Gustin Solar

Harrisville Township

Exhibit D

Solar PV Station O&M Manual

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Revision Summary

8/21/2025 Updated complaint reporting and resolution plan.

Purpose

This document summarizes Consumers Energy's utility scale solar PV station operating and maintenance policy and standards. It is not intended to be used as procedures or work instructions.

Scope

The scope of this operations and maintenance management plan will include Environmental, Health, Safety & Security, Technical Asset Management, Operation and Maintenance of utility scale solar PV stations. Some topics such as Emergency Response, Vegetation Management and Decommissioning are included specific documents so named. Also of note, the intended scope of this document is post-commercial operations date (COD).

Consumers Energy operates and maintains all utility scale PV generating stations of which it owns. The operation and maintenance of these assets will be conducted by union Solar/Battery Technicians who are trained in an 18 month earn-while-you-learn Department of Labor (DOL)-certified program that provides individuals with specialized skills that are essential to ensure high availability and capacity factor of the assets they support. UWUA Power for America Training Trust Fund (P4A) and the Utility Workers Union of America (UWUA), AFL-CIO administers the Michigan based program.

Vision & Policy

Vision: Consumers Energy Generation Operations is recognized as a world leading clean energy supplier. Our innovative and empowered team achieves industry defining outcomes that power Michigan safely, reliably, and affordably.

Policy: Safety is foremost at Consumers Energy, starting with public safety as detailed in the PV Emergency Response Plan. On going operations and maintenance of the site will be conducted safely by Consumers Energy and its agents with all such activities being conducted with the utmost care of the environment. Physical and cyber security shall also be paramount in ensuring public safety as well as the safe and reliable operation of each asset and components there-of.

Technology

The key components of a utility scale solar site are:

Solar Modules: Solar cells contain a material that conducts electricity only when energy is provided—by sunlight, in this case. This material is called a semiconductor; the "semi" means its electrical conductivity is less than that of a metal but more than an insulator's. When the semiconductor is exposed to sunlight, it absorbs the light, transferring the energy to negatively charged particles called electrons. The electrons flow through the semiconductor as electrical current, because other layers of the PV cell are designed to extract the current from the semiconductor. Then the current flows through metal contacts—the grid-like lines on a solar cell. To boost energy yield bifacial solar modules, which are double-sided to capture light on both sides

Notably, solar modules do not contain, nor do they release liquids or gases.

of a silicon solar module—they capture light reflected off the ground or roof where the panels are installed. (Source: energy.gov)

Trackers: These devices change their orientation throughout the day to follow the sun's path to maximize energy capture. Single-axis solar trackers rotate on one axis moving back and forth in a single direction. Motors and gear trains direct solar trackers by means of a controller that responds to the sun's direction and/or adjusts on a chronological basis to counteract the Earth's rotation by turning in the opposite direction.

Notably, solar trackers are also used to stow or position solar modules into a safe store position in order to mitigate any potential equipment damage in the event of severe weather such as high wind, hail and/or heavy snow.

Wiring and Connectors: Specialized, environmental resist conductors and connector are used to connect solar panels in series to form a string. This arrangement allows the electricity generated by each panel to flow through the entire string, resulting in a cumulative voltage output.

Strings are then connected in enclosed electrical combiner boxes to form an array. By connecting multiple strings of solar panels in parallel, meaning that the positive terminals of all the strings are connected, as are the negative terminals. This provides for an increased current output, thereby enhancing the overall power production of the solar panel system.

Inverters: The inverter converts the direct current (DC) to an alternating current (AC), which flows into the electric grid and, eventually, connects to the circuit that is your home's electrical system. As long as sunlight continues to reach the module and the circuit is connected, electricity will continue to be generated.

Generation Step Up Transformer: Generator step-up transformers (GSU) are the critical link between the utility scale solar station and the transmission network connecting AC networks of different voltage to each other. GSUs must be built to withstand severe electrical stress from fault currents and transients. generator. Its configuration and overall build are meant to withstand extreme thermal loading without succumbing to early wear and tear. A generator step-up transformer works by converting the generator's low voltage and high current output into a higher voltage and lower current. This is done by windings of wire around a common iron core.

Notably, GSUs are typically filled with an insulating fluid that is also circulated through cooling tubes/fins to dissipate heat. Mineral and synthetic oils are most often used. Spill containment is required for environmental protection/best practices and the fluid is periodically sampled to ensure its purity and efficacy. Polychlorinated Biphenyl (PCBs) oils are no longer used in the United States as of the 1979 Toxic Substance Controls Act.

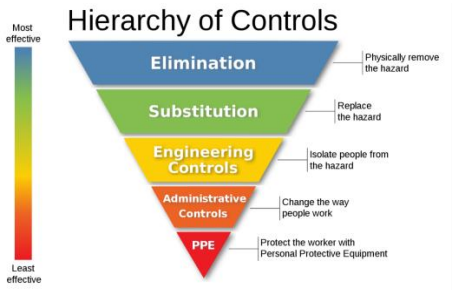
Substation: In additional to the GSU, substations may contain equipment that helps keep our electricity transmission and distribution systems running as smoothly as possible, without repeated failure or downtime. This includes protection equipment, which detects and clears faults

Each of the aforementioned key components will have been supplied by a Consumers Energy Approved Supplier based upon Consumers Energy technical specifications, as well as relevant codes, statues, etc.

in the network. Generally PV generating stations and substations are unattended, relying on SCADA (supervisory control and data acquisition) for remote supervision and control. Sensors, computers, networked data communications and graphical user interfaces are typically housed in a climate-controlled building called the control house which is connected via specialized fiber optic lines and communications to a remote control room that is staffed 24/7.

Environmental, Health, Safety & Security (EHSS)

The generation, transmission and distribution of electricity included inherit hazards and risks that must be mitigated by robust hazard identification and controls including:



EHSS hazards and risks are first eliminated and/or mitigated through facility design. Written policies, standards and work-instructions further mitigate EHSS hazards and risks and are required for every potentially hazardous situation at every Consumers Energy site. Each is informed by all relevant governmental and industry standards, codes, etc. as a minimum. Personal protective equipment is required commensurate with each situation and task, thereby providing a further barrier of protection.

EHSS communications and reporting each follow internal and external stakeholder standards and are to be conducted well within required timeframes. Security encompasses both physical security and cyber security as to ensure that wanderers and/or trespassers are kept safely outside of physical and/or cyber boundaries.

Technical Asset Management

Technical Asset Management (TAM) includes those activities that are used to inform, optimize, monitor and control energy production, minimize down time, reduce costs and accentuate the EHSS performance of the site. Such activities include remote monitoring and diagnostics of site equipment, sensors and instrumentation augmented by the use of unmanned aerial vehicles (drones) and third-party satellite imagery.

Change control, document and records management and warranty adherence/administration are also key elements of TAM. In particular, technical drawings and records must be up to date and readily accessible for both routine and emergency situations.

Operations

At Consumers Energy, the Merchant Operations Center (MOC) is responsible for dispatching Consumers Energy owned and contracted units as to support the reliable operation of the Bulk Electric System (BES). The MOC provides continuous monitoring and supervision of the solar PV station and performance. Routine operation is performed remotely using communication and software systems in a control room environment that is staffed 24/7. Should a fault or anomaly occur, the MOC follows specific protocol to notify/engage other teams.

Maintenance

Preventative and Predictive Maintenance: Is the core element of the maintenance activities at solar PV power stations. Periodic visual and physical inspections, as well as verification activities each performed at scheduled intervals are required. Original Equipment Manufacturer (OEM) manuals and specifications are used to inform the preventative and predictive maintenance plan.

Corrective Maintenance: Refers to activities performed to restore a solar PV station, equipment or component to a fully functioning state after a failure detection by remote monitoring or during an on-site inspection. Oftentimes corrective maintenance only affects a small portion of the solar PV station which can be isolated from the remainder of the site using lockout-tagout (LOTO) and electrical clearance/de-energization/grounding/etc. procedures. Replacing a couple low performing solar modules in a string would be such an example.

Major Maintenance: Pertains to the replacement or substantial refurbishment of a major piece of equipment. Replacing a complete inverter skid or doing a site-wide electrical shut-down to test/repair substation breakers and/or other components are two examples. Major maintenance typically involves the create of a specific outage plan and supporting procedures/work instructions.

Spare Parts Management: Must ensure that spare parts are available and in operating condition in a timely manner as to minimize the downtime of the solar PV station.

Indicative Schedule of Maintenance

Site

Item/Activity	Frequency	Comments

Monitor Cameras	Daily	Central security command center escalates any concerns to management, law enforcement and/or emergency responders.
Inspect Perimeter Fencing	Quarterly	Patrol perimeter to inspect fencing for damage.
Inspect Drain Tile Outlets	Quarterly	Patrol site to visually inspect drain tile outlets.
Storm Water Facilities	Quarterly or more frequently as specified in SWPPP.	Patrol site to visually inspect storm water facilities. See site specific Storm Water Pollution Prevention Plan (SWPPP)
Vegetation Management	Various	See stand-alone vegetation management plan specific to the site.
Respond to Community / Neighbor Concerns	Within two business days	Site manager or designee

Solar Modules

Item/Activity	Frequency	Comments
Module Cleaning	Infrequent	Standard practice in the Midwest not to wash panels except in extreme soiling situations when rain is insufficient.
Module Snow Removal	Infrequent	Standard practice is to use tilt and natural heating of the panels to clear snow/ice.
Visual Inspection	Ad Hoc	Large solar PV stations may contain over ½ million individual panels. Visual inspection will be conducted as needed in response to specific concerns.
Unmanned Aerial Inspection / Satellite Imagery	Annual, Ad Hoc	LIDAR, Infrared and other advanced imagery techniques will be utilized to identify anomalies.

Trackers

Item/Activity	Frequency	Comments
Visual Inspection	Bi-Annually	1. Inspect all fasteners on the outer rows of the site for any signs of loosening such as misaligned torque marks or loose nuts. 2. Inspect the Damper assemblies for misalignment or damage. 3. Inspect the Center Structures and Drivelines for to verify they are still correctly aligned. 4. Inspect the bolts on drive components to ensure torque markings are aligned; re-tighten if necessary on all outer rows. 5. Test stow functionality; trip any applicable sensor (if installed). 6. Inspect for corrosion on tracker components while performing.
Visual Inspection	Annually	1. Inspect Driveline assemblies and Bearing Housings for misalignment. Column settling can affect the alignment of tracker components. 2. Inspect the Bearings for excessive wear from Column settling. Check for misaligned torque markings on the Columns. Repair, replace, or re-torque if necessary. 3. Inspect the conduits and penetrations in the Motor Controller enclosures and verify the seal remains intact.
Visual Inspection	Every Two Years	1. Inspect all hardware on one complete row per Motor Block. If loose hardware is found on the row, expand inspection to all rows in the Motor Block.

		2. Inspect the module clamps on exterior rows for torque drop below the threshold using a torque wrench.

Disconnect, Transition Boxes, Wiring and Connectors

Item/Activity	Frequency	Comments
Unmanned Aerial Inspection / Satellite Imagery	Annual, Ad Hoc	LIDAR, Infrared and other advanced imagery techniques will be utilized to identify anomalies.
Switches, Disconnects, Breakers, Relays	Annual, Ad Hoc	Timing, methods and specifics TBD.

Inverters

Item/Activity	Frequency	Comments
Cooling System Inspection	Every 3 Months	Check for cooling liquid leakages. Check the correct input pressure of the expansion tank. Check and clean protective grilles. (Check for the absence of insects, fluff, dust, etc.) Check, clean and replace air filters. Check the fans operation.
	Every 5 Years	Change cooling liquid (water / glycol) and hoses.
Switches, Disconnects, Breakers, Relays	Annual, Ad Hoc	Timing, methods and specifics TBD.

Control House/Substation/Generation Step-Up Transformer/Switchyard

Item/Activity	Frequency	Comments
Inspection & Testing	Various	Refer to detailed component requirements and schedule in CE procedure 14-01 Substation Inspections, etc.

Operations and Maintenance Procedures and Work Instructions

CESWS: The Consumers Energy Standard Work System is an electronic library of sorts that houses site and/or equipment specific procedures and work instructions for those activities required for the ongoing operation and maintenance of the PV site.

ProjectWise®: Is an electronic library system of record for engineering drawings, OEM manuals, etc.

Operations and Maintenance Records

SCADA: Supervisory Control and Data Acquisition refers to the onsite hardware and software used to measure and report real time operating data to other CE systems.

PI: Operating and performance data can be monitored at a glance and are recorded using a logging and timestamping tool called PI Historian.

SAP®: Maintenance and inspection programs are prepared, executed, and recorded using SAP® enterprise resource planning technology.

Data Lake: The aforementioned data from SAP® and PI Historian may be captured in a large database that can subsequently be referenced for monitoring and diagnostics as well as reporting.

Training

Each person will be provided a comprehensive orientation before commencing any work at site. The material at a minimum will cover topics such as a general overview of the project, hazard analysis, emergency response, wildlife conservation training and vegetation management (as outlined in this document).

Stakeholder Concern Intake, Tracking and Resolution

Prior to Commercial Operation, a specific, stand-alone Liberty Solar Farms Complaint Resolution Procedure including specific email and phone intake contact points will be provided.

Vegetation Management

As part of detailed engineering and design, a specific, stand-alone vegetation management plan is prepared for each individual utility scale solar station and provided to interested parties. Specifications including ground cover species and maintenance there off, noxious/invasive weed control and fire prevention are detailed within the vegetation management plan.

Emergency Response

As part of detailed engineering and design, a specific, stand-alone Emergency Response Plan (ERP) is prepared for each individual utility scale solar station and provided to interested parties. Prevention, training, and response preparedness are key elements of the ERP.

Decommissioning

As part of detailed engineering and design, a specific, stand-alone decommissioning study/plan is prepared for each individual utility scale solar station and provided to interested parties. Typically, financial assurance is provided to governmental stakeholders in the form a surety bond in the amount of the estimated decommissioning costs determined in the study/plan.

References

The following documents were utilized to help inform this policy. Consult these documents for further applicable information.

- **Operations and Maintenance Best Practices 5.0** – Available at www.solarpowereurope.org
- **Best Practices for Operation and Maintenance of Photovoltaic and Energy Storage Systems; 3rd Edition** – Available at www.NREL.gov/solar
- **Various OEM Operating Manuals, etc.**