Impact of O&M on PV Plants

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ADVANCED ENERGY®

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Key Topics

Preventive Maintenance

- Electrical Components
- Visual/Site Inspection

Proactive Identification of Issues

- Performance Issues
- Safety
- Issues
- Warranty Issues

Corrective Maintenance Avoidance

- Underperformance
- More Expensive Repairs
- Longer MTTR (Mean Time To Repair)

Preventive Maintenance

- Program that maintains component warranties
- Provides a snapshot of site performance
- Maintains efficient operation of the PV Plant
- Identifies potential issues before they occur
- Planned maintenance schedule that provides uniformity to operations
- Typically required on all PV sites

Electrical Testing

- Inverter maintenance
- Operating current open circuit voltage testing on strings
- Thermal inspections on combiners
- Thermal inspections on modules
- Medium Voltage Transformer Maintenance
- Weather Station connectivity and calibration

Visual Site Inspection

- Access issues
- Shading issues
- Site erosion and vegetation
- Investigate overall aesthetic condition
- Cleanliness of modules
- Gross non-conformance items
  - Broken modules, malfunctioning tracker, exposed wires

Proactive Identification of Issues

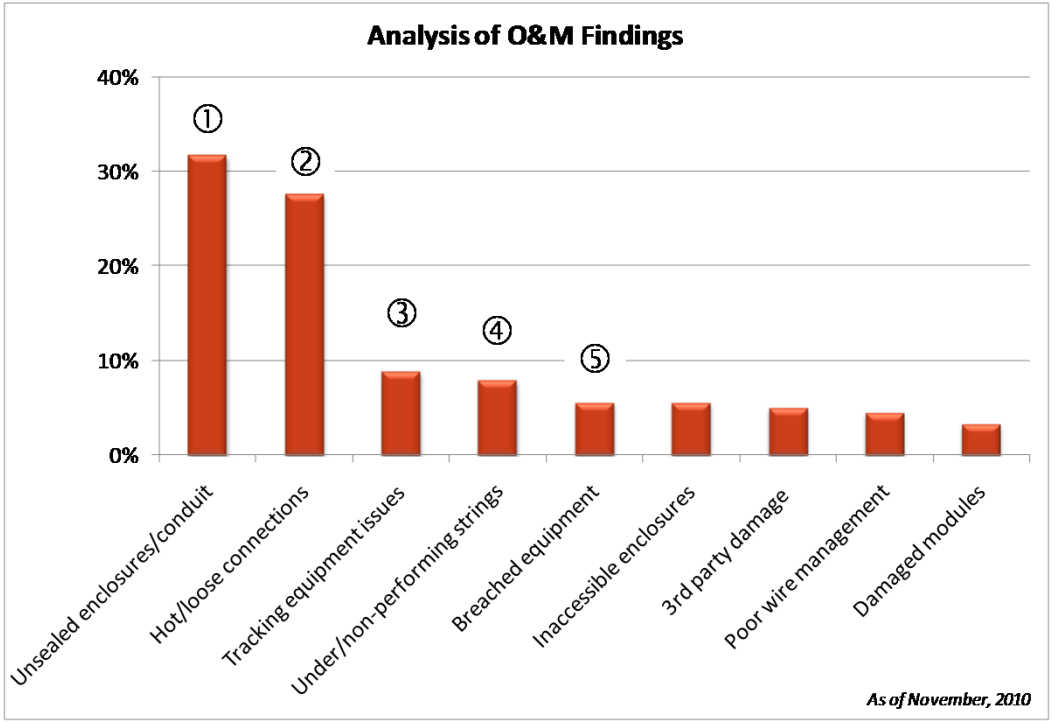


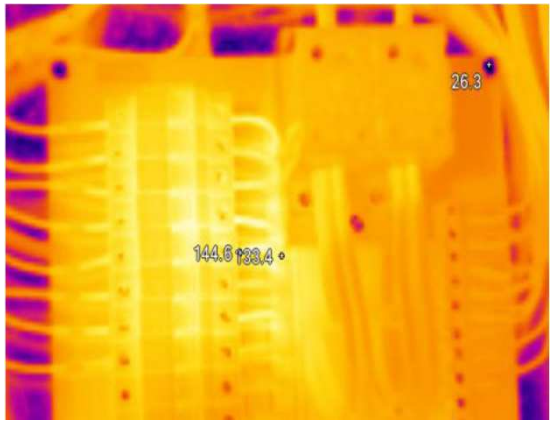
Figure . Pareto chart of the top issues and non-conformances found through the servicing of dozens of PV sites across North America in 2009 and 2010.

- A number of issues identified seem to be workmanship or quality issues
- Rapid response to corrective action with minimize further impact to site performance

Unsealed Enclosures and Conduit

- Erosion leads to a shifted electrical box
- Conduit improperly sealed which allowed dirt into the electrical box
- Improperly sealed junction box leads to corrosion and possible fire hazard

Hot/Loose Connections

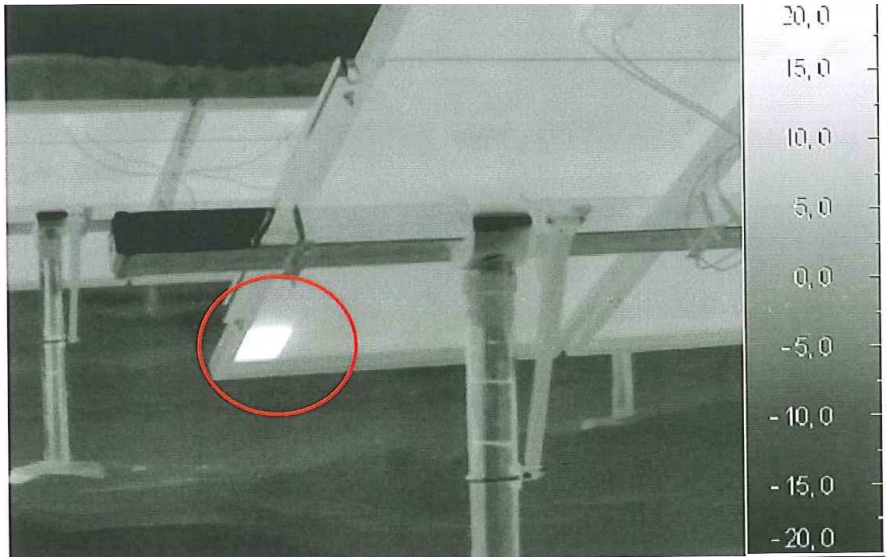


- Improper connections can create arc events, cause fires, and pose safety hazards to personnel
- Failing to meet torque specifications can also cause loose strings

Tracking Equipment Issues

- Issues on sites without surveillance may go unnoticed
- Malfunctioning tracker encoder could disrupt operation

Under/Non-Performing Strings



- Poor connections lead to underperforming strings
- Hot spots or damaged panels can lead to underperforming strings

Corrective Maintenance Avoidance

- Lack of industry standard makes CM costs hard to predict
- Benchmarking off of lessons learned can help prevent CM costs
- Partnering with O&M provider early in the site design process can also prevent CM costs
- A strong PM program can enable quicker MTTR
- Site performance can be better predicted when a routine maintenance plan has been implemented

Contact Info

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