
IIoT-Enabled Hybrid Power Controller for Telecom Towers

Fuel Savings | DG- Battery- Solar PV | Remote Monitoring



Solution Overview

A pre-wired, rack-based hybrid power management solution powered by an industrial edge controller, designed for telecom tower energy automation.

The system intelligently switches between Diesel Generators (DGs), Battery/UPS systems, and Solar PV sources while enabling centralized remote monitoring of critical energy parameters.

It captures real-time operational data including power generation, electrical performance, fuel usage, temperature, humidity and switching status and integrates this into an IIoT platform for:



Automated Reporting
(Hourly, Daily, Monthly & Yearly)



**Remote Access
and Control**



**Performance Benchmarking
and Optimization**

Key Features



Automated DG–Battery – Solar PV Switchover

Intelligent switching based on battery SOC, fuel levels, solar generation, and load demand.



Solar-First Algorithm

Optimized logic prioritizes Solar PV and Battery Energy Storage for maximum fuel savings, with DGs as backup



Real-Time Multi-Source Monitoring with Local HMI Interface

Gain on-site visibility into DG performance, battery health, rectifiers, solar PV metrics, and fuel levels



Scalable & Cloud-Connected with Multi-Protocol Support

Ensures secure 4G/LTE data transmission to central monitoring systems while enabling seamless interoperability through Modbus, CAN, MQTT, and other industry protocols



Rack-Mount Compact Design

Pre-wired, modular design for easy integration into existing telecom cabinets.



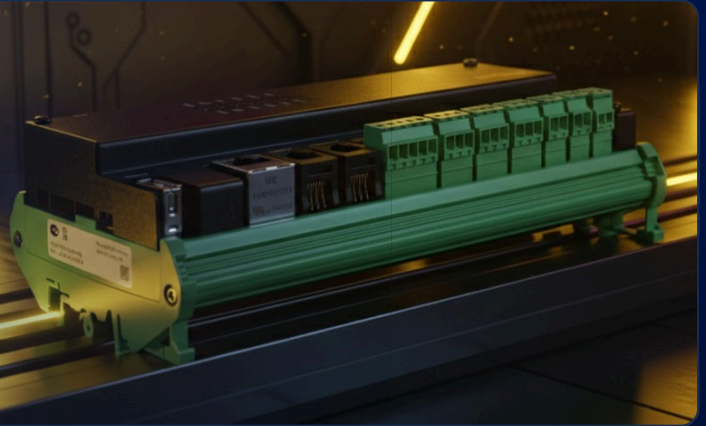
Advanced Alerts & Alarms

Notifications for DG start/stop failure, low fuel, BMS/rectifier faults, and connectivity loss via SMS/Email.

The Solution – Smart, Scalable & Reliable

IloTNext MicrEdge 370 – Hybrid Controller + Industrial IoT Gateway

At the core of the Hybrid Controller Box is the IloTNext MicrEdge 370, a powerful hybrid controller and industrial IoT gateway. The rack-mountable box is custom-built with an HMI for local display, the hybrid controller, and supporting accessories for seamless integration in telecom tower environments.



Key Highlights- MicrEdge 370



Multi-source data acquisition

Modbus RTU, CANbus, Solar PV inverter protocols, and hardwired I/Os



Smart Power Switching

Smartly switches between DG, Solar, and Battery via internal logic and I/Os.



Flexible Connectivity

Supports GSM, Wi-Fi, or Ethernet for reliable communication.



Fuel Level Monitoring

Tracks fuel in real time to prevent theft and shortage.



Remote Genset Control

Safely start or stop DGs remotely via SMS or platform.



Local HMI Display

Onsite screen shows vital operating and performance parameters.

IloTNext Platform Centralized Cloud Monitoring

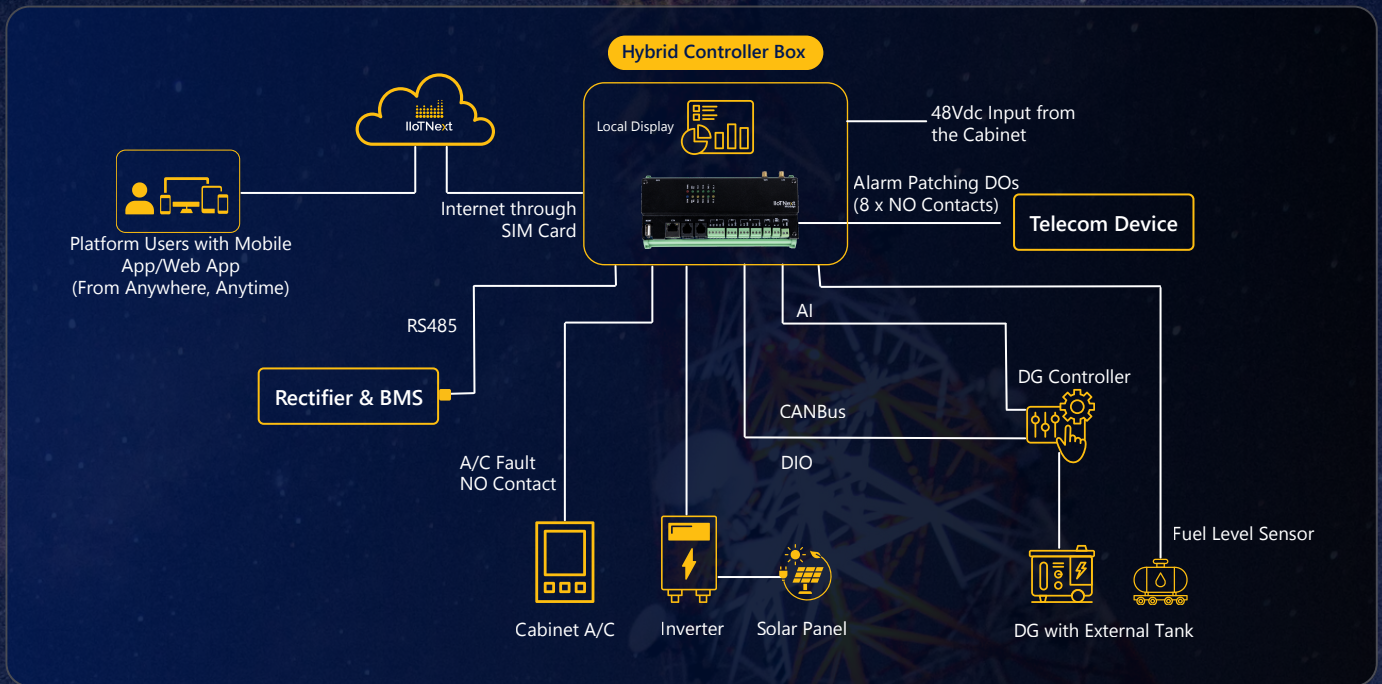
The IloTNext Platform is a secure, cloud-based system for real-time and historical data visualization, accessible anywhere, anytime. It enables operators to remotely manage, optimize, and scale tower power operations.



Platform – Key Features

- ★ **Cloud-Based Dashboards:** Centralized monitoring, visualization, and alerting for all sites.
- ★ **Live Insights:** Fuel levels, battery SOC, solar generation, DG run-hours, and energy output.
- ★ **Multi-Device Access:** Mobile app (Android) + web browser interface.
- ★ **Custom Alerts:** SMS/Email notifications for alarms, thresholds, and failures.
- ★ **Automated Reporting:** Scheduled PDF/Excel reports (hourly, daily, monthly).
- ★ **Enterprise-Grade Security:** Role-based access, encrypted communication, and secure data storage

System Architecture



Benefits



Solar-First & Sustainable

Prioritize Solar PV and Battery to reduce DG use and emissions.



Fuel & Cost Efficient

Optimize fuel use, prevent pilferage, and cut maintenance expenses.



High Uptime

Early alerts minimize downtime and failures



Remote Monitoring

Centralized visibility across all sites



Seamless Integration

Rack-mount, plug-and-play deployment



Scalable & Future-Ready

Manage 1000+ devices from one platform



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