CASE STUDY

Remote Fault Indication with Bi-directional Communication
SunElectric saves INR 9.5 lacs annually against an investment of INR 48 lacs and reduces outages due to faults by 75% with WebNMS PowerGrid monitoring solution.

Founded in 1989, SUN Group of Companies is specialized in sourcing and supplying electrical T&D equipment and allied material for utilities and turnkey contractors, involved in generation, transmission and distribution of electrical power.

Sunlight Electricals, an electrical trading division is focused on trading of electrical T&D material for over two decades.
FPI Adoption

Power and utilities companies are reinventing their business environment with M2M technology in the face of constant pressure to improve profitability and reduce downtime.

When there is a fault in a network, the circuit breaker trips, disconnecting power supply of the entire network. And the network can be restored only if it has been cleared from faults. Detecting a fault is time consuming and it results in a power shut down for a long duration.

FPIs (Fault Passage Indicators) installed in electrical distribution networks with multiple branches assists to identify faulty branches. Once the value of current in the line crosses a pre-set threshold, the indicator displays a fault and thus faulty branch is isolated from the rest of the network. Once the fault is clear, the isolated branch is connected back to the network.

For instance, a feeder linking 10 branches with 10 installations each will have a total of 100 installations (10 x 10 = 100). If there is a fault in one branch, the feeder will trip, resulting in loss of power supply for all the 100 installations. Whereas in a branch in a network which is identified and isolated by FPI, power supply can be immediately restored to 9 x 10 = 90 installations. FPIs are best way to quickly track the faulty branches.

Business Benefits

- Reduced downtime
- Speedy fault detection
- Reduced human intervention
- Customizable energy dashboard
- Integration with Google Maps
The Challenge: Stand-alone FPIs

Though FPIs help in identifying the faulty circuits, it is still intense to patrol and identify the fault indicators considering the location of network in remote sites, additional manpower, and logistics. In such circumstances, the need for communicable FPIs emerges. Communicable FPIs will save considerable time if the FPIs identify the faulted circuits and alert the maintenance team with accurate fault location.

Result
- Involves human resource and logistics
- Prolonged downtime
- Time consuming in detecting fault in the network

The Solution: Communicable FPIs

To overcome the challenge, a scalable, customizable, and robust M2M solution was required for Sun Electric. SunElectric decided to evaluate WebNMS PowerGrid monitoring solution consisting of a hardware component (RTU) and software (WebNMS M2M platform) that provides remote fault indication with bi-directional communication.
RTU communicates the fault information/alerts to a central location or concerned maintenance personnel over GSM/GPRS. FPI is installed on the power lines and Remote Terminal Unit (RTU) is installed on the poles near the FPIs. FPIs communicate with the RTU over radio frequency signals and RTU in-turn communicates with the WebNMS M2M platform via GSM.

Going a step further, WebNMS PowerGrid monitoring solution communicates with a central server, sending the information of the faults, and also other data like fault logs, network current, settings of the FPI itself, health of the FPI, battery status of the FPI, etc. FPIs are monitored via WebNMS M2M platform.

Example of a Distribution Network with Communicable FPIs and M2M

**Fault Occurs at 11:30.00 AM**

**Circuit Breaker Trips at 11:30.80 AM**
Power Supply cut to all customers

**Maintenance team receive the alert on the precise location of the fault at 11:35.00 AM**

**Maintenance team take 15 minutes to repair. Power supply restored at 11:50 AM**

**Result**
- Highly reduced downtime
- Lesser manpower
- Fault is detected accurately
- Customer satisfaction
The customizable energy dashboard also features the map of the city/country where-in the FPIs are installed, showing the precise locations and fault alerts. This helps to track faulty networks.

All distribution networks are prone for faults and time taken to identify faults is always more than time taken to rectify them. Implementing WebNMS PowerGrid monitoring solution has greatly reduced the time taken to identify the faults and hence, the network is “UP” for maximum time. A network which is “UP” for maximum time increases revenue for the distribution companies and also increases customer satisfaction”, says Mr. Dilip Closepet, Vice President Business Development.
Result

SunElectric installed 104 nos. of FPIs has shown that the downtime has been reduced by nearly 43% after installing the FPIs as stand-alone devices. Considering the reduced downtime and reduced HR, there has been a saving of INR 5.44 lacs per year against an initial investment of INR 13 lacs. This means that the payback period is less than 3 years.

SunElectric extrapolated the above study to communicable FPIs using WebNMS Power-Grid Monitoring solution, has shown that outages due to faults are reduced by 75% with saving of INR 9.48 per year against an investment of INR 48.00 lacs, with a highly increased customer satisfaction and reduced expenses on logistics.

WebNMS M2M

WebNMS M2M offers niche M2M solutions and M2M Platform that provides cloud-based data integration and application development environment for rapidly developing and deploying M2M applications for managing millions of connected devices in real-time. WebNMS M2M Platform has been declared 'Best M2M Platform for Service Providers 2013' at M2M Evolution Conference, Miami and also recognized as 'Innovation in M2M' at the Aegis Graham Bell Awards 2013. webnmsm2m.com