FOTAS PV Solar Farms Perimeter Security Project

Background

As the global demand for energy continues to rise, solar power is becoming one of the leading renewable energy sources. However, solar farms are often located in remote and unmanned areas, making them vulnerable to security threats. Given the large and irregular perimeters of these sites, a single security technology is often insufficient to provide full protection. This case study explores the application of the FOTAS AI-driven Distributed Acoustic Sensing (DAS) Fiber Optic Perimeter Intrusion Detection System (PIDS) in securing solar farms.

Security Challenges in Solar Farms

Solar farms face increasing security threats due to their remote locations and vast perimeters. The need for robust, reliable, and scalable perimeter intrusion detection systems (PIDS) is critical to protect these investments. Conventional security solutions may not effectively cover all assets due to the size and shape of the perimeter. Fiber optic-based PIDS provides an ideal solution by offering continuous, real-time monitoring of perimeter activity.

Implementation

In many cases, solar fields are dispersed and individually enclosed by fences, necessitating separate security systems for each site. However, in this project, the FOTAS D30 DAS system was chosen for its ability to monitor multiple solar fields from a centralized location. The system was deployed as follows:

- A dual-channel FOTAS D30 system was installed at a central point, allowing fiber optic cables to extend across different sites.
- The system was not used in cut-resilience mode; instead, two separate fiber optic cables traveled to different solar fields.
- For cut-resilience mode, two channels would need to loop through the same sites in opposite directions (clockwise and counterclockwise).
- The fiber optic cables were buried underground in some sections and installed along poles in others to ensure comprehensive coverage.
- Specific non-detection zones, such as underground passages and selected areas, were configured using AI-based calibration.
- The system was fine-tuned by setting calibration points at key locations like fence corners and fiber splices.
- Integration with perimeter cameras enabled real-time threat verification via automatic alarm-triggered video pop-ups.

Advantages of FOTAS D30 for Solar Farms

The FOTAS D30 DAS system offers a highly effective and reliable solution for securing solar farms. Key advantages include:

- **Long-Range Detection:** The system supports up to 30 km of sensing fiber per channel, allowing vast areas to be monitored with minimal infrastructure.
- **Versatile Installation:** The DAS system can be mounted on fences to detect climbing and cutting or buried to detect footsteps and vehicle activity.
- **High Sensitivity & Accuracy:** Provides superior acoustic signal detection and identifies intrusions with an accuracy of up to 10 meters.
- **Integration Capabilities:** Seamlessly integrates with CCTV cameras, Video Management Systems (VMS) such as Milestone and Genetec, and third-party security devices including relays and network audio systems.
- **Efficient Monitoring:** Enables early warning of unauthorized perimeter activity, reducing response times and enhancing overall security.

Conclusion

The implementation of the FOTAS D30 system in solar farms has significantly improved security and operational efficiency. By leveraging AI-driven fiber optic sensing technology, this solution provides a cost-effective and scalable approach to perimeter intrusion detection. Discussions are underway for further deployment in additional solar farms to enhance the security of renewable energy assets.