

End-to-End Solution for Substation Communications and Backup Generators

Keeping ongoing power supply is paramount, especially in times of extreme weather conditions, natural disasters and other major electrical grid malfunctions. During harsh weather, gaining access inside the power stations can be hazardous and, sometimes, impossible. Therefore, appropriate measures are vital to ensure ongoing power supply.

Implementing onsite backup power is a cost-effective method to mitigate power outage risks occurring. Generators are often used as backup power sources when the primary power grid experiences an outage. These can kick into operation automatically or manually when they detect loss of power from the grid, thereby ensuring a continuous supply of electricity to critical systems or facilities such as residential homes, businesses, hospitals, or data centers.

The power grid is supported by a distributed array of 50kW generators, and in the event of a generator failure, heavy-duty batteries are in place as a backup. Battery life is typically not very long, but it is meant to buy the power company a few hours until technicians can access the affected site. The problem begins when the site is inaccessible for any reason. Hence, the most secure and efficient approach for power utilities requires having remote access to critical assets



Your Network's Edge®



Application Brief

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such as generators and batteries to allow real-time monitoring and control.

To ensure that the power grid can work at full capacity 24/7, generators are deployed in strategically located power substations. Consequently, when a natural disaster occurs, the relevant power substation can activate backup generators, isolate the damaged grid segments and re-route energy supply. As the power substation sites control the infrastructure that distributes power from the generation and transmission systems to homes and businesses, the above solution reduces the risk and loss for businesses. It is therefore clear why reliable and secure communications are a must in such a setup.

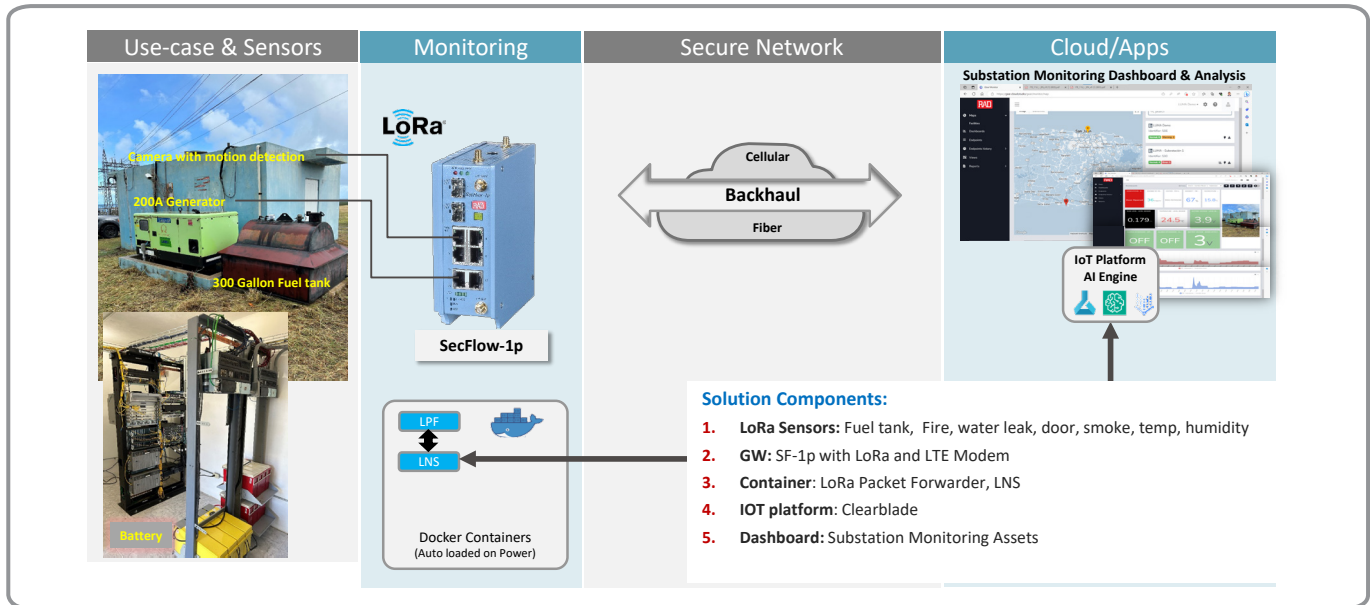
Ensuring Always-On Operation for Remote and Geographically Distributed Generators

RAD offers an end-to-end solution that allows ongoing and secure substation communications and reliable operation of backup generators. The solution includes:

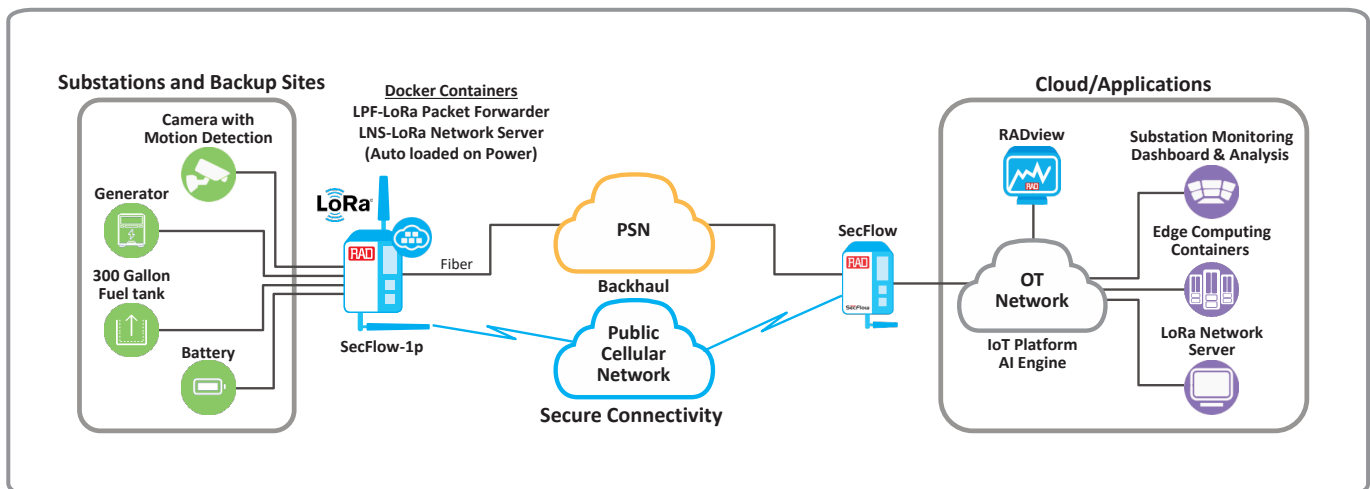
- **SecFlow IIoT gateways**, which aggregate data from various sensors and systems. These could be LoRa-based sensors, as well as sensors operating on any other technology, that ensure the equipment is properly functioning. The SecFlow features a variety of technologies for both wide area network (WAN) connectivity and for IIoT sensor connectivity. On the WAN side, SecFlow offer options to connect via fiber optic, but also LTE, 5G, 900 MHz band (Anterix), CBRS and 450MHz wireless networks. On the IIoT side the SecFlow offers LoRaWAN, Wi-Fi and Wi-Fi Halow wireless technologies as well as sensors and SCADA connectivity using serial or Ethernet interfaces. Additionally, the SecFlow features edge computing capabilities for hosting a variety of software-based functionalities upon demand, such as containers for controlling PTZ and storing data from surveillance cameras, cyber security functionalities, protocol conversion, IoT agents and much more.
- **Sensors:** To monitor the fuel, power generation, and environmental conditions at the substation communication huts. These sensors include smoke detectors, AC power meters, air conditioning and ventilation sensors, and surveillance systems.
- **IoT platform dashboard** to present all data collected from the sensors and manage them remotely. The dashboard is installed at the NOC (network operations center) and allows relevant personnel to have full visibility from afar, without endangering field technicians.

The dashboard displays energy levels on each system as well as energy levels flowing in the grid. In addition, the platform checks the voltage of the generators' batteries and the batteries system status. . This approach provides insight into the diesel levels in the generators' fuel tanks. Should the power grid be hit and the generators take over, the dashboard advises the time span that these generators can remain operational.

Substation Asset Monitoring Components



Solution End-to-End Architecture



To learn more about how RAD's end-to-end solution can help you ensure uninterrupted grid operation and remote monitoring and control of critical assets in real-time, contact us at: market@rad.com.