

# Client Reference

## Renewable Energy | Installation of Permanent Sensors | Ensuring plant Availability and Reliability

Installing permanent Partial Discharge sensors within certain types of switchgear and MV electrical assets allows power plant owners to assess equipment without having any unwanted downtime and maintaining contractual supply needs, as well as gaining valuable insight and mitigating risk of assets failures.



### Client background

A plant operator in the renewable solar energy space approached Martec to provide a condition assessment of their MV electrical network and assets after experiencing an unexpected failure where they lost about 30% plant capacity. They have to ensure plant capacity is at least 95% available at all times due to contractual regulations.

It is paramount to conduct these assessments when the plant is subject to the whole combination of thermal, electrical and mechanical stresses whilst in service.



### Key challenges

- The design of the individual electrical cabins did not allow access to the cable sections for placement of PD sensors on the 22kV Un-armored XLPE cables lying under the grid floor.
- Due to safety concerns related to electricity being live, the cabin had to be isolated, and permanent sensors were installed for testing purposes.
- Due to demand requirements, these cabins could not be switched off during peak day generation periods.

### Findings and Observations

- Visual inspections identified they used incorrect wiring for VT connections, which caused discharges that will lead to failure of components within the switchgear system.
- Terminations were not according to SANS 876 / NRS 012:2009 specifications, bundled together, clamped on the incorrect area and discharging on the screen cut area.

### Value add

- Identifying defects that could turn into unwanted premature failures and downtime.
- Improved personnel safety during switching operations of the electrical plant.
- Identifying defects to be repaired during planned outages.
- Avoiding penalties for not keeping to supplier contractual agreements.
- Installed cost-effective sensors for easy plant assessments.
- Compiled a Risk Matrix for critical assets.
- Improved reliability of the overall MV plant.



### Martec intervention

- Martec supplied and assisted in installing permanent PD sensors on all critical cables to be able to assess the MV plant safely during normal plant operation.
- Defects were identified, which if not repaired, would have lead to electrical failure of the asset and potentially safety incidents to staff.
- The team performed the partial discharge assessments in a non-intrusive and safe manner.
- Future assessments can be done quickly and without any additional outages.



### Tools and technology

- Frequency System PD Analyzer
- Aquila Advanced PD Diagnostics
- Visual inspections
- Martec permanent PD sensors
- In-time condition assessment process
- Implementing P-F Curve

