

**APPENDIX O – OPERATIONS & MAINTENANCE PLAN**



## **Operations & Maintenance ("O&M") Plan TPE IL KN188, LLC**

The O&M plan is structured to both maximize system performance and meet all permitting requirements. Regional O&M staff and seasonal staff will be assigned to perform: 1. Preventative maintenance, 2. Corrective maintenance, and 3. Support of monitoring and asset management services. A summary scope of work for each is as follows:

### **Preventative Maintenance**

- Industry standard of care to ensure and maintain solar production levels.
- Regular maintenance on project components per manufacturer recommendations and industry best practices and standards of care.
- Module cleanings are not expected given the average monthly rainfall in the area. If cleaning is required, modules will be cleaned to ensure project performance.
- Vegetation abatement as required to ensure project performance.
- Primary component inspection on an annual basis (panels, inverter, high voltage equipment)
  - Array & balance of system inspection
  - Module visual inspection
  - Data Acquisition System (DAS) & Meteorological (MET) station inspection
  - Inverter full inspection
  - High voltage equipment inspections
- Mechanical & electrical maintenance on an annual basis including inverter maintenance per manufacturer warranty requirements and standards of care.
- Yearly inspection and maintenance as needed for roads, storm water, and other site civil features.

### **Corrective Maintenance**

- Remote problem diagnosis & qualification via the project SCADA system.
- On-site technician dispatch: Trained, qualified and insured service techs utilized for rapid response.
- Warranty submittal/claims notification, tracking of replacement parts' arrival/storage/ installation, etc.
- Maintenance ticket updates and closure identifying root cause/problem resolution reporting to owner.

### **Monitoring**

- Remote equipment monitoring (24x7x365) via SCADA system.
- Remote dispatch per customer/owner requirements.
- Ticketing: Create and dispatch automated ticketing with issue resolution notifications and root cause reporting.
- Problem tracking and ensured resolution reporting included within monthly report.
- Identify potential and actual underperformance issues; recommend remedies.
- Customized data analysis and alerts for customer:
  - Collection and hosting of system monitoring data.
  - Owner access to online portal monitoring and production with weather data.
  - Operator to host site communication and fees for monitoring.

Monitoring and asset management services are provided by the late-stage development company's remote operation center and central services staff.

### **Plan and Timeline for Responding to Loss of Major Plant Components**

O&M personnel will be notified of any loss of major plant component or related failures by the 7x24 remote operations center. This center will dispatch onsite technicians for system critical failures (inverter, or transformer failure). The plan for such losses is to:

- Remove and replace the failed equipment with spare parts, nearby parts in inventory or emergency delivery of parts from manufacturer as rapidly as possible.
- Diagnose reason for failure.
- Work with general contractor and/or manufacturers for any warranty or related claims.

### **Compliance with Prudent Utility Practices**

All O&M practices follow Prudent Utility Practices with the utmost focus on safety. As a part of all O&M contracts with vendors, contractors, and sub-contractors, our team will ensure that these companies are responsible for the safe performance of work and for the safety of its and its subcontractors' employees, representatives, agents, and invitees of the contractor or its subcontractors at and around the project site, or any other person who enters the project site for any purpose. To facilitate this, all contractors must provide a safety plan whereby the contractor maintains responsibility for maintaining all safety precautions and measures for areas on and around the project site. As part of 3 this safety plan, contractor must provide a safe working environment at the project site during the performance of the work, and shall, among other requirements, seek to minimize the number of safety-related incidents during the performance of the work (with both TPE's and contractor's mutual objective of zero lost time accidents). Such safety plan shall include requirements for the safety prequalification of each subcontractor and a drug and alcohol program (which shall include a drug testing policy). Furthermore, the safety plan shall meet the requirements of applicable laws and applicable standards.

After the commencement of work, TPE and contractor shall periodically review safety compliance, particularly in light of any injuries or near-miss incidents that may arise through the performance of the work and cooperate jointly to develop necessary changes to the safety plan in light of such circumstances, if any.

The safety plan shall apply to all individuals accessing the project site and performing work on the project. As part of the safety plan, a safety representative will be identified with the necessary qualifications and experience to supervise the implementation of, and monitoring of compliance with, the safety plan. The safety representative shall make routine inspections of the project site and shall hold regular safety meetings with contractor's personnel, subcontractors, and others.

Each staff member undergoes personal background checks, qualifies as possessing safety and related solar skills training required, or shall gain this training from an approved O&M training program prior to starting work on the job site.

The contractor shall make the site safety plan available to local authorities having jurisdiction/permitting authorities (AHJs) during the construction process, upon request. The safety plan should include provisions for the management of site access, traffic management, road maintenance, and site security.

### **Emergency Response**

The site owner shall provide an emergency response plan to the AHJs prior to commercial operation of the facility, if required by the local AHJs. The site owner shall provide an education training session to county representatives and first responders prior to commercial operation of the facility, if required by the

local AHJs. The site owner shall provide a means and procedure for site access in coordination with the local AHJs.

### **Equipment Manufacturer Recommendations**

The O&M plan referenced above complies with or exceeds all standard utility-scale PV equipment manufacturer recommendations. We can provide copies of all major equipment O&M recommendations prior to formal procurement as needed.

### **Mowing and Weed Management**

A comprehensive vegetation management plan shall be implemented and followed for the duration of the project life. A mowing schedule shall be established based on the plant species in the seed mix that is properly timed to balance avoiding the disturbance of wildlife and native vegetation with the need to avoid the establishment of weeds. Vegetation underneath and between the solar panels should be well maintained in the defined lease area to keep vegetation below the low edge of the solar panels at maximum tilt angle. Management should comply with any local ordinances or conditions of approval. Mowing and weed whacking schedules will be adjusted from time to time to allow for flexibility based on rainfall and vegetation growth. Chemical control shall be used in accordance with the Illinois noxious weed regulations.

### **Warranties**

All warranties are managed and handled at the project company level and are the responsibility of the late-stage development company that will operate and own the project over its useful life. Manufacturers of major equipment including modules, inverters, racking, and transformers provide equipment warranties for the life of their products.

### **Outage Schedules**

All planned shutdown of equipment for routine maintenance will be planned and coordinated with the local utility. When possible, these outages will occur in non-solar producing hours (nighttime). As such, no planned outages are scheduled.

### **Spare Parts**

As part of the installation of the project, spare parts may be procured and stored with the O&M service provider for faster access to parts when necessary. This may include spare modules, inverters, parts, fuses, wire, and related inventory. Additionally, along with the warranty of the equipment, we expect to gain committed response intervals from manufacturers to address equipment replacement requirements. Spare parts will not be stored on site, rather, they will be stored off site in the O&M provider's facilities.

### **Start-up / Ramp-up Requirements / Times**

The PV solar plant starts up as the sun rises in the morning and ramps down as the sun sets in the evening. We can provide specific historical times for the location of our solar array as a means of working to optimize this generation asset.