Village of CALEDONIA

Meeting Date: February 24, 2025

Item No. **6A**

PLAN COMMISSION REPORT

Proposal:	Building, Site, and Operation Plan Review
Description:	Review a building, site, and operation plan to construct and operate a ±32-acre, 6Mw solar generation facility for the solar utility located at 7444 CTH V.
Applicant(s):	Peter Murphy
Address(es):	7444 CTH V
Suggested Motion:	That the Plan Commission recommends to the Village Board that the building, site, and operation plan for the constructions of a ±32-acre solar power generation facility located at 7444 CTH V be approved for the following reason: 1. The proposed use is allowed by underlying zoning through the building, site, and operation plan review process.

Owner(s):	J&L Trading Investments LLC
Tax Key(s):	104-04-22-07-033-000
Lot Size(s):	101.7 acres
Current Zoning District(s):	A-2, Agricultural District
Overlay District(s):	N/A
Wetlands:	☒ Yes ☐ No Floodplain: ☐ Yes ☒ No
Comprehensive Plan:	Medium Density Residential

Background: The applicant is requesting site plan approval for a 32-acre solar utility facility on the 101-acre vacant property located at 7444 CTH V. This type of use is permitted in the A-2 District.

The applicant is proposing to construct and operate a solar generation facility that has the capacity to generate 6MW of energy. The Applicant intends to start construction on the project in the spring of 2026, pending required permits and approvals and availability of key equipment for the project. Construction of the project is expected to take approximately 4-6 months.

The location of this facility is outside the sewer and water service area. This is not an issue as the proposed use does not require either of these services. The proposed use does not generate large volumes of traffic, pollution, or noise. Power generated by the facility will be available to local customers within the

WE Energies services area and will produce enough energy to supply over 1,400 average Wisconsin homes.

As illustrated on the site plan, the applicant is proposing to install a large solar panel array on the property located in the southwestern portion of the property located at 7444 CTH V. The proposed array will comply with setback requirements for the A-2 Zoning District with the street yard setback being greater than 1,300 feet from 6 ½ Mile Road; approximately 240 feet from the east lot line, 100 feet from the west lot line, and approximately 90 feet from the south lot line.

The array consists of multiple solar panels that tilt throughout the day. At their highest degree of angle to the ground, the panels will stand eight feet above grade. During midday, the panels will be oriented horizontally to the ground and have a height of five feet above grade. The height of the solar panels complies with height restrictions for accessory structures in the A-2 District. As part of the facility, there will be transformer pads located within the array. These ground equipment areas comply with setback requirements and will be partially screened by the solar array.

A gravel access road is proposed as part of this development that will be located along the southern portion of the site having direct access to CTH V. The applicant will need to work with the County to get road access from CTH V.

The applicant is proposing an eight-foot security fence and is illustrated in the documentation included in your packet. This design of fencing is permitted in the A-2 District.

No lighting is proposed, however, if any lighting were to be proposed, the applicant will need to receive Village approval prior to installation.

The applicant has provided a vegetation management plan that outlines how the areas in and around the solar panels will be installed, maintained, and monitored. Staff have reviewed the plan and has determined that the plan provides suitable ground cover for the site. Any grading of the site will require approval from the Village Engineering Department and comply with Village Stormwater Management regulations.

The Fire Department has reviewed the proposed site layout and has no concerns as the applicant has provided an emergency access drive on the western edge of the site in line with the driveway access for Amston Trailers. The Fire Department will continue to work with the applicant to ensure suitable emergency access throughout the site.

The applicant has also provided a decommissioning plan for the facility if or when the site would no longer be utilized for a solar power generation facility and will be incorporated as part of the conditions of approval.

If the Plan Commission is comfortable the building, site, and operation plan, staff has drafted suggested motion.

Respectfully submitted:

Peter Wagner

Peter Wagner, AICP
Development Director

VILLAGE OF CALEDONIA

7444 CTH V

0 400 800 1,600 US Feet

N

Peter Murphy
OneEnergy Renewables
10 N Livingston St
Suite 201
Madison, WI 53703

January 31, 2025

Peter Wagner
Village of Caledonia
5043 Chester Lane
Caledonia, Wisconsin 53402

SUBJECT: BUILDING, SITE, AND OPERATION APPLICATION FOR ROOT RIVER SOLAR

DEAR MR. WAGNER,

OneEnergy Development, LLC ("OneEnergy" or "the Applicant") is applying for a Building, Site, and Operation Permit with the Village of Caledonia for the Root River Solar Project (the "Project").

The Project is a proposed 6-Megawatt solar generation facility. OneEnergy will develop, engineer, and construct the Project. The Applicant intends to start construction in the spring of 2026, pending receipt of all required permits and approvals and availability of key equipment. Construction is expected to take approximately 4-6 months. Once complete, the Project will generate local power for local customers within We Energies' service territory. The Project is expected to produce enough electricity to power over 1,400 average Wisconsin homes.

The Project is located on approximately 32 acres of vacant land in the Village of Caledonia on parcel # 104042207033000, west of County Road V and south of 6 ½ Mile Road. The land is part of a larger 101.7-acre parcel owned by J&L Trading-Investments, LLC (Jerry Warntjes). The proposed Project is situated on land that is zoned A-2 Agricultural. The site will have a 16' wide gravel access drive off County Road V and be enclosed by an 8' tall woven-wire deer exclusion-style agricultural fence. The area beneath and around the panels will be planted to a low-growing perennial pollinator mix or pasture mix for sheep grazing.

Please see the attached Plan Commission / Building, Site, and Operation Permit Application form and Application Narrative, which includes the following attachments:
Site Plan, Operations Plan, Construction Schedule, Vegetation Management Plan, Decommissioning Plan, Survey Map, Frequently Asked Questions, and Project Profile.

Respectfully,

PETER MURPHY
ASSOCIATE DIRECTOR, PROJECT DEVELOPMENT
262.573.3089 | C

peter@oneenergyrenewables.com

Building, Site, and Operation Permit Application Addendum

Village of Caledonia, WI

Root River Solar Project

Applicant:
OneEnergy Development, LLC
10 N. Livingston St., Suite 201
Madison, WI 53703

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Exhibits

Exhibit A – Site Plan

Exhibit B – Operations Plan

Exhibit C – Vegetation Management Plan

Exhibit D – Decommissioning Plan

Exhibit E – Survey Map

Exhibit F – Frequently Asked Questions

Exhibit G – Project Profile

Exhibit H – Glare Analysis

Background

The Root River Solar Project (the "Project") is a proposed 6 Megawatt solar generation facility. OneEnergy Development, LLC ("OneEnergy" or "the Applicant") will develop, engineer, and construct the Project.

The Applicant will complete all environmental studies and surveys required to construct the Project, including the following: wetland delineation, Phase I Environmental Site Assessment, soil analysis, Wisconsin State Historical Preservation Office, and endangered resources review. The Project is not expected to impact natural resources.

The Applicant intends to start construction on the Project in the spring of 2026, pending receipt of all required permits and approvals and availability of key equipment for the project. Construction of the project is expected to take approximately 4-6 months. If construction starts in spring of 2026, the Project is expected to be completed by the end of 2026. If construction is delayed due to key equipment availability or other issues until spring of 2027, the project is expected to be constructed and operational by the end of 2027. Once complete, the Project will generate local power for local customers within We Energies' service territory.

Image 1 Strobus Solar Project in Black River Falls, WI

A. General Land Use Description

Location

The Project is located on approximately 32 acres of vacant land in the Village of Caledonia, Racine County known as parcel # 104042207033000, west of County Road V and south of 6 ½ Mile Road. The land is part of a larger 101.7-acre parcel owned by J&L Trading-Investments, LLC (Jerry Warntjes).

Zoning

The proposed Project is situated on land that is zoned A-2 Agricultural.

Setbacks

OneEnergy commits to following all applicable setbacks, as shown in the attached site plan, including those defined by Village of Caledonia Zoning Ordinance SEC. 16-6-2:

Street yard setback of 75 feet

Rear yard setback of 25 feet

Side yard setback of 25 feet

B. Description of Equipment

Racking and Panels

The racking for the proposed project consists of driven steel I-Beams that are embedded approximately 10’ into the ground, and extend approximately 5’ above ground. A torque tube connects to the top of the I-Beams, and the panels are mounted to the top of the torque tube. All components of the racking system are galvanized steel.

Below is a depiction of the horizontal profile view of the panels and racking, which will run in rows from north to south throughout the site and will track the sun from east to west throughout the day. At their maximum angle in morning and evening, the panels are 50 degrees from horizontal facing either east (morning) or west (evening). At mid-day, the panels are flat. At their maximum tilt angle in morning and evening, the tallest part of the panel is ~8’ above ground level.

Figure 1 – Example of Horizontal Profile View panels and racking

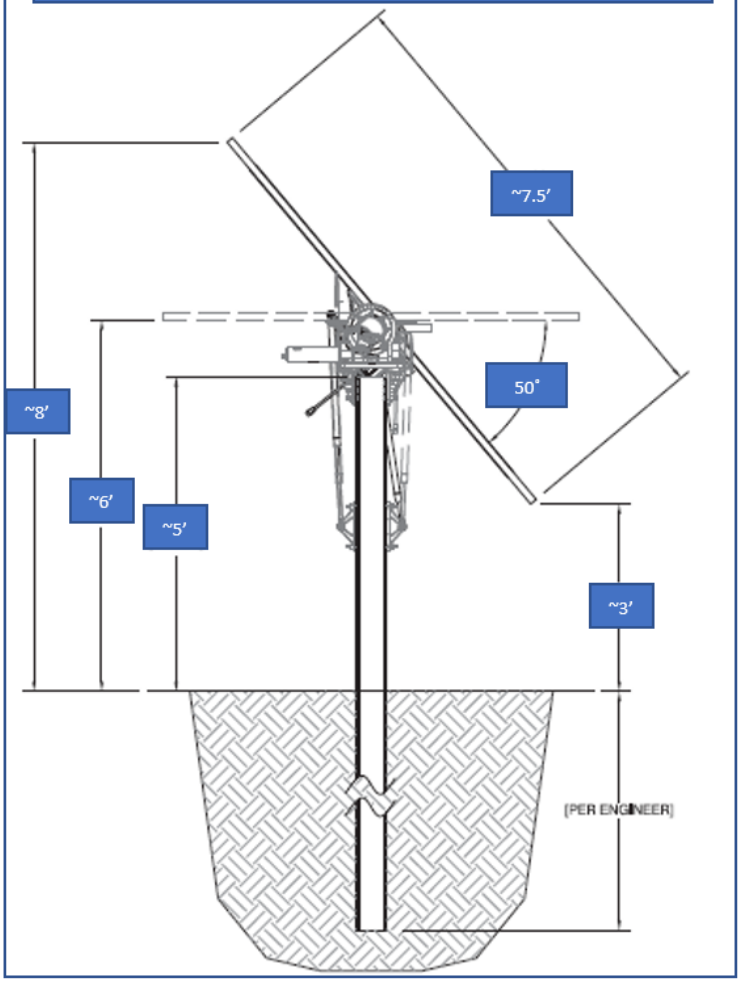


Image 2 - Strobus Solar Project in Merrillan, WI

Image 3 - Stockton Solar Project in Stockton, MN

Solar Panels

Crystalline silicon solar PV panels, which represent ~95% of the installed solar panels in the US, consist primarily of tempered glass, silicon wafers, anodized aluminum, and wiring, all of which can recovered and recycled at the end of their useful life. PV panels are extremely durable and built for long service life, as indicated by their 30-year warranty.

Inverters, Transformer, Electrical Rack

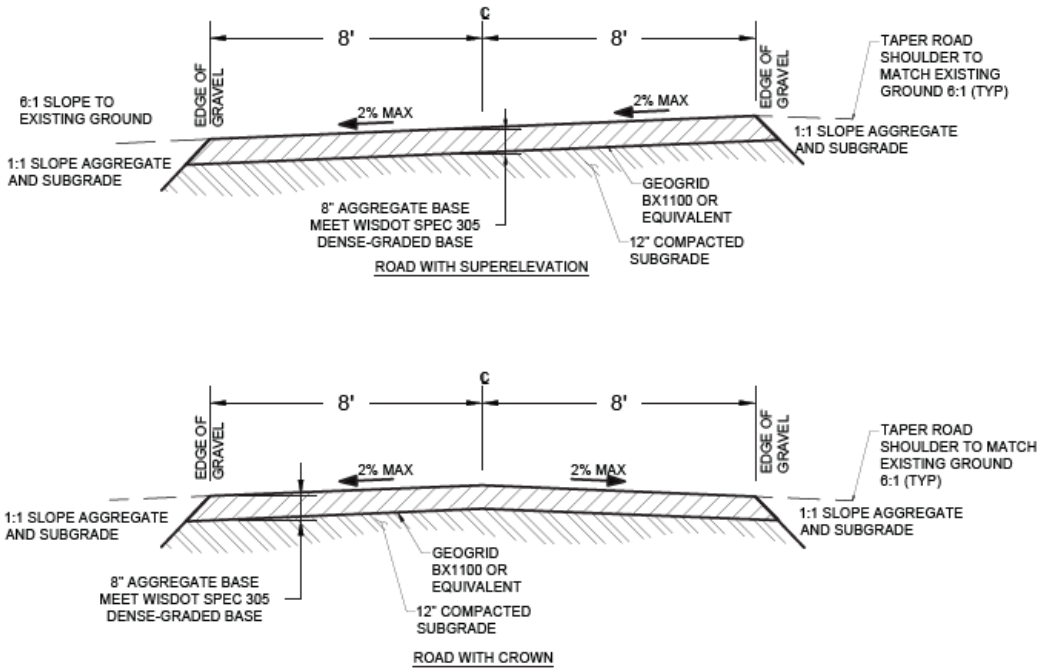
The inverters, electrical panels and transformers will be located in the middle of the project as depicted in the site plan. Most equipment (inverters, electrical panel, etc.) will be mounted on driven pilings similar to the pilings that support the solar panels and racking with a maximum height of 8 feet. The transformers and disconnects will be mounted on a steel skid. These pieces of electrical equipment look similar to what you would see at a large load service like a grocery store.

Image 4 - Hodag Solar Project in Rhinelander, WI

Access Drive

The access drive is proposed to be 16’ wide and will come off of County Road V. The access drive will be installed below depending on the slope. The access drive is installed at-grade to minimize changes to existing drainage patterns. The project is expected to have less than 1 acre of impervious surface area.

Figure 2 – Example of Access Drive Design Detail



Fence

A fence will surround the solar project and will be an 8’ tall agricultural-style fixed knot wildlife exclusion fence similar to what you might see around an orchard. The fence will have either wood or steel posts.

Image 5 – Fence at Rushford Village Solar Project in Rushford Village, MN

Image 6 – Fence at Blue Prairie Solar Project in Black River Falls, WI

C. Scale Map of the Project Site

Please see **Exhibit A - Proposed Site Plan** for dimensions and location of proposed facilities. OneEnergy designs our projects using highly efficient bifacial solar panels and single-axis tracking racking. Using this equipment, a 6 Megawatt solar system can be located on approximately 32 acres of relatively flat topography and, most importantly, consistent elevations in the north-south direction. The proposed project is expected to produce enough electricity for over 1,400 average Wisconsin residences.

D. Landscaping

The Project will be developed in a manner that complements the agricultural setting by using an agricultural-style fence, either a pasture for grazing sheep or a pollinator seed mix to attract bees and birds. Topsoil integrity will be preserved throughout construction by pre-seeding a cover crop prior to construction to minimize erosion and compaction, as well as by minimizing grading within the site. The permanent seeding will take place after construction is complete, and will conform with Wisconsin DNR recommendations for solar projects. The final landscape plan will be developed in partnership with the Wisconsin DNR and in compliance with all applicable stormwater requirements. By planting dense perennial vegetation beneath and around the solar panels, the project provides ecosystem services associated with pollinator benefits, soil building, increased water infiltration and reduced stormwater runoff compared to regularly tilled farmland. Please see **Exhibit C – Vegetation Management Plan**.

E. Wetland and Drainage Facilities

The project is designed to minimize soil disturbance and drainage alterations as much as possible. OneEnergy anticipates limited ground disturbance for the installation of the solar array and will ensure all grading is done in compliance with recommended best practices for stormwater and sediment erosion control. Because the project will occupy more than one acre, OneEnergy will be required to comply with the Wisconsin Department of Natural Resources NPDES Construction General Permit, which has the following requirements:

- Implement Best Management Practices to control sedimentation during construction, i.e. silt fencing, fiber logs, temporary stabilization, etc.
- Submittal of a Water Resource Application for Project Permits (WRAPP)
- Develop a Stormwater Management Plan approved by the Wisconsin DNR prior to commencement of construction

Sedimentation will be controlled from leaving the project area after construction by changing the land use of the project area from cultivated agricultural land to nearly 100% vegetated ground cover. The pollinator meadow growing beneath and around the solar panels acts as a vegetative buffer that covers ~95% of the site. Runoff from the access roads and concrete pads will travel through the vegetative cover prior to leaving the project area. Water that runs off panels into the proposed dense pollinator planting below will act as a natural vegetative buffer which will increase infiltration and act as erosion control to help the site meet required standards.

F. Construction Schedule

OneEnergy's goal is to finalize engineering in the winter of 2025-2026, to enable purchasing of long-lead equipment in early 2026 and construction during the months of May to October, 2026. If construction is

delayed due to key equipment availability or other issues until spring of 2027, the project is expected to be constructed and operational by the end of 2027.

A project of this size typically takes 4-6 months to construct. The Project is intended to start construction in the summer of 2026 and be complete by the end of 2026. A tentative construction schedule is as follows:

Civil Work and Fencing Install	5/1/2026	5/31/2026
Pile Installation	6/1/2026	7/1/2026
Racking and Module Installation	7/1/2026	9/1/2026
Wiring and Transformer Installation	9/1/2026	10/15/2026
Pollinator Seeding and Revegetation	10/15/2026	11/1/2026
Target In-service Date	11/1/2026	

G. Operations & Vehicular Traffic Description

During operation, the Facility will be an unmanned plant that will operate through local and remote control/monitoring. Please see **Exhibit B – Operations Plan**. During construction, we anticipate that there will be between 5 and 30 construction workers on-site for the 6-month period (May-October) during which the bulk of construction will take place. Adequate provision for parking of such construction staff has been included in the design of the laydown area within the site perimeter. Additionally, deliveries will be expected during business hours. It is not expected that more than 3-4 delivery trucks will arrive to the site per day during construction. Following construction, traffic will be very limited. We typically expect approximately one pickup truck to visit the site per month during the operational period for routine site maintenance and mowing.

H. Decommissioning and Removal

OneEnergy has committed through its lease agreement with the landowner to remove the system at the end of the project life, including provisions to ensure that there is adequate financial security set aside to perform such decommissioning. When the Project is decommissioned, all infrastructure will be removed, and the site will be restored to predevelopment conditions for continued agricultural use with rested and restored soils. Please see **Exhibit D – Decommissioning Plan.**

I. About OneEnergy

OneEnergy is the leading developer of distributed utility scale solar in Wisconsin, having developed 55 projects in the Midwest totaling 220 MW, and 39 projects totaling ~170 MW in Wisconsin that are currently operating or under construction.

Our regional team consists of developers, engineers, legal, and construction managers based out of our Madison office. The team completed development, engineering, and, in 2024, managed the construction of 7 projects in Wisconsin, including a series of four 6 Megawatt projects for WE Energies located in Fond du Lac, Jefferson, Racine, and Walworth Counties.

In this work, we have cultivated strong relationships with permitting entities and developed expertise in effective stakeholder communication, ensuring smooth project execution.

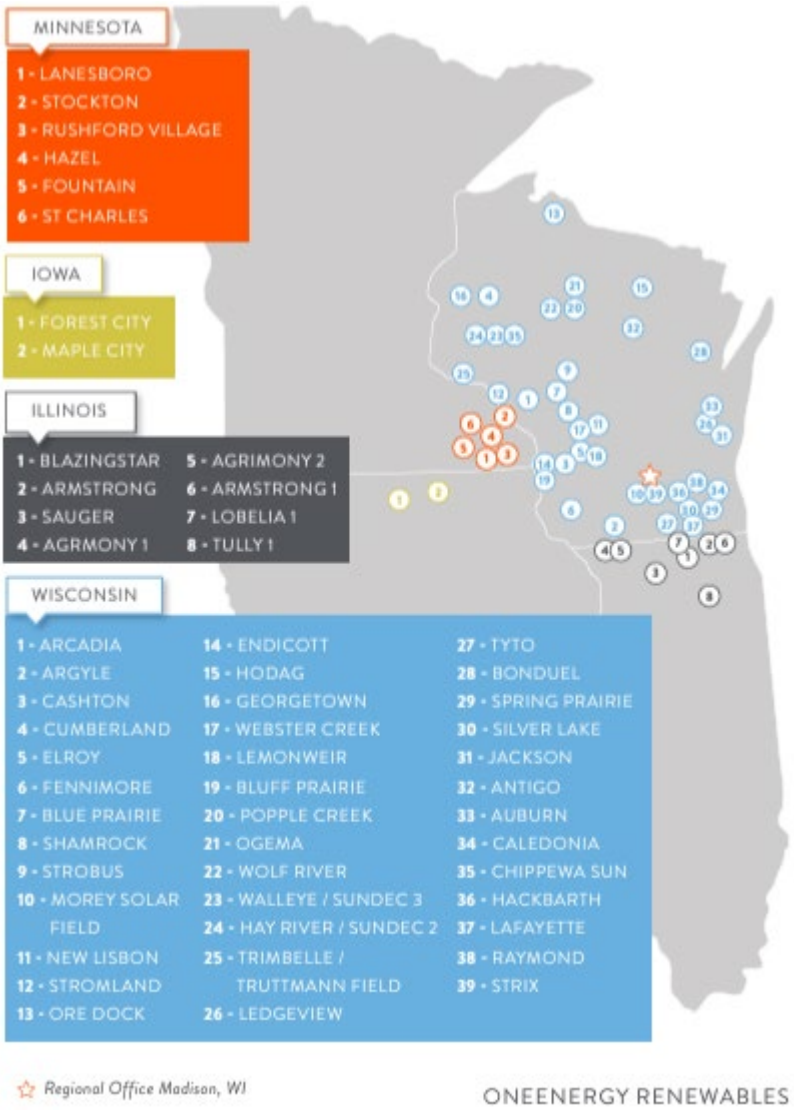


Figure 3 – OneEnergy Midwest Solar Projects

ROOT RIVER SOLAR

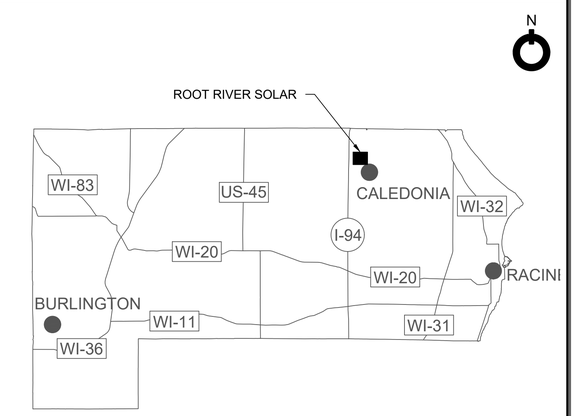
RACINE COUNTY, WISCONSIN

SOLAR PV PROJECT
6.000 MWAC

LEGEND

- PARCEL BOUNDARY
- ZONING SETBACK
- NEIGHBORING PARCEL
- TREE LINE (E)
- PERIMETER FENCE (P)
- GRAVEL ACCESS ROAD
- LAYDOWN AREA
- UGMV — UG MV (P, OER)
- UGMV — UG MV (P, UTIL.)
- OHU — OH ELECTRICAL (E)
- OHU — OH ELECTRICAL (P, UTIL)
- UGG — UG GAS
- UTILITY POLE (P, UTIL.)
- UTILITY POLE (P, OER)

RACINE COUNTY MAP



PROJECT DETAILS

THIS PROJECT CONSISTS OF THE DESIGN AND INSTALLATION OF 6.000 MWAC SOLAR PHOTOVOLTAIC SYSTEM. MODULES ARE TO BE MOUNTED IN A SINGLE AXIS TRACKERS, WHICH FOLLOW THE SUN FROM EAST TO WEST THROUGHOUT THE DAY.

SITE DETAILS:

PARCEL ID	104042207033000
OWNER:	J&L TRADING-INVESTMENTS, LLC
ACREAGE:	101.70
EXISTING ZONE:	A-2 Agricultural

LAND USE SUMMARY:

TOTAL PARCEL AREA (ACRES):	101.70
TOTAL LEASED AREA (ACRES):	-
TOTAL FENCED AREA (ACRES):	30.82
GRAVEL ACCESS ROAD (ACRES):	0.98
LAYDOWN AREA (ACRES):	0.73

DESIGN SUMMARY:

MODULE POWER:	605 W
MODULE COUNT:	TBD
ARRAY DC VOLTAGE:	1500 V
INVERTER SIZE:	250 kW / 250 kVA
INVERTER COUNT:	24
DC SIZE:	TBD MWdc
AC SIZE:	6.000 MWac
DC/AC RATIO:	TBD
GROUND COVERAGE RATIO:	32%
ASCE 7-16 GSL:	30 PSF
ASCE 7-16 WIND SPEED:	100 MPH

ADDITIONAL NOTES:

- BASEMAP DEVELOPED FROM ALTA SURVEY
- PARCEL DATA TAKEN FROM ALTA SURVEY
- NWI & FEMA FLOOD HAZARD ZONE FROM GIS DATA

OneEnergy RENEWABLES
2003 Western Ave, Suite 225
Seattle, WA 98121
oneenergyrenewables.com
206 922 7072

PRELIMINARY

NOT FOR CONSTRUCTION

REVISION LOG

REV	DESCRIPTION	DATE	BY	CK'D	SME
00	5% DEVELOPMENT LAYOUT	01/09/2025	AC	AK	
01	5% DEVELOPMENT LAYOUT - AHJ COMMENTS	01/30/2025	AC	AK	

ROOT RIVER SOLAR
ONEENERGY DEVELOPMENT, LLC.
42.818594°, -87.938952°
RACINE COUNTY, WISCONSIN

SHEET TITLE:
DEVELOPMENT LAYOUT - 2

SHEET NO:
D-100

PUBLISHED ON: 01.30.2025 6:14 PM

Exhibit B – Operations Plan

Root River Solar Project

Applicant:
OneEnergy Development, LLC
10 N. Livingston St. Suite 201
Madison, WI 53703

OneEnergy Renewables

Root River Solar Project

Solar Generating Facility Operations Plan

Type of Activity Proposed: OneEnergy Development, LLC is proposing to build a solar generation project (the "Facility" or "Project") located on approximately 32 acres, consisting of solar modules and associated collection equipment that delivers power to the electric grid. The Facility will have a maximum capacity of 6 MW AC. The on-site equipment at the Facility will consist primarily of solar modules mounted on single-axis tracking racking. These panels generate direct current (DC) electricity. Twenty-four inverters, situated throughout the array area, convert the DC electricity to alternating current (AC) electricity to allow it to be delivered to the existing electric distribution system. Two transformers increase the AC voltage produced by the inverters to the grid voltage of the existing three-phase distribution line to which the Project connects.

The Facility will be an unmanned plant that will operate through local and remote control and monitoring. The PV system will be monitored remotely through the Utility Energy Management System and the integrated Data Acquisition System (DAS), which signals alerts for any irregular operating condition. Scheduled maintenance will occur once annually to inspect all elements of the project to ensure optimal performance. After construction is complete, there will be limited access to the site for periodic inspections (monthly), maintenance and vegetation management.

The Facility will provide solar electricity to serve the needs of local utility customers.

1. **Hours of Operation**: The solar facility will operate during daylight hours. This Facility will not be continuously staffed and will not be open to the public. It is anticipated that once construction is complete, operations and maintenance personnel (one or two people) will access the site once or twice per month for inspection or minor maintenance.
2. **Number of Employees**: There will be no employees stationed at the Facility. As noted in Item No. 1 above, one or two people will visit the site a once or twice each month for inspection and minor maintenance, as needed.
3. **Anticipated Customers**: No customers will be served at the Facility, and there will be no traffic associated with such customers. The renewable electricity generated from the Facility will be used to serve the needs of local utility customers.
4. **Outside Storage**: None proposed.
5. **Outdoor Activities**: Inspection of the solar electric system and periodic maintenance as described above.
6. **Outdoor Lighting**: No permanent outdoor lighting is proposed.
7. **Outside Loudspeakers**: None.
8. **Proposed Signs**: The site will only include necessary safety signage with contact information for the Project Operations team and an entrance sign.
9. **Trash Removal**: There will not be trash generated at this site.

Root River Solar

Vegetation Installation and Management Plan

Date: 1/6/2025
Site Location: 42.818594, -87.938952

ONEENERGY RENEWABLES • 10 N LIVINGSTON ST • STE 201 • MADISON, WI
WWW.ONEENERGYRENEWABLES.COM

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1 Site Overview

Root River Solar is a 6 MWac solar project located in the Village of Caledonia in Racine County, Wisconsin. The approximately 30-acre project site is currently used for agricultural production and was most recently planted in corn. The project area contains hydric soils but no wetlands. The predominant soils on site are moderately well-drained Ozaukee silt loam, poorly-drained Ashkum silty clay loam, and somewhat poorly-drained Blount silt loam. Following construction of the solar array, the site will be planted with native prairie species to provide pollinator habitat.

2 Benefits of Pollinator-Friendly Solar

There are many benefits to installing native prairie plant communities on solar sites. Pollinator friendly solar sequesters carbon into the soil through plants, while carbon emissions are simultaneously reduced by using renewable solar energy. Planting native prairie species restores soil by preventing erosion, improving soil structure, increasing carbon storage, diversifying microbial communities, and increasing soil fertility. In addition to supporting native wildlife, these improvements to the soil will increase the value of the soil for future agricultural production once the solar panels are removed. Agricultural benefits are not limited to future land use. Supporting native pollinator populations can increase yields of nearby pollinator-dependent crops such as soybeans, apples, and many vegetables.

The aesthetic benefits of pollinator habitat provide additional services to the local community for those who appreciate observing the wildflowers, birds, butterflies, and other species that are drawn to the solar site. Native prairie plants prevent stormwater runoff and improve surrounding water quality, which is an important consideration following the construction of solar projects. While the initial costs and amount of planning needed for installing and managing native pollinator habitat may be greater than turfgrass, the benefits outweigh the costs. Following the first five years of management, as the hardier native plant communities become established, reduced management needs are anticipated for the remainder of the time the solar array is in operation.

3 Site Preparation and Temporary Seeding

Construction debris and building materials will be cleared from the seeding area. An herbicide application may be required prior to seeding to remove undesirable vegetation from the site. The type of herbicide used will depend on the target species observed during initial site inspections by environmental specialists. If an herbicide such as glyphosate is used, this would necessitate a 10-day waiting period before disturbing the soil or seeding.

Invasive species observed east of the project area include reed canary grass (*Phalaris arundinacea*) and narrow-leaved cattail (*Typha angustifolia*). Weedy species include barnyard grass (*Echinochloa crus-galli*) and roughfruit amaranth (*Amaranthus tuberculatus*).

The environmental specialist overseeing site preparation activities and selecting herbicide treatments for noxious and invasive species suppression will have comprehensive knowledge and experience selecting and applying herbicides for restricting invasive species and managing vegetation to encourage native plant communities. Additionally, the environmental specialist will have detailed knowledge of Wisconsin flora, excellent vegetation identification skills, and experience in ecological restoration that includes overseeing and conducting native prairie restoration and vegetation assessments.

Winter wheat or oats will be used as a cover crop depending on the time of year and based on the WDNR Technical Standard (1059) and the WisDOT seeding specification (630). A cover crop is also used in disturbed areas throughout construction as part of the Stormwater Pollution Prevention Plan.

4 Permanent Seeding

The soil will be disced and then either harrowed or raked to prepare the soil for seeding. Native grasses will be seeded using a mechanical broadcast spreader at a depth of ¼ to ½-inch. An annual nurse crop of winter wheat or oats will be seeded along with the native grass mix to provide winter stabilization and weed suppression. Following grass seeding, the site will be raked and harrowed. Wildflowers and sedges will be seeded using a mechanical broadcast spreader and covered by raking the site.

The primary seed mix used will be a diverse upland mix of around thirty plant species designed by environmental specialists to suit site-specific soil and microclimate conditions and to provide continuous forage and habitat for pollinators. The seed mix includes flowering species with a wide range of bloom times to cover each season pollinators are active. Species suitable for hydric soils will be included in this seed mix.

Changes to plant species and their proportions in the mix may be necessary depending on seed availability at the time of planting. The diversity of species and quality of the mix will be maintained.

5 Vegetation Management and Monitoring

Vegetation will be managed to achieve the following objectives:

1. Establish native vegetation cover as prescribed in the selected pollinator seed mixes.
2. Maintain complete vegetation cover while limiting noxious and invasive species.

3. Encourage the growth of flowering species to provide continuous forage and habitat for pollinators.

During the germination year, the site will be mowed to reduce competition and control weed growth. Additional mowing may be required to prevent annual and biennial weeds from setting seed. During the establishment period, which spans about 2 to 5 years after seeding, mowing should occur 2-3 times per year, subject to the recommendations of the environmental specialist. Vegetation will be mowed to a height of 8". Following the establishment period, the site will be mowed as needed invasive and noxious weed species control and to intermittently remove biomass. A suggested timeline for vegetation management is provided in Section 7.

The following objectives will be achieved through vegetation monitoring:

1. Document the presence of desirable native species.
2. Document the presence of noxious and invasive weed species.
3. Provide recommendations for appropriate corrective actions to promote the planned vegetative cover and limit noxious and invasive species.

Specific management activities and timelines will depend on observations during seasonal site inspections. Following a fall seeding, these inspections would begin in late April to mid-June. Following a spring seeding, inspections should begin by mid-May.

Vegetation Management Reports (VMRs) will be completed during each site visit to record the amount of vegetation cover and the presence of noxious and invasive species and native species. Recommended next steps will be noted, and management plans will remain flexible to reflect changes in noxious and invasive weed pressure.

6 Invasive and Weed Species Management

In addition to the removal of invasive species, plant species will be suppressed if they are likely to either outcompete the native species planted or grow to a height that may shade the solar panels. Noting noxious and invasive species through well-timed site inspections and proactively controlling these species during the establishment phase is critical for the long-term success of native vegetation establishment. Control of noxious and invasive species may include spot-spraying with herbicide, spot-mowing, hand weeding, wicking, or other methods selected by the environmental specialist and depending on the target weed species and time of year.

If necessary, the following herbicides may be used for spot-treatment: glyphosate, triclopyr, clopyralid, or aminopyralid. Glyphosate is a non-selective systemic herbicide used to treat broadleaf weeds, grasses, and woody plants, and triclopyr is a selective systemic herbicide used to control woody and herbaceous broadleaf species. Clopyralid and aminopyralid are selective herbicides used to target broadleaf weeds, especially clover and thistle. Herbicide contact with

native species will be limited and herbicides will not be used when wind speeds exceed 10 mph to prevent drift.

Other herbicides may be utilized based on the target species observed and identified for management. Environmental specialists will identify actual herbicide prescriptions based on observations during site inspections. The site will be inspected at least twice a year: once from late April to mid-May, and again in mid-June. Site inspections may be needed at other times, depending on the life cycle of the species targeted for removal. Spot-mowing and removal of invasive species and other weeds will be completed as needed. If biomass removal is needed, the site can be mowed every three years using a flail mower. After the initial 5-year establishment period, the site should not be mowed more than once per year.

7 Vegetation Management Timeline

Year 0		
Seedbed Preparation	Herbicide application, soil bed preparation.	Sep-Oct
Seeding	Site will be seeded with native prairie mix and a nurse crop of winter wheat.	Oct-Nov
Years 1-3		
1st Site Inspection	Document locations of native and weed/invasive species and recommended management activities. Site inspection may take place at the same time as management visit.	Apr-May
1st Mow	Site mowed to 8" vegetation height. Spot-treat weed/invasive species as needed. Timing of mowing is dependent on plant phenology and weed/invasive species pressure documented during site inspection.	Jun
2nd Site Inspection	Document locations of native and weed/invasive species and recommended management activities.	Late Jun-early Jul
2nd Mow	Site mowed to 8" height. Spot-treatment of weed/invasive species as needed. Timing of mowing is dependent on observations during site assessments.	July-Aug
3rd Site Inspection	Document locations of native and weed/invasive species and recommended management activities.	Late Aug
3rd Mow	Complete site mow to 8" and spot-treatment of weed/invasive species as needed. Timing of mowing is dependent on observations during site assessments.	Sept
Year 4		
1st Site Inspection	Document locations of native and weed/invasive species and recommended management activities.	Apr-May

Dormant Mow	Mulch biomass by mowing in the spring to reduce competition and encourage native plant growth.	Apr-Jun
2nd Site Inspection	Document locations of native and weed/invasive species and recommended management activities.	Jun-Jul
Spot treatment of invasives/weeds	Herbicide treatment types will depend on the target species observed during site inspections.	Variable
Years 5-25		
Site Inspections	Two annual visits to monitor vegetation in the spring and early summer. Spot-mowing or weed/invasive species removal will be completed as needed based on site inspections. If biomass removal is needed, sites can be mowed every three years using a flail mower. Site should not be mowed more than once per year, and mowing should occur from Mar-Apr 15th or Sept-Oct to avoid disturbing nesting birds. Rotating halves or thirds of the site while mowing will increase plant diversity and structure and provide adjacent refuge for wildlife.	Late April to early May & mid-June

8 References

Siegner, K., Wentzell, S., Urrutia, M., Mann, W., & Kennan, H. (2019) Maximizing land use benefits from utility scale solar: A cost benefit analysis of pollinator-friendly solar in Minnesota. *Yale Center for Business and the Environment*. https://cbey.yale.edu/research/maximizing-land-use-benefits-from-utility-scale-solar.

Walston, L. et al. (2018) Examining the potential for agricultural benefits from pollinator habitat at solar facilities in the United States. *Environmental Science & Technology 52* (13), 7566-7576. https://doi.org/10.1021/acs.est.8b00020.

Walston, L. et al. (2020) Modeling the ecosystem services of native vegetation management practices at solar energy facilities in Midwestern United States. *Ecosystem Services* (47), 101227. https://doi.org/10.1016/j.ecoser.2020.101227.

Appendix A: Native Prairie Seed Mix

Scientific Name	Common Name	% of Mix	Seeds/ft^2
Grasses			
Sideoats Grama	Bouteloua curtipendula	31.53%	9.38
Slender Wheatgrass	Elymus trachycaulus	9.18%	3.14
Plains Oval Sedge	Carex brevior	2.59%	3.72
Wood Gray Sedge	Carex grisea	0.86%	0.38
Troublesome Sedge	Carex molesta	1.18%	1.46
Brown Fox Sedge	Carex vulpinoidea	1.80%	8.93
Silky Wild Rye	Elymus villosus	0.00%	0.00
Virginia Wild Rye (sub)	Elymus virginicus	1.65%	0.34
Little Bluestem	Schizachyrium scoparium	25.10%	18.67
Prairie Dropseed	Sporobolus heterolepis	0.39%	0.31
Forbs			
Common Yarrow	Achillea millefolium	0.63%	5.57
Nodding Onion	Allium cernuum	0.24%	0.09
Lead Plant	Amorpha canescens	1.33%	1.06
Canada Anemone	Anemone canadensis	0.04%	0.02
Wild Columbine	Aquilegia canadensis	0.04%	0.08
Whorled Milkweed	Asclepias verticillata	0.05%	0.03
Common Milkweed	Asclepias syriaca	0.31%	0.06
Butterfly Milkweed	Asclepias tuberosa	0.31%	0.07
Partridge Pea	Chamaecrista fasciculata	4.55%	0.61
White Prairie Clover	Dalea candida	4.98%	4.69
Purple Prairie Clover	Dalea purpurea	5.88%	5.25
Cream Gentian	Gentiana flavida	0.16%	1.11
Virginia Mountain Mint	Pycnanthemum virginianum	0.16%	1.75
Prairie Wild Rose	Rosa arkansana	0.31%	0.04
Black-eyed Susan	Rudbeckia hirta	1.88%	8.58
Gray Goldenrod	Solidago nemoralis	0.27%	4.02
Ohio Goldenrod	Solidago ohiensis	0.20%	1.09
Calico Aster	Symphyotrichum lateriflorum	0.04%	0.50
Sky Blue Aster	Symphyotrichum oolentangiense	0.16%	0.63
Ohio Spiderwort	Tradescantia ohiensis	0.24%	0.10
Hoary Vervain	Verbena stricta	1.41%	1.96
Golden Alexanders	Zizia aurea	2.53%	1.38

Seeding Rate: 13.5 lbs/acre (85 seeds/square foot)

Appendix B: Preliminary Site Plan

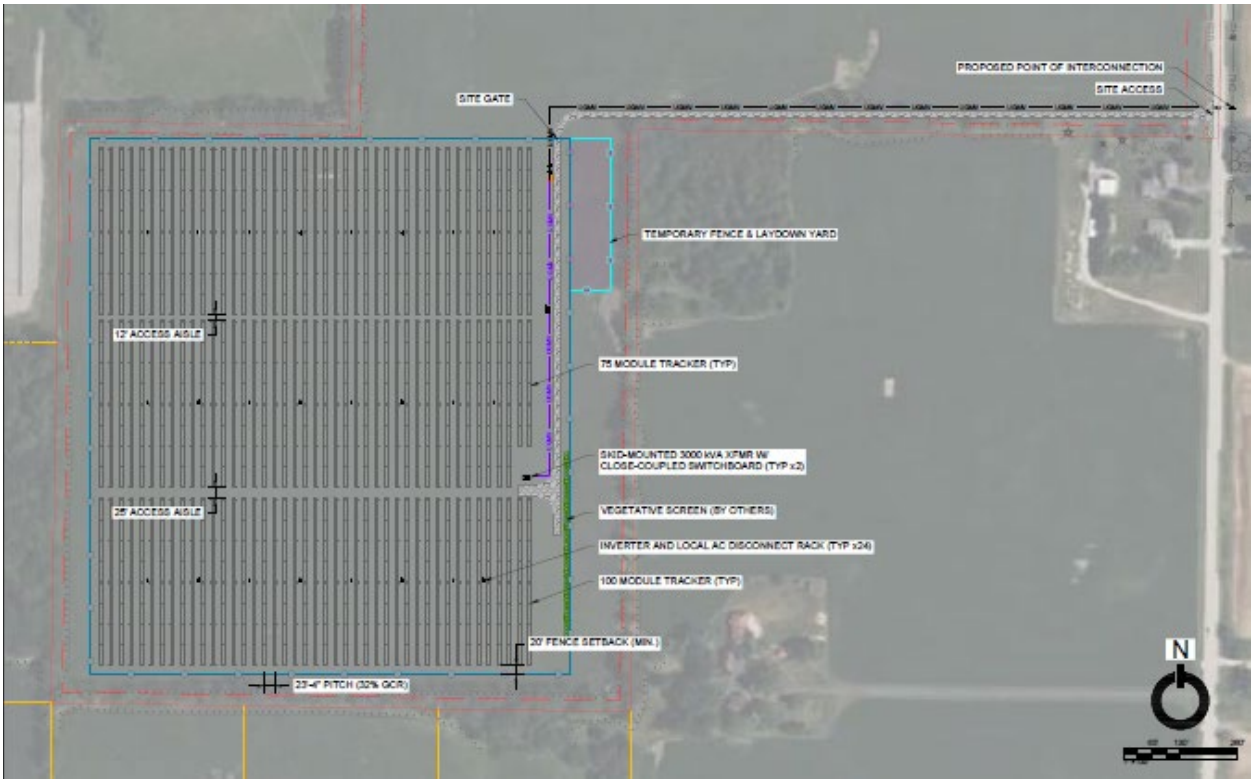


Exhibit D – Decommissioning Plan

Root River Solar Project

Applicant:
OneEnergy Development, LLC
10 N. Livingston St. Suite 201
Madison, WI 53703

OneEnergy Renewables
Root River Solar Project
Solar Generating Facility Decommissioning Plan

1. Introduction

The Decommissioning Plan provides an overview of activities that will occur during the decommissioning phase of the Root River Solar Project, the "Project," including activities related to the restoration of land and management of materials and waste.

The Project has an estimated useful lifetime of 40 years. This Decommissioning Plan assumes at the point it is no longer economical or prudent to continue operating, the Project will be dismantled, and the site restored to a state similar to its pre-construction condition.

Within 180 days of the project being placed in service, project owner shall provide financial assurance in the form of a letter of credit, performance bond, or other means acceptable to municipality in the amount of the Decommissioning Costs, unless the owner is a public utility regulated by the Public Service Commission of Wisconsin (PSCW).

Decommissioning activities include but are not limited to, disconnecting the Solar Facility from the electrical grid and removal of all components, including:

- Photovoltaic (PV) modules, panel racking, and supports
- Inverter units, transformers, and other electrical equipment
- Wiring cables, communications, and perimeter fence

The Decommissioning Plan is based on current best management practices and procedures. This Plan may be subject to revision based on new standards and best management practices at the time of decommissioning. Permits will be obtained as required and notification will be given to stakeholders prior to decommissioning.

Project Information

Address: To be assigned
County: Racine, Wisconsin
Village: Caledonia
Project Size: 6 MWac

2. Decommissioning Process

At the time of decommissioning, the installed components will be removed, reused, disposed, and recycled where possible. The site will be restored to a state similar to its pre-construction condition. All removal of equipment will be done in accordance with any applicable regulations and manufacturer recommendations. All applicable permits will be acquired before decommissioning activities begin.

Equipment Dismantling and Removal

Generally, the decommissioning of a Solar Project proceeds in the reverse order of the installation.

1. The Project will be disconnected from the utility power grid.
2. PV modules will be disconnected, collected, and disposed at an approved solar module recycler or reused/resold on the market. Although the PV modules will not be cutting edge technology at the time of decommissioning, they are expected to produce approximately 80% of the original electricity output at year 40 and offer value for many years.
3. All aboveground and underground electrical interconnection and distribution cables will be removed and disposed off-site at an approved facility.
4. Galvanized steel PV module support and racking system support posts will be removed and disposed off-site at an approved facility.
5. Electrical and electronic devices, including transformers and inverters will be removed and disposed off-site at an approved facility.
6. Concrete pads will be removed and disposed off-site at an approved facility.
7. Fencing will be removed and disposed off-site at an approved facility.

Environmental Effects

Decommissioning activities, particularly the removal of project components, could result in environmental effects similar to construction such as ground disturbance (erosion/sedimentation). Mitigation measures employed during the construction phase of the Project will be implemented. These will remain in place to mitigate erosion and silt/sediment runoff and prevent any impact to the natural features located adjacent to the site.

Road traffic will temporarily increase due to the movement of decommissioning crews and equipment. Work will be undertaken during daylight hours to conform to any applicable restrictions.

Site Restoration

Upon completion of the decommissioning phase, the site will be restored to a state similar to its pre-construction condition. Rehabilitated lands may be seeded with native seed mixes to help stabilize soil conditions, enhance soil structure, and increase soil fertility.

Managing Materials and Waste

During the decommissioning phase, a variety of excess materials and wastes (listed in the table below) will be generated. Most of the materials used in a Solar Project are reusable or recyclable and some equipment may have manufacturer take-back and recycling requirements. Any remaining materials will be removed and disposed of off site at an appropriate facility. Policies and procedures will be established to maximize recycling and reuse and project owners will work with manufacturers, local subcontractors, and waste firms to segregate material to be disposed of, recycled, or reused.

Solar module manufacturers are looking for ways to recycle and/or reuse solar modules when they have reached the end of their lifespan. OneEnergy works with The Retrofit Companies, Inc. (TRC) in Minnesota to recycle panels that are damaged during shipping or installation and intends to partner with TRC or another similar panel recycler to recycle any panels that require disposal in the future. Modules will be disposed in the best way possible using best management practices at the time of decommissioning.

Material / Waste	Means of Managing Excess Materials and Waste
PV Panels	If there is no possibility for reuse, the panels will either be returned to the manufacturer for appropriate disposal or will be transported to a recycling facility where the glass, metal, and semiconductor materials will be separated and recycled.
Mounting racks and supports	These steel and other metal materials will be disposed off-site at an approved facility
Transformer	The small amount of oil from the transformer will be removed on-site to reduce the potential for spills and will be transported to an approved facility for disposal. The transformers will be sent back to the manufacturer, recycled, reused, or safely disposed off-site in accordance with current standards of the day.
Inverters	The metal components of the inverters will be disposed of or recycled, where possible. Remaining components will be disposed of in accordance with the standards of the day.

Concrete Pad	Concrete pads will be broken down and transported by a certified and licensed contractor to a recycling or approved disposal facility.
Cables and Wiring	All electrical wiring will be disconnected and disposed of at an approved facility, associated electronic equipment (isolation switches, fuses, metering) will either be returned to the manufacturer for recycling or disposed off-site in accordance with current standards and best practices.
Fencing	Fencing will be removed and recycled at a metal recycling facility.
Debris	Any remaining debris on the site will be separated into recyclables/residual wastes and will be transported from the site and managed as appropriate.

Decommissioning Notification

Decommissioning activities will require the notification of stakeholders given the nature of the works at the site. Twelve months prior to the start of decommissioning activities the list of stakeholders will be updated and notified. Federal, county, and local authorities will be notified as needed to discuss the potential approvals required to engage in decommissioning activities.

Approvals

Well-planned and well-managed renewable energy facilities are not expected to pose environmental risks at the time of decommissioning. Decommissioning of the Project will follow all standards of the day. Any required permits will be obtained prior to the start of any decommissioning activities.

This Decommissioning Report will be updated as necessary in the future to ensure that changes in technology and site restoration methods are taken into consideration.

ALTA/NSPS LAND TITLE SURVEY

The East ½ of the Northwest ¼ of the Southeast ¼; the Southwest ¼ of the Southeast ¼ and the Northeast ¼ of the Southeast ¼ of Section 7, Township 4 North, Range 22 East. EXCEPTING THEREFROM lands conveyed by Warranty Deed recorded on April 4, 2016, as Document No. 2431615 and corrected by an Affidavit of Correction recorded on August 24, 2016, as Document No. 2443140, described as follows: Part of the Northeast ¼ of the Southeast ¼ of Section 7, Township 4 North, Range 22 East, bounded and described as follows: Commencing at the Northeast corner of said Southeast ¼; thence South 00°37'16" East, on and along the East line of said Southeast ¼, 24.75 feet; thence South 89°19'18" West, 33.00 feet to the point of beginning; thence South 00°37'16" East, on and along the West right of way line of CTH V, 20.00 feet; thence North 45°40'22" West, 28.28 feet to the South right of way line of 6 ½ Mile Road; thence North 89°19'38" East, on and along said South right of way line, 20.02 feet to the point of beginning. Said land being in the Village of Caledonia, County of Racine, State of Wisconsin.

Property Address: 7444 County Hwy V, Caledonia, WI 53108
Tax Key Number: 104-04-22-07-033-000

Prepared for: Root River Solar, LLC
Survey No. 169559-RMK

A. Basis of Bearings
Bearings are based on the North line of the Southeast 1/4 of Section 7-4-22, which bears South 89°13'42" East. Wisconsin County Coordinate System, Racine County.

B. Title Commitment
This survey was prepared based on Knight Barry Title, Inc. and underwritten by Stewart Title Guaranty Company title commitment file number 2296073, commitment date September 4, 2024 , which lists the following easements and/or restrictions from schedule B-II:

1, 6-8, 10. Visible evidence shown, if any.

2-5, 9, 12. Not survey related.

11. Public or private rights, if any, in such portion of the Land as may be presently used, laid out, or dedicated in any manner whatsoever, for street, highway and/or alley purposes. Lies within or crosses the surveyed property - its location is shown.

C. Flood Note
According to flood insurance rate map of the Village of Caledonia, community panel number 55101C0079D & 55101C0083D, effective dates of 5/2/2012, this site falls in zone X (areas determined to be outside the 0.2% annual chance floodplain).

D. Elevations
Elevations refer to NAVD88 Datum. Starting benchmark - HARN Station DF9497 elevation 680.13

F. Municipal Zoning
The zoning information listed is taken from the Village of Caledonia website- site is zoned A-2 Agricultural

Street setback - 75'
Side yard setback - 25'
Rear yard setback - 25'
Maximum height - 35'

G. Notes
As to table A item 11
Surveyor's responsibility to coordinate markings shall be limited to one marking request to 811 (national "call before you dig" number) based on the property address, as provided by the client.
Note to the client, insurer, and lender - With regard to Table A, item 11, information from the sources checked within will be combined with observed evidence of utilities pursuant to Section 5.E.iv. to develop a view of the underground utilities. However, lacking excavation, the exact location of underground features cannot be accurately, completely, and reliably depicted. In addition, in some jurisdictions, 811 or other similar utility locate requests from surveyors may be ignored or result in an incomplete response.
As of the field date indicated below in certificate (most recent site visit/inspection), it appears some underground utilities were not marked. This affected the surveyor's assessment of the location of the utilities resulting in partial illustration and/or mapping per plan. Where additional or more detailed information is required, the client is advised that excavation may be necessary.

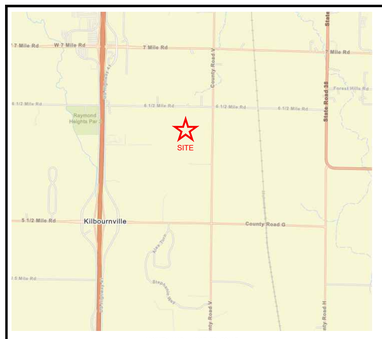
There is no visible evidence of recent earth moving work, building construction or building additions observed in the process of conducting the fieldwork.

There are no proposed changes in street right of way lines, if such information is made available to the surveyor by the controlling jurisdiction or observed in the process of conducting the fieldwork.

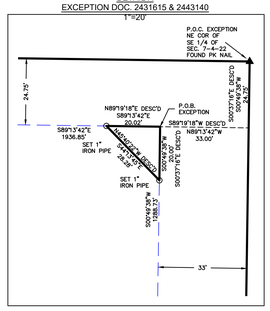
There is no visible evidence of recent street or sidewalk construction or repairs observed in the process of conducting the fieldwork.

There are no plottable offsite easements.

The property hereon is the same property described in that certain Title Commitment issued by Knight Barry Title, Inc., title commitment file number 2296073, commitment date September 4, 2024.



VICINITY MAP – NOT TO SCALE



GRAPHIC SCALE
50 0 50 100 200
(IN FEET)

LEGEND

- BOLLARD
- SOIL BORING/MONITORING WELL
- FLAGPOLE
- MAILBOX
- SIGN
- AIR CONDITIONER
- CONTROL BOX
- TRAFFIC SIGNAL
- CABLE PEDESTAL
- POWER POLE
- GUY POLE
- GUY WIRE
- LIGHT POLE
- SPOT/YARD/PEDESTAL LIGHT
- HANDICAPPED PARKING
- PULL BOX
- ELECTRIC MANHOLE
- ELECTRIC PEDESTAL
- ELECTRIC METER
- ELECTRIC TRANSFORMER
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL
- UTILITY VAULT
- GAS VALVE
- GAS METER
- GAS WARNING SIGN
- STORM MANHOLE
- ROUND INLET
- SQUARE INLET
- STORM SEWER END SECTION
- SANITARY MANHOLE
- SANITARY CLEANOUT OR SEPTIC VENT
- SANITARY INTERCEPTOR MANHOLE
- MISCELLANEOUS MANHOLE
- IRRIGATION CONTROL BOX
- WATER VALVE
- HYDRANT
- WATER SERVICE CURB STOP
- WATER MANHOLE
- WELL
- WATER SURFACE
- WETLANDS FLAG
- MARSH
- CONIFEROUS TREE
- DECIDUOUS TREE
- SHRUB
- –EDGE OF TREES
- S –SANITARY SEWER
- STO–STORM SEWER
- W –WATERMAIN
- G –MARKED GAS MAIN
- E –MARKED ELECTRIC
- OHW–OVERHEAD WIRES
- B –BUREAU ELEC. SERV.
- T –MARKED TELEPHONE
- TV–MARKED CABLE TV LINE
- FO–MARKED FIBER OPTIC
- (P) — UTILITY PER PLAN
- 780 — INDICATES EXISTING CONTOUR ELEVATION
- × 780.55 INDICATES EXISTING SPOT ELEVATION

DIGGERS HOTLINE TICKET NO. 20244514980

THE UNDERGROUND UTILITY INFORMATION AS SHOWN HEREON IS BASED, IN PART, UPON INFORMATION FURNISHED BY UTILITY COMPANIES AND THE LOCAL MUNICIPALITY. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, ITS ACCURACY AND COMPLETENESS CANNOT BE GUARANTEED NOR CERTIFIED TO.

(P) INDICATES PIPE SIZES PER RECORD PLANS. OTHER PIPE SIZES ARE ESTIMATED. NO PIPE SIZES SHOULD BE RELIED UPON WITHOUT FURTHER VERIFICATION.

To: Root River Solar, LLC
Knight Barry Title, Inc.
Stewart Title Guaranty Company

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS and includes items 1, 2, 3, 4, 5, 6(a), 6(b), 7(a), 7(b)(2), 8, 11(a), 11(b), 13, 14, 16, 17, 18, 19 and 20 of Table A thereof. The fieldwork was completed on November 19, 2024.

Date of Plat or Map: November 25, 2024

I CERTIFY, that this survey was prepared under my supervision and is correct to the best of my professional knowledge and belief and complies with Chapter A-E 7 of the Wisconsin Administrative Code.

Michael J. Ratzburg
Professional Land Surveyor
Registration Number S-2236
michael.ratzburg@rasmith.com

WISCONSIN MICHAEL J. RATZBURG S-2236 WAUKESHA W. LAND SURVEYOR

raSmith
CREATIVITY BEYOND ENGINEERING
16745 W. Bluemound Road
Brookfield, WI 53005-5938
(262) 781-1000
rasmith.com

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Frequently Asked Questions

Project Details

What kind of solar project is this and who it will serve?

The project is described as a ground-mounted solar electric generating facility. Solar panels that convert sunlight into electricity are mounted on racking and secured to steel I-beams that have been driven into the ground. The rows of racking and panels are connected by a series of wires that lead to inverters. Inverters change the electricity produced by the solar panels from direct current to alternating current so it can be supplied to the utility grid. Transformers, like the ones used for schools, grocery stores, and other large buildings, convert the electricity produced to match the voltage of the electric distribution system nearby.

The project will tie into the existing distribution system and serve local customers of We Energies. Electricity generated by the project will flow to the existing 3-phase electrical lines located along the road. This project is considered a "distributed generation" project because it generates electricity close to where it is consumed and stays on the local distribution system. This is different from coal and natural gas plants, or large-scale solar facilities, where power is generated in one place and transmitted to consumers over longer distances. The project will not cause any changes to the price or quantity of electricity on your household utility bill.

When is the planned or anticipated start date?

Pending availability of key equipment and lead times, the project is expected to begin construction in the spring or summer of 2026. The project is expected to take 4-6 months to construct.

What is the life expectancy of the project?

The warranties on solar panels are 30 years and the panels are expected to work efficiently beyond that, thus projects are designed to last 30-50 years. These projects are considered a temporary land use as the components of the solar electric facility will be removed at the end of the project's useful life. The land surrounding, between, and under the panels will be planted with a deep-rooted perennial pollinator mixture or a grazing pasture mix. Once the project lifespan is complete and the facility is removed, the rested land can return to its original agricultural use.

Please explain why this property is proposed for installation.

We looked for a property owner who is interested in hosting a solar project on land that is close to adequate electrical infrastructure. The property is located close to a substation with adequate transformer size/load and adjacent to a 3-phase distribution line so the solar electric facility can interconnect to the grid. In addition, the land is relatively flat, has favorable characteristics for a solar project, and avoids environmental constraints (outside of wetlands, floodplains, contains appropriate soil type and subsurface conditions, etc.).

Solar Panels

How long do Solar Panels last?

The solar panels we use are warrantied for 30 years. OneEnergy expects panels to have additional useful life at the end of their 30-year warranty, so we design the project to a 50-year lifespan. Our lease has a 30-year initial term with an option to extend for two additional periods of 10 years.

What are the components of the solar panels? What are they made of?

The solar panels are comprised of non-toxic materials. The silicon in solar panels is made from purified silica, which comes from sand. Silica sand is heated and formed into ingots which are then sliced into thin wafers. These solar cells convert sunlight into electricity and are wired together with copper. The solar cells are sandwiched between two layers of tempered glass and enclosed in an anodized aluminum frame. The glass, aluminum, solar cells, and copper wiring, which comprise about 99% of a solar panel by volume, are all recyclable.

What is the procedure if one breaks?

Solar panels themselves are made of non-toxic materials (aluminum frame, tempered glass, copper wiring and silica sand). In product testing, the panels are broken into pieces and ground up to test for any harmful environmental effects. Even under these extreme testing conditions, the solar panels present no harm to children, adults, pets and/or farm animals. Since they are made of tempered glass, the panel surface may fracture but will remain enclosed within the frame. Our remote monitoring system detects faults at the site such as broken panels. We are notified immediately if a panel is not functioning as designed so we can promptly remove and recycle the damaged panel and replace it with a new one.

Are these panels subject to storm damage and what is the risk of damage to other properties if debris is carried onto a residence?

OneEnergy reviews historical weather conditions for each project location and ensures all project materials are rated to withstand maximum wind speeds and snow loads for the area. All solar panels are designed and tested to withstand extreme weather. For example, after Hurricane Sandy, a large solar installer in New Jersey reported just two loosened panels in a large installation out of the tens of thousands they had installed throughout the region. Our projects throughout the Midwest have

withstood Derechos and tornados and have never had panels or other equipment displaced from its racking. That said, OneEnergy carries commercial insurance that covers any damage to other properties that may occur in a worst-case scenario.

How and with what are panels cleaned if needed? Are chemicals used?
OneEnergy does not anticipate the need for cleaning panels during operations. Cleaning is sometimes required in desert environments that are very dusty and experience very little rain. It rains frequently enough in Wisconsin that we have never had (nor do we expect) to ever clean our panels.

Who is responsible for removal and disposal of solar panels?
Our lease agreement obligates the company to remove all the solar facility's components within one year from when the project is no longer producing power.

How are solar panels disposed of and where?
Given the lifespan of solar panels, our projects are all still operating (OneEnergy has not yet decommissioned one of its solar projects). However, OneEnergy Development is a member of the Solar Energy Industry Association (SEIA), a national organization active in developing effective end of life processes for solar panels. The U.S. and Europe already have collection and recycling programs in place and these programs are expected to grow as the solar industry does. Recently, OneEnergy has worked with The Retrofit Companies, Inc. in Minnesota to recycle panels that were damaged during shipping or installation and intends to partner with TRC or another similar panel recycler to recycle any panels that may need to be disposed of in the future.

Safety of Solar Projects

Will there be glare?
Modern solar panels are designed to absorb (rather than reflect) sunlight and are not considered to produce glare. Further, the panels we use are treated with a non-toxic, anti-reflective coating. When reviewing proposed solar projects on airports, the Federal Aviation Administration concluded that solar panels are much less reflective than a lake or snow-covered ground. OneEnergy has successfully permitted and constructed a solar project on airport property immediately adjacent to the runways of the Middleton Municipal Airport in Wisconsin, and there are numerous other large-scale solar projects adjacent to airports in Madison, Indianapolis, Denver, and elsewhere.

Water run-off issues: Where will the water flow to? What direction and how will it impact the environment/fields and wildlife in area? Has the water flow been assessed by the DNR?
This project is designed with tracking technology, meaning each row of panels track the sun as it tilts from east to west throughout the day. The "drip edge" of the panels, or the edge closest to the ground, changes position as the trackers move. This spreads the panel runoff over a wider area than would be the case if the panels were fixed and drained to a single point, like on a roof. As part of the stormwater permit we submit and obtain through the Wisconsin DNR, we conduct a hydrology study that shows how water flows before and after the project is installed. The hydrology study results show that because the project area will be planted with deep-rooted perennial vegetation, water infiltration increases after installation of the project relative to the pre-construction condition of conventional row-crop farming. This is mainly attributed to the absence of tillage and soil disturbance associated with seeding and harvesting cultivated crops.

Do solar projects cause stray voltage? How is this prevented? How is this monitored by OneEnergy?
Solar projects of the scale OneEnergy is proposing are considered electrical facilities subject to state electrical licensing and inspection in Wisconsin. Our electrical engineering designs must be approved by the Wisconsin Department of Safety and Professional Services. The state sends an electrical inspector to verify the system is being installed per the approved plans during construction and shortly before completion of construction. The facility cannot be energized until this inspection is completed. This inspection ensures that the system is installed and grounded correctly per National Electrical Code, and that the utility interconnection is designed with the appropriate fault detection such that the system de-energizes within 2 seconds if a grid fault is detected.

A letter[1] written by Douglas A. Mutcher, a Professional Electrical Engineer from Westwood Professional Services familiar with solar project design and operation, regarding stray voltage and solar projects, written in support of an application to the Public Service Commission for a 100+MW solar project, concludes that “any concerns associating solar PV plants with increased risk of stray voltage are baseless.”

OneEnergy is not aware of any credible reports of solar projects in Wisconsin experiencing issues relating to stray voltage. Stray voltage is much more likely to occur from many other buildings installed in rural areas such as pole barns, storage warehouses, etc. which have unbalanced single phase loads and are not subject to rigorous design or inspection criteria.

Are there fire risks for solar projects?
The risk of fire at a solar project is no greater than that at the transmission and distribution lines that we all live and work nearby every day. Although very rare, fires at solar projects do sometimes happen, and they typically self-extinguish at the component level. The best preventative measures for fire are workmanship and wire maintenance. Once constructed, further fire prevention and mitigation strategies are in place to ensure no large fire outbreak will occur. This includes regular testing with standardized quality assurance measures to replace any damaged, malfunctioning, or prematurely aged components.

[1] “Appendix C-12 - Stray Voltage Opinion” Public Service Commission of Wisconsin, Wisconsin Power & Light Company, Docket No. 6680-CE-182 and Docket No. 6680-AE-120 https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=390344

The US Department of Energy translated and re-published an extensive report [2]and guidance from the German government about the risks of fire and solar, concluding that "the fire emergence risk in PV systems is very low given planning in accordance with fire protection, use of high-quality components and proper installation." Furthermore, the authors "rule out any hazard to the environment from gaseous pollutants related to burning PV modules."

What are the effects on wildlife?

We design our projects with wildlife and land stewardship in mind. Studies are conducted prior to a project's construction to ensure no critical habitats exist within a solar project's footprint. In addition, we use a deer exclusion type fencing that allows movement of smaller animals through the project. If the project is to be grazed, we work to ensure the fencing is designed to keep out predators but to allow other wildlife movement through the project area. In addition, the project's vegetation of pollinator meadow or grazing mix are beneficial to wildlife in the area as it provides more suitable habitat than the previous land use of conventional row-cropping.

What are other potential problems, issues and/or negative impacts that could occur with the installation of solar panels?

OneEnergy Renewables hires reputable and experienced contractors to install solar panels who adhere to OSHA regulations. Once installed, solar panels operate quietly and do not present harm to people, animals, the environment, or property values. As the solar industry grows, the industry is working hard to address any potential concerns related to the end of life of panels. OneEnergy is a member of SEIA (Solar Energy Industries Association). SEIA and its members are active in developing end-of-life recycling programs. There are currently several operating recycling facilities throughout the country, including facilities in Arizona, California, Colorado, Georgia, Illinois, Indiana, Massachusetts, Minnesota, New Jersey, New Mexico, New York, North Carolina, Ohio, Texas, Utah, Virginia, and Washington.

Neighboring Properties

Will the project be a nuisance to neighbors or adjacent property owners?

We do not expect the project to be a nuisance to any neighbors. Solar projects do not produce sound that is audible at the perimeter of the project. OneEnergy designs its fencing, vegetation, and other elements of the project to integrate into the agricultural landscapes in which they are located. After

[2]TÜV Rheinland Energie und Umwelt GmbH. (2018). Assessing Fire Risks in Photovoltaic Systems and Developing Safety Concepts for Risk Minimization. U.S. Department of Energy Solar Energy Technologies Office, Washington, DC. Retrieved from https://www.energy.gov/sites/default/files/2018/10/f56/PV%20Fire%20Safety%20Fire%20Guideline_Translation_V04%2020180614_FINAL.pdf

construction is complete, the project would only require a visit once or twice a month for vegetation maintenance and other incidental maintenance.

If there is a mortgage on a property where panels are proposed to be installed is the mortgage company informed and adjacent properties owner and their bank/mortgage holders informed as well?
We obtain an SNDA (subordination, non-disturbance and attornment agreement) if there is a mortgage on the property where the solar project is built. This acknowledges the mortgage company and OneEnergy Renewables' relative position in the Title report. No adjacent properties' mortgage holders are informed of the project by OneEnergy Renewables.

What effect does a solar project have on the valuation of property and surrounding properties?
In December of 2024, an analysis[3] of 70 utility-scale solar projects built in the Midwest from 2009-2022 using data from the Lawrence Berkeley National Laboratory and housing value data from Zillow shows that utility-scale solar projects increase nearby property values by roughly 0.5-2.0%. Projects smaller than 20MW have a more positive impact on nearby property values than projects larger than 20MW.

The most robust study[4] of the effects of solar on property values, which came out in early 2023, shows that the effect of solar on property values is very small and varies by state (and has a positive effect on property values about 1/3 of the time).

Potential drivers of negative effects on property values are scarce green space, limited vegetative screening, and high level of public controversy surrounding a project. It is our goal to site and construct projects in such a way as to minimize any effect on property values. We site projects in rural areas with an abundance of green space and we are willing to discuss targeted vegetative screening of our sites with neighbors.

[3] Simeng Hao, Gilbert Michaud, Assessing property value impacts near utility-scale solar in the Midwestern United States, Solar Compass, Volume 12, 2024, 100090, ISSN 2772-9400, https://doi.org/10.1016/j.solcom.2024.100090.
[4] Salma Elmallah, Ben Hoen, K. Sydny Fujita, Dana Robson, Eric Brunner, Shedding light on large-scale solar impacts: An analysis of property values and proximity to photovoltaics across six U.S. states, Energy Policy, Volume 175, 2023, 113425, ISSN 0301-4215, https://doi.org/10.1016/j.enpol.2023.113425.

Land Use

Why are these solar panels not put on existing structures (i.e. roofs) in cities and closer to the electric power plant?

Roof-mounted projects produce approximately 40% less energy per panel than ground-mounted facilities using single-axis tracking and bifacial panels.

The cost of installing roof-mounted systems is generally about 55% more expensive per panel.

These two elements combined generally make it difficult for utility-scale projects (like what we are proposing here) to be cost-effective when sited on rooftops. Ground-mounted single-axis tracking systems are able to produce electricity at cost-effective rates that benefit utility customers.

How much land is needed for solar projects? Is solar an effective use of land?

5-7 acres of land typically can accommodate 1MW of solar power generating capacity. Farmers and landowners in Wisconsin are already major energy producers with 37% of the state's corn crop going to ethanol production[5]. Generating electricity with solar is an extremely efficient use of land:

- Net energy production of solar PV is 100x greater than corn-based ethanol[6].
- Corn-based ethanol requires 32x the amount of land to power the same number of vehicle miles as solar PV[6].
    - Put another way, one acre farmed with corn would produce enough energy to run a single car for a year. One acre of solar will produce enough energy to run more than twelve F150s for a year.

To achieve a net-zero carbon emission economy in Wisconsin by 2050, solar could be sited on less than 1.4% of our farmland[7].

Permits

Has the State of Wisconsin been contacted and permits obtained if needed?

The only permit needed from the State of Wisconsin for a solar project of this scale is coverage under the "Construction Site Storm Water Runoff General Permit" Storm Water Associated with Land Disturbing Construction Activity permit through the DNR (Permit Number WI-S067831-6). The Wisconsin DNR requires that our projects have received zoning approval when we apply for a stormwater permit. They do this to avoid people submitting speculative permits for projects that may not happen or may have major design changes. Thus, OneEnergy typically applies for this permit once all engineering is complete and shortly before commencement of construction.

Can copies of the permits obtained from PSCW/DNR be provided?

This project does not require a permit from the Public Service Commission of Wisconsin (PSCW). The PSCW is involved when projects are over 100MW.

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[5] Wisconsin Corn Growers Association. (n.d.). Corn Facts. Retrieved January 8, 2025, from https://wicorn.org/resources/corn-facts/

[6] Corn Ethanol vs. Solar: A Land Use Comparison. Paul Mathewson and Nicholas Bosch. Clean Wisconsin. January 19, 2023. https://www.cleanwisconsin.org/wp-content/uploads/2023/01/Corn-Ethanol-Vs.-Solar-Analysis-V3-9-compressed.pdf

[7] Stumpf, Nolan. Solar and Agricultural Land Use Report. Renew Wisconsin, May 2023. https://www.renewwisconsin.org/wp-content/uploads/2023/05/Solar-and-Agricultural-Land-Use-Report-1.pdf

As described above, a Construction Site Storm Water Runoff General Permit is obtained from the Wisconsin DNR, and often Wisconsin Counties and Townships will require that we submit a copy of this permit to them once it is obtained/prior to construction as a condition to the zoning approval.

Taxes

Does a parcel where a solar field is installed become exempt from property taxes?
If the project is owned by an independent power producer, the equipment is exempt from personal property taxes like all energy generation equipment for all types of energy generators under 50 Megawatts. The land, however, typically is re-assessed for tax purposes (even though for zoning purposes it remains Agricultural) to commercial, and is taxed at a correspondingly higher rate which varies by jurisdiction but is usually 10-15x higher per acre.

If the project is owned by a utility, the project would contribute Public Utility Aid Payments through the Gross Receipts tax based on project size. At 6 Megawatts, this project would result in a total yearly payment of $24,000 that would be split between the municipality and the County. Utilities pay a Gross Receipts tax in lieu of property tax payments to the Wisconsin Department of Revenue, who then distributes to local jurisdictions.

Is OneEnergy subject to pay tax on revenue gained from their solar panels? To state and/or Federal government?
Yes, OneEnergy is subject to typical corporate income taxes both at the state and federal level for revenues gained from selling the electricity to the local utility. We forecast paying ~$1.4MM in federal income tax and ~$270,000 in state income tax over the life of the project.

Zoning

When solar projects are located in agricultural areas, is the land required to be rezoned to commercial?
OneEnergy's projects in Wisconsin can remain in Agricultural Zoning, and if solar arrays are not permitted by right, a temporary conditional use permit can be issued. Solar projects are a temporary use of the land, and our lease agreements obligate us to remove all equipment at the end of the project life and return the land to a farmable state. In addition, our projects are designed to combine solar electric generation with a vegetation maintenance plan for either a deep-rooted pollinator (a similar mix as found in Conservation Reserve Program (CRP)) or a pasture forage mix. We would use the pasture mix if we can find a local farmer with sheep willing to graze the site. If not, we would use the pollinator mix, and we often are able to find a beekeeper locally to host an apiary on site. This dual use of the land continues an agriculture environment throughout the lifespan of the project.

What is the proposed setback and height of the solar panels?
At their highest point, the solar panels are around 8 feet above ground level. Solar panels will be set back a minimum of 20 feet from the perimeter fence, which will be a deer-exclusion style agricultural fence. At a minimum, OneEnergy commits to following all applicable Setbacks.

OneEnergy Renewables

Is OneEnergy considered a Utility Company?
OneEnergy Renewables is not a utility company. OneEnergy is a solar development company that builds, constructs, and maintains solar projects and either sells the project to a utility as a power generating asset or sells the power generated to utilities through long term power purchase agreements.

In the event OneEnergy would go bankrupt or out of business. What would be the process?
Each project OneEnergy Renewables constructs has project-specific lending established. These projects have a large upfront capital investment. If OneEnergy were to go out of business, in the short term the lender would take over the lease payments and the project management. The lender is highly incentivized to keep the project producing energy so it can generate revenues, keep operating the project and paying down the loan. For the long term, the lender would likely seek out another solar company to continue operating the project, paying lease payments, and continuing to maintain the project consistent with local codes and permits.

Township Benefits

What is the benefit to the Township to have a solar panel field installed on any property aside from OneEnergy selling the product produced to an electric company for profit for OneEnergy?
The proposed project will tie into We Energies' distribution system. Thus, the power produced will go directly to the customers of We Energies. By producing power locally, We Energies saves money because they avoid paying transmission fees for power generated or fuel mined elsewhere. In addition, local power generation helps to build resilience into the electric distribution system by limiting risk of outages and allowing faster restoration of service.

What is the benefit/gain to the residents of the Township and individual property owner(s) if they contract with OneEnergy?
The property owner we are leasing from has decided that the lease payments we offer are preferable to alternative uses of the property.

The project will benefit We Energies customers by stabilizing their cost of electricity. The project will contribute to a more resilient electrical grid, generating more power closer to the point of use that doesn't need to be imported from generating stations far away.

The project represents a significant investment in the community. OneEnergy works primarily with

Wisconsin-based contractors to construct solar projects, and these contractors spend money in the area at hotels and restaurants while the project is being constructed.

The main contractors we have used to build our projects are Wisconsin-based Pieper Power, Westphal, and Arch Electric, and these projects have allowed them to hire dozens of new solar installers. These are family-supporting, prevailing wage jobs.

Solar projects produce electricity (which we all use) with a resource that we have (the sun) employing people who live here in Wisconsin to build and maintain the systems. This reduces the amount of money we send out of state to buy coal and gas that Wisconsin doesn't produce. Scott Coenen from the Conservative Energy Forum notes in the letter he sent to Oneida County in support of our Hodag Solar project built in 2021, Wisconsin spends $15 billion dollars importing oil, natural gas, and coal and creating hundreds of thousands of jobs elsewhere.

ROOT RIVER SOLAR
Project Overview

OneEnergy Renewables is in the process of developing a 6 MW solar project in the Village of Caledonia in Racine County, WI. The project is located west of County Road V and south of 6 ½ Mile Road (Please see site plan on reverse). OneEnergy Renewables will develop, design, and construct the solar project, and electricity from the project will serve local We Energies customers.

The project will occupy approximately 32 acres, and has an expected useful life of 30-50 years, providing clean, local renewable energy for years to come. At the height of construction, roughly 30 people will be employed on this project. *Solar installer* is one of the fastest growing jobs in the USA.

SYSTEM STATISTICS

6 Megawatts
~32 acres
~12,000,000 kWh per year

MAIN SYSTEM COMPONENTS

- Single-axis tracker (tracks the sun from east to west throughout the day)
- Bifacial solar panels
- Inverters
- Transformers

12,000,000 kWh of electricity per year, equivalent to…

1,400
AVERAGE WISCONSIN HOUSEHOLDS

9,241
TONS OF CO_2 AVOIDED, LIKE TAKING 1,600+ CARS OFF THE ROAD*

9,700
ACRES OF U.S. FOREST CARBON SEQUESTRATION*

*Source: EPA Greenhouse Gas Equivalencies Calculator

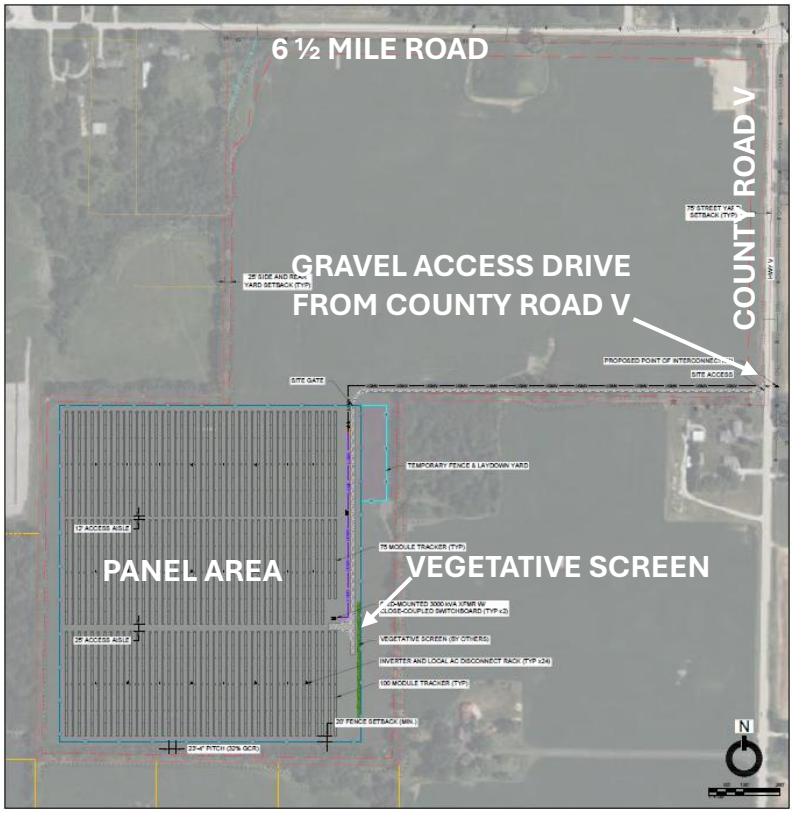
Sustainable Design and Construction

The area beneath and around the panels will be planted to a low-growing perennial pollinator mix. This increases water infiltration relative to conventional row-cropping. Water that flows off solar panels is safe for people and wildlife.

The project area will be fenced within an 8’ tall deer-exclusion style fence, similar to what one might find around an orchard. The area surrounding the project will continue to be farmed.

When the project is decommissioned, all infrastructure will be removed, and the site restored to pre-development conditions for continued agricultural use with rested and restored soils.

PROPOSED ROOT RIVER SOLAR PROJECT SITE PLAN



Contact

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Madison, WI 53703

FORGESOLAR GLARE ANALYSIS

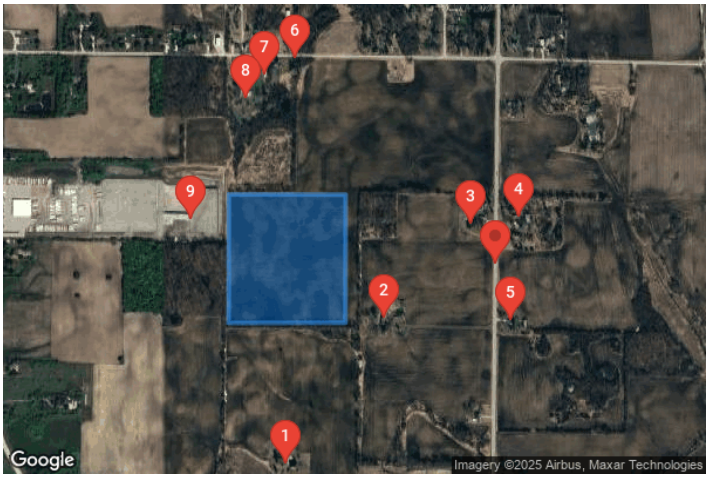
Project: **Root River**

Root River Solar will include approximately 60 acres of agricultural land in the city of Caledonia, WI. Some light grading and clearing may take place but there will be little change to the quantity of impervious surface. It is expected that the project will generate 6 MW of power.

Site configuration: **Untitled**

Created 04 Feb, 2025
Updated 04 Feb, 2025
Time-step 1 minute
Timezone offset UTC-6
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Category 5 MW to 10 MW
Site ID 140618.23781

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2



Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	0	0.0	0	0.0	17,800,000.0

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0

Component Data

PV Arrays

Name: PV array 1
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 52.0°
Resting angle: 52.0°
Ground Coverage Ratio: 0.3
Rated power: 6000.0 kW
Panel material: Light textured glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.818555	-87.943829	740.58	7.00	747.58
2	42.818547	-87.939548	740.04	7.00	747.04
3	42.815116	-87.939559	743.55	7.00	750.55
4	42.815108	-87.943839	760.37	7.00	767.37

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	42.811346	-87.941737	755.63	17.50
OP 2	2	42.815250	-87.938132	742.32	17.50
OP 3	3	42.817768	-87.934956	733.21	17.50
OP 4	4	42.817941	-87.933197	734.76	17.50
OP 5	5	42.815171	-87.933519	732.33	5.50
OP 6	6	42.822206	-87.941372	723.52	10.00
OP 7	7	42.821766	-87.942488	733.53	17.50
OP 8	8	42.821136	-87.943175	737.77	17.50
OP 9	9	42.817894	-87.945192	746.87	5.50
OP 10	10	42.816697	-87.934034	724.91	10.00

Glare Analysis Results

Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	0	0.0	0	0.0	17,800,000.0

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0

PV: PV array 1 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0

PV array 1 and OP 1

No glare found

PV array 1 and OP 2

No glare found

PV array 1 and OP 3

No glare found

PV array 1 and OP 4

No glare found

PV array 1 and OP 5

No glare found

PV array 1 and OP 6

No glare found

PV array 1 and OP 7

No glare found

PV array 1 and OP 8

No glare found

PV array 1 and OP 9

No glare found

PV array 1 and OP 10

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians