 requirements, as well as Ranger Power's leases with landowners. Leaseholders can choose to continue farming after the solar project life.
- c. According to the Michigan Department of Agriculture and Rural Development, Michigan has 4 million acres of agricultural land. Roughly 750,000 acres are



used in ethanol production in Michigan alone. For a full transition to wind and solar, it's estimated that 250,000 acres are needed in Michigan. [See testimony from Ed Rivet from the Conservative Energy Forum on this topic here.](#)

**4. “Michigan produces low amounts of sunlight, why build solar there?”**

- a. Solar projects have contractual obligations with utility power purchasers in Michigan that require certain capacity output levels for each project. If solar projects were not efficient enough to produce the required output for these contracts, they would not be built. We expect the Portside project to generate enough power for **25,000 homes in Michigan.**

**5. What types of pollinating plant mixes are planted and who oversees the selection?**

- a. Using Michigan State University Extensions’ Pollinator Habitat Planning Scorecard for Solar Sites, we will plant native grasses and plants below the panels. Trees selected for the vegetative buffer will be based off of recommendation and consultation with local landscapers with area expertise in Michigan as we have done at our Assembly Solar project.
- b. See below for the scorecard!

**Michigan Pollinator Habitat Planning Scorecard for Solar Sites**

This form was developed by the MSU Department of Entomology to guide vegetation management at solar installations to make them more supportive for native pollinators. Check the boxes and add up the points to determine whether the plans meet or exceed the minimum requirements. For more local information on pollinators and habitat: [www.pollinators.msu.edu](http://www.pollinators.msu.edu)

**PROJECT DETAILS**

Solar developer: \_\_\_\_\_  
 Vegetation consultant: \_\_\_\_\_  
 Project location: \_\_\_\_\_  
 Project size (acres): \_\_\_\_\_

**SITE SCORES**

- 1. **SITE PLANNING AND MANAGEMENT**
  - Detailed plant establishment and vegetation management plan developed +10 pts
  - Site plan developed with a vegetation management company + 5 pts
  - Signage legible at forty or more feet stating pollinator friendly solar habitat +3 pts
- 2. **HABITAT SITE PREPARATION PRIOR TO IMPLEMENTATION**
  - Measures taken to control weeds during season prior to seeding +10 pts
  - No weed control -20 pts
- 3. **INSECTICIDE RISK**
  - Planned on-site use of insecticide or pre-planting seed/plant treatment (excluding buildings/electrical boxes, etc) -40 pts
  - Communication with local chemical applicators and site registered on <https://msu.dfwatch.org/msa> +20 pts
- 4. **AVAILABLE HABITAT COMPONENTS WITHIN 0.25 MILES (check/add all that apply)**
  - Native bunch grass for bee nesting +1 pt
  - Open sandy soil areas for bee nesting +1 pt
  - Trees/shrubs for bee nesting +1 pt
  - Clean, perennial water sources +1 pt

**FLOWERING PLANT SCORES**

- 5. **FLOWERING PLANT SPECIES SEEDED IN PERIMETER AREA (species with more than 1% cover)**
  - 5-10 species +1 pts
  - 10-15 species +3 pts
  - 16-20 species +8 pts
  - >20 species +10 pts

*Exclude invasive plant species from total*

- 6. **PLANT DIVERSITY UNDER SOLAR ARRAY\***
  - Grass only +2 pts
  - Clover/grass mix +8 pts
  - Low-growing wildflower mix +10 pts

- 7. **PERCENT OF SITE PLANNED TO BE DOMINATED BY WILDFLOWERS\*\***
  - 0 - 25% 0 pts
  - 26 - 50 % +3 pts
  - 51-75 % +8 pts
  - More than 75% +15 pts

*Projects may have different species mixes under the solar array panels and in the perimeter. Flower cover should be averaged across the entire site.*

- 8. **SEEDS USED FOR WILDFLOWER AREAS**
  - Mixes are seeded using at least 40 seeds/square foot +5 pts
  - All wildflower seeds are from a source within 150 miles of the site +5 pts

- 9. **SEASONS WITH AT LEAST THREE BLOOMING FORB SPECIES PRESENT (check all that apply)**
  - Spring (April-May) +5 pts
  - Summer (June-August) +5 pts
  - Fall (September-October) +5 pts

\* For seeding in the panel array, these can be a short-stature wildflower mix or clovers and other non-native species beneficial to pollinators. If clovers are used, these should be seeded in locations separate from the native wildflowers in the perimeter locations.

\*\* Wildflowers in Question 7 refer to forbs which are flowering plants that are not woody, and are not grasses, sedges, etc. Measurements of percent cover should be based on the percent of the ground surface covered by foliage as viewed from above.

Refer to [www.nativeplants.msu.edu](http://www.nativeplants.msu.edu) or a local native wildflower supplier for advice on plants that are attractive to pollinators and will work in various Michigan settings.

For more on pollinator habitat: [www.pollinators.msu.edu](http://www.pollinators.msu.edu)

<b>Total points:</b>	<input style="width: 40px; height: 15px;" type="text"/>
<b>Provides exceptional habitat</b>	<b>90+ points</b>
<b>Meets pollinator standards</b>	<b>76 – 89 points</b>
<b>Does not meet standards</b>	<b>below 75 points</b>





**6. What is the level of sound (in dB) from solar projects?**

- a. See the sound study provided in our application package. We are required to meet the sound requirements of the township's ordinance.
- b. The sound from the project is produced by the cooling fans from the project inverters and can only be heard during the day given that the solar facility operates when the sun is in the sky. This sound is likened to a hum and can only be heard nearby project inverters or substations. Portside Solar is required to meet sound requirements within Clyde Township and Fort Gratiot Township ordinances. We have shared a sound study to confirm our compliance with the ordinance requirements. We have committed to setbacks of at least 350 feet from inverters to residences.

**7. Who monitors the project to make sure it meets regulations? The state, county, town?**

- a. Our projects are monitored to ensure the project continues to meet regulations at all levels of government. Part of our job is to make sure the project follows all standards, ordinances, and regulations, which is a key focus during our developmental process. Following construction, the projects continue to be monitored 24/7. This includes both in-person and remote monitoring of the projects. Our operators can respond to any project components throughout the site very quickly.

**8. Is the demand for power in the area actually increasing?**

- a. With the retirement of many coal power plants across the country and in Michigan, the demand for new power generation is increasing. Solar power presents a unique opportunity for cheap, affordable power that has direct community benefits such as increasing tax revenue. In the Midwest, Michigan ranks in the bottom half of energy production across twelve states and third for energy consumption. More information about Michigan's energy portfolio can be found [here](#). Corporations such as Ford and GM are investing in new renewable energy. From [Ford's sustainability plan](#), "Ford's sustainability goals include becoming carbon neutral globally by 2050, using 100 percent locally-sourced renewable energy for all manufacturing plants globally by 2035." GM plans to "source 100 percent renewable energy to meet GM's global electricity needs. In the meantime, we plan to achieve 60 percent globally by 2025... For us, transforming the communities where the GM family works and lives is a key value" amongst other renewable energy related goals in [their development forecast](#).

**9. Who funds the project?**

- a. Our projects are funded by D.E. Shaw Renewable Investments (DESRI). Making up one of the largest domestic investors in renewable energy, DESRI supports Ranger Power to ensure projects are developed, constructed, and operated with proper funding from initial development through decommissioning at the end of the project's life.



## 10. Why would farmers and communities support solar development?

- a. Tax revenue for community
  - i. Not only do farmers see financial benefits from their participation in solar projects, but many community members will also see benefits through the generation of significant state and local tax revenue. See the Assembly solar tax numbers in the document I provided in this package.
- b. Wildlife benefits
  - i. Solar power generation produces minimal sound, no pollution, and no chemical emissions that are dangerous to wildlife. Solar also emits no harmful byproducts during operation and requires no fuel for operations or transportation. Independent third-party sources confirm the benefit of solar facilities on the environment. Please take a look at the examples from our Dressor Plains project in Illinois.
- c. Cheaper energy prices
  - i. Comparing utility scale solar energy to other renewable energy methods, we found that utility scale solar production is almost \$100/MWh cheaper than rooftop solar. When compared to non-renewable energy sources such as coal, utility scale solar is approximately \$40/MWh cheaper per the Lazard LCOE report.
- d. Farmers who voluntarily participate in leasing their land for solar projects receive annual land use payments that exceed the possible revenue from agricultural production per-acre from almost any crop. The long-term lease payments help supplement farm income, provide a stable source of revenue, and provide a hedge against changing prices for row crops and livestock.

## 11. “What does the housing market report show? Does it look at both the number of days on the market and the market values?”

- a. Researching the effects of solar projects on adjacent neighboring homes, we consulted a third-party contractor to conduct a study on solar projects throughout Michigan and the Midwest to determine the project impacts on property values. This research included variables like the number of days on the market for adjacent properties and their market values. Please see our application package for the Cohn Reznick property values report for all the findings. **Noting market values, the report concludes no significant difference in the market value of properties adjacent to solar facilities compared to property values in the county.** The report also demonstrates no negative effects of days on the market and property value.

## 12. Is large scale solar the cheapest form of energy?

- a. Yes. See Lazard’s unsubsidized analysis shared.

## 13. How close are the technicians to the project? Who is responsible for the security of the project?





- a. Operators and maintenance professionals are located near the project and will monitor the project both on site and remotely 24/7. This allows maintenance teams to respond to any issues immediately, while always monitoring output from the project. The project is monitored 24/7 to ensure the project is safe and secure.
- b. Our solar projects create local jobs by filling positions with community members during the construction process. These jobs will benefit local businesses, hotels, restaurants, shops, etc. Experience that is gained by local construction workers, in turn, benefits the use of local technicians who are familiar with the project and can ensure the project operates to the best of its ability.
- c. The fence around the project will be a 7' tall woven wire agricultural fence that will help maintain the aesthetic of the area. In accordance with the Federal National Electrical Safety Code, the project substation is required to have a seven-foot wooden post woven wire. There will likely be security cameras placed to safeguard some areas of the project.

**14. How much tree clearing?**

- a. We are taking an avoidance approach to developing the Portside project. From a developmental standpoint, we want to minimize our environmental impact while reducing project costs that are reflected in the price of the energy produced by the project. Cutting down trees is costly both to us and the environment. If we do need to clear trees, we would do so in the least impactful manner.

**15. Is there any glare from the panels (e.g., when you drive by)**

- a. The goal of solar panel use is to capture the energy from the sun for electricity. Sunlight can be absorbed and reflected, and solar panels are made to absorb light, so glare is minimal. Solar modules are covered by anti-glare coatings and studies have shown that solar panels reflect little incoming light. Ranger Power has developed projects near airports in compliance with FAA regulations for glare. We have provided a glare study showing absolutely no glare from the project. We are required to meet requirements at the township level regarding glare.

**16. What are the effects on heat? Is there extra heat load off down wind from panels?**

- a. There is no evidence that supports the idea of a "heat island" surrounding solar projects. The PV panels are elevated off the ground, surrounded by ambient air, set apart with spacing between racking, and underlain by vegetation which all act to circulate airflow and ensure no significant difference in heat around solar facilities compared to ambient air temperature. During the day, solar panels that are exposed to the sun generate a very small amount of heat that is not detrimental to human and environmental health and any small amount of heat dissipates during the evenings.

**17. What are the details of the panel manufacturing origin, materials?**



- a. We have not committed to a specific panel manufacturer, but we fully anticipate major project components like panels and steel to be produced in the United States for the Portside Solar project. Recently, heightened demand for solar power has encouraged domestic production of solar power materials in the United States. We have used US made panels and steel at multiple projects that we have constructed.

**18. Why build solar farms rather than smaller-scale installations like parking lots on or on top of buildings.**

- a. As coal-fire power plants are taken offline, energy demand will increase and new methods for electricity generation will be needed. Solar power technology and installation costs have been declining and the cost of power from large-scale solar facilities have been decreasing by 80% over the last decade. At this point, solar power is cheaper and cost-competitive with traditional coal and natural gas power plants.
- b. The cost of generation for large solar projects is much lower than that of rooftop or smaller scale projects due to economies of scale. Investigating energy costs across various methods of production, Lazard's Levelized Cost of Energy Comparison found that utility rooftop solar has a floor cost \$117/MWh compared to the utility-scale solar floor cost of \$24/MWh.

**19. "Are there effects on the soil and worms?"**

- a. By placing solar panels on agricultural land, our developments encourage nutrient absorption through the planting of vegetative cover crops, which benefits soil restoration and a natural return to productive nutrient levels. As for worms, following the construction phase of development, the land that solar panels are placed upon lays fallow and undisturbed which gives worms a chance to play their role in soil restoration, much more so than tilled land that is in a crop rotation. Leaving the land dormant over the course of the project lifespan is proven and effective.

**Resources:**

[Solar for Soil, Water, Pollinators and Farmers](#)

[Henry Hieslmair PhD: How Big is the Solar Panel Waste Stream?](#)

[NREL Researcher: How Long Do Solar Panels Last?](#)

[Solar Panel Recycling - A Growth Industry](#)

[How Does Ethanol Compare to Solar Energy?](#)

[Clean Energy is a Property Rights Issue](#)



[Solar Saves Soil: Experts Explain](https://www.sun101.org)

<https://www.sun101.org>

**From:** [Planning](#)  
**To:** [Anne Hilton](#); [Charles Koob](#); [Courtney Reckker](#); [Kathleen M. Wurminger](#); [Nathan Oprita](#); [Rick Mills](#); [Robert Buechler](#); [Shannon Muir](#)  
**Subject:** FW: 1/2 Supplemental Submittal - More Information on Portside Solar  
**Date:** Monday, October 30, 2023 11:36:00 AM

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**From:** Toby Valentino <toby@rangerpower.com>  
**Sent:** Friday, October 27, 2023 4:08 PM  
**To:** Planning <planning@fortgratiot.us>; Robert Buechler <rbuechler@fortgratiot.us>  
**Subject:** Re: 1/2 Supplemental Submittal - More Information on Portside Solar

Hello,

Following up here, please see below for language from Canadian Solar's 2022 ESG report outlining the heavy metals testing that their modules (solar panels) are subject to. We will be using a Tier 1 module at our Portside Solar project, whether Canadian Solar or another manufacturer that will be subject to similar requirements.

### **Canadian Solar 2022 ESG Report:**

“At the product level, our solar modules and system solutions adhere to the European Union’s REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals) regulation for chemicals (EC) No. 1907/2006 and follow the implementation guidelines issued by the European Chemical Agency (ECHA)... All our photovoltaic module designs undergo Toxicity Characteristic Leaching Procedure (TCLP) testing to monitor the presence of any toxic metal substances (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver) according to TCLP Standard EPA Test Method 1311, as issued by the U.S. Environmental Protection Agency (EPA) under the Toxic Substances Control Act (TSCA) for landfill disposal of modules. We also closely monitor regulations under the EPA’s TSCA, governing the manufacturing and use of chemical substances in the U.S. Our photovoltaic modules adhere to the latest ruling requirements over PBT Chemicals (Persistent, Bioaccumulative, and Toxic) under the TSCA”

Best,  
Toby

On Fri, Oct 27, 2023 at 2:11 PM Toby Valentino <[toby@rangerpower.com](mailto:toby@rangerpower.com)> wrote:

Hello,

At a recent St. Clair County Board meeting we were asked about panel safety and life after their use. I have addressed panel safety already. To follow up on the questions regarding use of the county landfill, we do not expect the need to dispose of panels at the county landfill. I have confirmed that it is not standard practice for us to dispose of panels at landfills. In the rare case there are issues with a panel, the panel is taken off site, and either sent to recycling centers, or back to the manufacturer to be repaired. We expect this to continue to be the case for the Portside project we are proposing.

Best,  
Toby



“Clean Energy in Michigan” Series, Number 12

# Facts about solar panels: PFAS contamination

By Dr. Annick Anctil, Michigan State University

## Q: Do solar panels contribute to PFAS contamination?

Multiple states have raised concerns about PFAS contamination from solar farms, largely citing academic research on how PFAS could *potentially* be used in photovoltaic (PV) solar panels.<sup>1</sup> The fact is that PFAS is *not* customarily used in solar panels because safer, effective alternatives have already been developed and commercialized. Moreover, no studies have shown the presence or leaching of PFAS from PV panels—either while they are in active use or at the end of their life (e.g., in a landfill).

## Anatomy of a solar panel

These three parts of a solar panel cause confusion about the presence of PFAS.

### Self-Cleaning Coat

A self-cleaning coating on the top of a solar panel helps reduce dust, pollen, and snow adhesion, extending both the power output and the lifetime of the panel.<sup>2</sup> Multiple self-cleaning coating options are available on the market, many of which make use of non-hazardous silicon-based chemistry.<sup>3</sup> Confusion comes from the fact that some other commercialized self-cleaning coating options do make use of PFAS-based chemicals, although even those do not degrade under normal use.

### Adhesives

PV panels are sealed from the elements to maximize power output and lifetime. While PFAS chemicals are found in certain adhesives, such as carpentry glues, they are not typically used in sealant adhesives for solar panels.<sup>4</sup> Instead, solar adhesives are based on silicone polymers, which are well known for their lack of negative health impacts and remarkable stability.<sup>5</sup>

### Substrate

PV modules are housed in a weather-resistant substrate that offers additional protection from the elements. Thin-film PV units use glass as the substrate, while crystalline silicon PV units use a polymer substrate, which has led to the rumors of

Solar Panels. Photo by Mariana Proenca on Unsplash.



MICHIGAN DEPARTMENT OF  
ENVIRONMENT, GREAT LAKES, AND ENERGY



GRAHAM  
SUSTAINABILITY INSTITUTE  
UNIVERSITY OF MICHIGAN

## Acknowledgement

This material is based upon work supported by the Department of Energy and the Michigan Energy Office (MEO) under Award Number EE00007478.

The Clean Energy in Michigan series provides case studies and fact sheets answering common questions about clean energy projects in Michigan.

Find this document and more about the project online at [graham.umich.edu/climate-energy/energy-futures](http://graham.umich.edu/climate-energy/energy-futures).

potential PFAS use in solar panels. The most common polymer used in silicon PV units is Tedlar, a weather resistant polymer that is not a PFAS compound itself and makes no use of PFAS during its manufacturing process.<sup>6</sup> Far more common materials, like those used in construction projects and weather resistant fabrics, present a higher risk of PFAS exposure than PV. In fact, a recent study found that these more common materials release PFAS under conditions where solar panels do not, indicating that PFAS exposure risk may be higher sitting on outdoor furniture, for example, than living next to a solar farm.<sup>7</sup>

## What is PFAS anyway?

Per/Poly Fluoro-Alkyl Substances, PFAS for short, are a class of chemical compounds. PFAS are used in several industries for their unique properties, notably their ability to create coatings that are highly water repellent.

PFAS are extremely persistent within the environment, not breaking down over time. Certain PFAS compounds have been linked to human health issues—notably low infant birth weights, increased risk of certain cancers, and thyroid issues. As a result of their persistence and toxicity, those PFAS compounds that pose a significant risk have been banned from use and production, and subsequently replaced with safer alternatives.

It's important to note that not all PFAS compounds are dangerous. Some PFAS compounds, such as Teflon, are much more stable and present no risk to human health under normal conditions of use.<sup>8</sup>

- 
- 1 S. Maharjan *et al.*, "Self-cleaning hydrophobic nanocoating on glass: A scalable manufacturing process," *Mater. Chem. Phys.*, vol. 239, Jan. 2020.; . Son *et al.*, "A practical superhydrophilic self cleaning and antireflective surface for outdoor photovoltaic applications," *Sol. Energy Mater. Sol. Cells*, 2012.; H. C. Han *et al.*, "Enhancing efficiency with fluorinated interlayers in small molecule organic solar cells," *J. Mater. Chem.*, vol. 22, no. 43, 2012.
  - 2 "How a solar cell works – American Chemical Society." [Online]; H. C. Han *et al.*, "Enhancing efficiency with fluorinated interlayers in small molecule organic solar cells," *J. Mater. Chem.*, vol. 22, no. 43, 2012.; M. Simon and E. L. Meyer, "Detection and analysis of hot-spot formation in solar cells," *Solar Energy Materials and Solar Cells*. pp. 106–113, 2010.
  - 3 "Say Goodbye To Solar Panel Cleaning | Ultimate Efficiency | Solar Sharc®." [Online].
  - 4 "Electronics Product Catalog | Dow Inc." [Online]; B. J. Henry *et al.*, "A critical review of the application of polymer of low concern and regulatory criteria to fluoropolymers," *Integrated Environmental Assessment and Management*, vol. 14, no. 3. pp. 316–334, May-2018.
  - 5 "Electronics Product Catalog | Dow Inc."; "Properties of Silicones." [Online]; A. M. Bueche, "The curing of silicone rubber with benzoyl peroxide," *J. Polym. Sci.*, vol. 15, no. 79, pp. 105–120, Jan. 1955.
  - 6 M. H. Alaaeddin, S. M. Sapuan, M. Y. . Zuhri, E. . Zainudin, and F. M. AL-Oqla, "Polyvinyl fluoride (PVF); Its Properties, Applications, and Manufacturing Prospects," *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 538, p. 012010, Jun. 2019.
  - 7 R. M. Janousek, S. Lebertz, and T. P. Knepper, "Previously unidentified sources of perfluoroalkyl and polyfluoroalkyl substances from building materials and industrial fabrics," *Environ. Sci. Process. Impacts*, vol. 21, no. 11, pp. 1936–1945, Nov. 2019.
  - 8 "Per- and Polyfluoroalkyl Substances (PFAS) | US EPA." [Online].; B. J. Henry *et al.*, "A critical review of the application of polymer of low concern and regulatory criteria to fluoropolymers"



# HEARTWOOD SOLAR PROJECT

## HILLSDALE COUNTY, MICHIGAN:

### A SHINING EXAMPLE OF COMMUNITY PARTNERSHIPS

Ranger Power began engaging private landowners in 2020 to develop a solar project in Hillsdale County, Michigan, that would take advantage of existing interconnection availability and also proximity to large load centers such as Hillsdale, Battle Creek, and Jackson. As these relationships and the project evolved, Ranger Power proactively established relationships with local officials, educating them about Heartwood Solar and the many benefits it would bring to Hillsdale County.

Now, after maintaining a steady presence in the community for more than three years, Ranger Power has built robust local relationships and strong community partnerships, in a region that continues to prove challenging for developing renewable energy projects.

## HEARTWOOD SOLAR:

### LOCAL ECONOMIC IMPACT

Heartwood Solar is a proposed 150 MW utility-scale solar project located in Fayette and Allen Townships sited on private land. Representing a \$150 million investment, Heartwood Solar expects to provide immense economic benefits to Hillsdale County over the duration of the project.

The facility is expected to generate approximately \$17 million in tax revenue over the project lifetime, providing critical funding for local schools, libraries, fire and police, roads, and community services. Within the first year of operation, Heartwood Solar is projected to generate millions in tax revenue. During project construction, Heartwood Solar expects to provide 250 construction jobs along with a boost in local economic activity.

## Community voices of support

“The Foundation is honored to assist Heartwood Solar in making an impact in the education at Jonesville Community Schools. This is an amazing example of a business and its individuals giving back to the community it serves.”

~ Sharon Bisher

*President and CEO*

Hillsdale County Community  
Foundation

“We would like to thank Heartwood Solar for their partnership with our teachers. The two grants that were awarded just this year will go towards our new robotics course and a meal prep course for our resource room at the high school. These two programs will give our students hands-on experience that can assist them in the future. We are grateful for Heartwoods' commitment to enriching the education of our students.”

~Erik Weatherwax

*Superintendent*

Jonesville Community Schools





## A Community Focused Approach to Solar Development

As part of a proactive and community focused approach during the project's planning and development phases, Ranger Power worked diligently to establish long-term partnerships with local stakeholders and numerous community organizations.

Through sponsoring annual Pork Suppers with the Jonesville Rotary Club, spring luncheons with the Economic Development Partnership of Hillsdale County, and Rural Education Day with the Hillsdale County Farm Bureau, the Ranger Power team created positive first impressions. These first impressions helped build trust in the community and strong relationships with stakeholders.

The development team established key local partnerships with organizations that were both reflective of and highly respected by the community, including the Hillsdale County Community Foundation, Economic Development Partnership of Hillsdale County, Jonesville Community Schools, along with local food pantries and other civic organizations.

## Strong local partnerships are vital for success.

Heartwood Solar Grant Program works in conjunction with the Hillsdale County Community Foundation, with the shared mission to support and enrich educational programs and other projects that enhance the quality of educational opportunities for students enrolled in the Jonesville Community Schools.

The grant program will support a variety of school programs across all grade levels. The Heartwood Solar grant program will transition to a long-term endowment fund with the Hillsdale County Community Foundation upon the project's commercial operation. The Heartwood Solar Grant Program also provides regular funding for local food pantries to enhance food security.



Jonesville High School faculty members and District Superintendent welcome Spring 2023 educator grant funds from Ranger Power and HCCF.



Jonesville Mission program coordinator and volunteers obtain new summer food pantry funding from HCCF and Ranger Power.

## A few examples of Heartwood Solar Project Community Sponsorships

- Hillsdale County Farm Bureau – Project RED/Rural Education Day and Annual Meeting
- Jonesville Rotary Club – Annual Pork Supper -Platinum Level
- Economic Development Partnership of Hillsdale County- Luncheon
- Economic Development Partnership of Hillsdale County- Student Robotics Training





# Inside Climate News

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INSIDE CLEAN ENERGY ⏵

## A Reality Check About Solar Panel Waste and the Effects on Human Health

The coming surge in photovoltaic panel waste is tiny compared to other categories, and most health concerns about solar equipment are unfounded.



By Dan Gearino October 12, 2023

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The Amazon Fort Powhatan Solar Farm in Disputanta, Virginia on August 19, 2022. Credit: Drew Angerer/Getty Images

Having sat in many community hearings about solar power development, I am used to vivid descriptions of how photovoltaic panels might as well be dripping with harmful substances that will sicken people and livestock.

The concerns are pervasive, but almost completely separate from reality.

For example, one of the recurring issues raised against solar development is the presence of cadmium in photovoltaic panels. But researchers have shown that cadmium is present in only a small share of panels; it makes up 0.1 percent or less of the mass of the panels in which it's present; and the form of cadmium sometimes used in panels is different and safer than the form that leads to health concerns.

Annick Anctil, an engineering professor at Michigan State University, knows this research because she's done a lot of it herself. And she can see that there is a disconnect between what experts know and what the public worries about.

"The fact is, we haven't communicated that information very well to a large audience," she said.

I got in touch with her this week to get her thoughts on a [new opinion essay published in the journal Nature Physics](#) that is a brief debunking of many of the major concerns about the toxicity of solar panels and the growing volume of panel waste.

Anctil says the essay, written by a team that includes people from the National Renewable Energy Laboratory and the Colorado School of Mines, gets the science right and has a clarity that could be a step toward increasing public understanding of health and safety issues related to solar power. (She wasn't a co-author, although she knows several of the co-authors.)

Here are some of the main points:

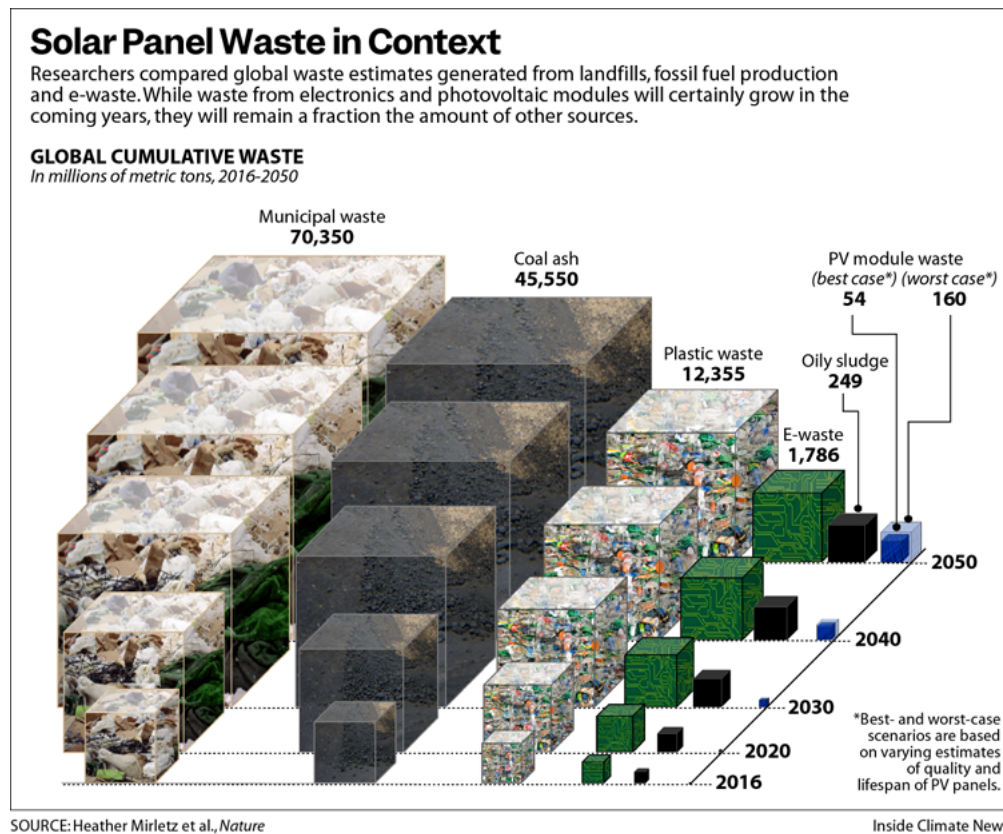
- Concerns about an increase in solar panel waste need to be placed in the context of how the amount of waste compares to other sources. Projections of panel waste are "a drop in the ocean," the authors say, compared to waste categories like plastics, coal ash and municipal solid waste, and are also much less than e-waste like old phones and computers. The vast quantity of waste from all of those sources is a concern and we need to find ways to reduce waste, but solar panels are not a major issue in that larger conversation.

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s that often get discussed  
samples of solar panels for

utility-scale development that contain arsenic, gallium, germanium or hexavalent chromium. A small share of panels contain trace amounts of cadmium, but this is a form of the metal that is stable and not a danger to human health.

- The solar industry is taking a variety of steps to reduce waste and concerns about toxicity by extending the lifespan of panels, finding alternatives for certain materials and [working on efficient ways to recycle panel components](#). The hope is that these efforts will mean that the actual amount of waste will be less than current estimates.



One thing I'll add: Solar developers are responsible for decommissioning projects when they reach the end of their lives, and they often have to post a bond at the time of construction to cover the costs of an eventual teardown and restoration of land. If a company sells a project or goes out of business, regulators have a process for determining who inherits responsibility for decommissioning. Community leaders are often concerned about getting stuck with the costs of decommissioning, but there are straightforward ways to make sure that the people making money from the development are on the hook for those costs.

"We're trying to address some of what to us seem like the biggest concerns that really need things like that," said  
ado School of Mines and

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the National Renewable Energy Laboratory.

The paper is not new research. Instead, it is a compilation of the work of a variety of other researchers, designed to make a case about the safety of solar panels.

If I was a solar developer, I would print thousands of copies of this three-page piece and hand them to everybody at local hearings.

In those hearings, people who oppose projects will often talk about health concerns, reading things they got from internet searches or by sharing talking points from groups that oppose nearly all solar development. There are many examples in [my reporting last year](#) about opposition to solar projects in Ohio, including one instance of [a county health official repeating some of the dubious claims](#).

Some of this is intentionally misleading, but I think it's a mistake to say that most opposition to development is being done with ill intent. Many people are looking for good answers to their questions about health and safety.

Also, I want to make clear that there is a difference between saying that some health concerns about solar are inaccurate and saying that there are zero concerns.

Researchers like Anctil spend their days probing these questions and she is careful to specify that her findings are based on currently available data, and that the body of knowledge on this subject will continue to grow.

One of the big challenges as we enter a period of rapid growth in development is to explain what researchers know in a way that's easy to understand.

Other stories about the energy transition to take note of this week:

**UAW Says General Motors Will Allow Battery Plant Workers to Be Covered by Labor Deal:**

The United Auto Workers strike continues this week, but there are signs of progress. UAW President Shawn Fain has said that General Motors is now willing to allow workers at battery joint ventures to be included in the company's union contract, as [Tom Krisher reports for the Associated Press](#). The union views this as a breakthrough, although it is part of broader negotiations that remain in flux. The UAW is on strike at selected plants operated by GM, Ford and Stellantis, the parent company of Chrysler. One of the union's big concerns is that wages and benefits will decrease as a large share of jobs shift to battery plants that are operated by automakers in partnership with battery companies.

**There's Surprisingly Little Evidence That EVs Will Require Fewer Workers:** It is often repeated that the shift to electric vehicles will mean less of a need for auto workers. [Emily Pontecorvo of Heatmap News has a story](#) in which she asks what evidence exists to support this claim. She finds that there is little research that conclusively says that there will be less of a need for auto workers, and there is some evidence the need for workers will be about the same or even increase. This is a story that couldn't be more timely, considering the UAW strike, and Pontecorvo makes a clear case for how many observers of the industry have been operating under what may be false assumptions.

**Community Solar Is a Growing Option for People Who Can't Do Rooftop Solar:** Signing up for solar power may soon be as easy as signing up for Netflix, as [Michael J. Coren reports for The Washington Post](#). He looks at the growth of community solar, which are subscription-based projects that allow people to benefit from solar without needing to put it on their roof. This option, available in more than 20 states, is popular with people who live in apartments or

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**Batteries:** Green Mountain Power, a Vermont utility, is asking regulators to approve a plan to address problems with grid reliability by providing battery storage systems to the households most prone to power failures. This is an unusual proposal for a utility, but Green Mountain Power has been on the leading edge of encouraging the use of home-based batteries, as [Ivan Penn reports for The New York Times](#).

**Making Solar Energy as Clean as Can Be Means Fitting Square Panels Into the Circular Economy:** We Recycle Solar is one of the companies trying to build a market for reusing and recycling solar panels and their materials. Like many businesses in a nascent industry, The Arizona-based company has advantages as an early mover but disadvantages because there isn't much infrastructure yet for solar recycling, as [my colleagues Emma Peterson and Wyatt Myskow report for ICN](#). This story is a reminder that most of the mass in a solar panel is glass, so despite all the talk of rare materials in the clean energy economy, the main task for a recycler is figuring out what to do with all that glass.

*Inside Clean Energy is ICN's weekly bulletin of news and analysis about the energy transition. Send news tips and questions to [dan.gearino@insideclimatenews.org](mailto:dan.gearino@insideclimatenews.org).*

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**Dan Gearino****Clean Energy Reporter, Midwest, National Environment Reporting Network**

Dan Gearino covers the midwestern United States, part of ICN's National Environment Reporting Network. His coverage deals with the business side of the clean-energy transition and he writes ICN's [Inside Clean Energy](#) newsletter. He came to ICN in 2018 after a nine-year tenure at The Columbus Dispatch, where he covered the business of energy. Before that, he covered politics and business in Iowa and in New Hampshire. He grew up in Warren County, Iowa, just south of Des Moines, and lives in Columbus, Ohio.

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## Making Solar Energy as Clean as Can Be Means Fitting Square Panels Into the Circular Economy

As solar projects surge nationwide, the demand is increasing for recycling solutions that will keep photovoltaic panels out of landfills and their energy-producing elements in the sun.

By Emma Peterson, Wyatt Myskow

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