

# Micro

Hybrid Smart Power solution delivering reliable power for telecom

Micro is the first **hybrid power solution** designed for telecom sites, providing reliable, cost-effective power in off-grid and bad-grid regions. Its modular design supports various site needs and enables **remote management via Clear Blue's Illumience** platform.



The Micro power solution includes a sealed battery cabinet and up to three **tamper-proof converter units** with Clear Blue's **passively cooled** smart electronics. It supports various site needs, from **good-grid to off-grid hybrid setups with gensets and solar**. A Remote Monitoring and Control unit optimizes performance, with Illumience enabling remote management.



## Easy Installation & Maintenance

Micro power systems feature sealed converter units for easy installation, with remote support from Clear Blue's expert service team. More than 80% of issues are managed and resolved through Clear Blue's remote management service.



## Maximum Uptime

The system ensures uptime with Smart Off-Grid 24x7 monitoring, alerts, and alarms. Predictive analytics, weather forecasting, and load control enable proactive maintenance and expert management for maximum performance and reliability.



## Long Life

The Clear Blue system ensures that battery power management, lifecycle optimization and proactive maintenance are easy and can be controlled over the internet, so you get the longest life possible out of your batteries.

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## Features and Benefits



### Modularity

Highly modular solution able to deliver rectification power between 10.5 and 31.5 Kw. Esite-Micro can serve a variety of sites, while being upgraded easily.



### Outdoor Converter Units

Converter units are built for harsh outdoor environments. They use passive convection cooling to protect the system from overheating, and ensure long life.



### Power Source Switching

Built-in Power Source Switching automatically switches between power inputs to ensure power uptime, with solar always being prioritized, thereby minimizing genset use.

#### Converter Unit

- RSE**  
Rectifier Solar External
- RE**  
Rectifier External
- SE**  
Solar External

34 U 19" battery space



**RMC**  
Remote Monitoring Control



**PCU**  
Power Combiner Unit

Free Air cooling filters and inlet



### Site Control Functions

Micro optimizes solar, reduces genset use, and maximizes uptime with advanced battery charging, Solar MPPT, and predictive solar control.



### Remote Management

Integrated with Clear Blue's Illumience, users can monitor and control power generation, load consumption, and battery charging to ensure reliability and optimal site performance.



### Grid Power Harvesting

Able to harvest grid power even at lower voltages. Grid Power Harvesting reduces use of genset, thereby optimizing site performance.

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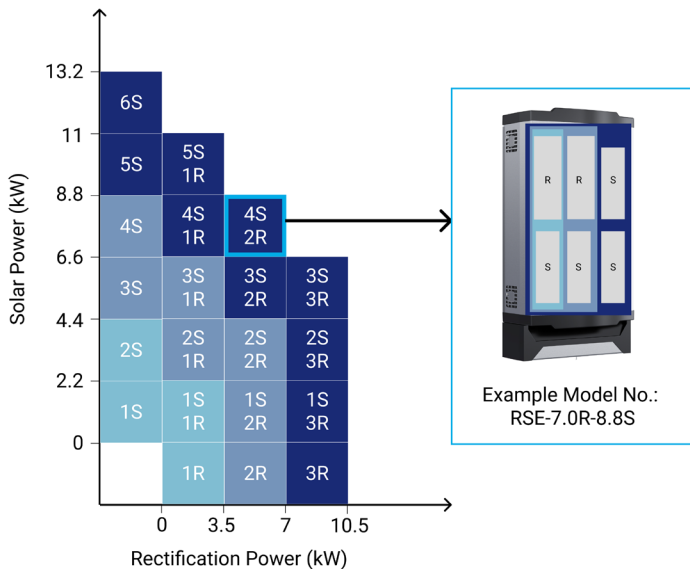
## System Sizing and Modularity

Micro's modularity makes it simple to build multi-tenant power solutions for large telecom sites. With Micro, depending on your power requirements and sources, combine rectifiers and solar controllers to manage multiple power inputs with maximum efficiency.

### Micro Converter Sizing

Step 1:  
Determine how much solar and rectification power is needed.  
Example, you need 8.8kW of solar and 7kW of rectification.

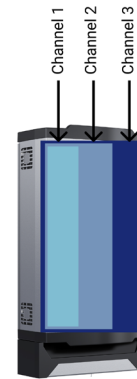
Step 2:  
Find the combination of solar and rectification you need on the table.



### Micro System Modularity

A) Each solar charger can have 6-8 solar panels per charger, depending on the solar panel size.

B) Each converter has three channels. Each channel can either fit two rectifiers, one solar and one rectifier or one SE or one RE.



C) Not enough power in one converter? No problem, you can have up to three converters per system



Pick up to 3 converters per system

Micro makes it easy to install a modular system designed specifically to support the site's power needs. Rectifier-only systems deliver up to **31.5 kW** of rectification power. Solar-only systems deliver up to **39.2 kW** of solar power, and hybrid systems deliver a combination of rectification and solar.

# Micro Components

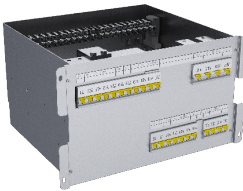


## Converter Unit

Available in multiple configurations, the converter unit converts grid, generator, and/or solar power into -48 VDC. Each converter unit has 6 slots which can hold up to 6 power units:

- Quantity 0-3 rectifier units which support grid and generator and include a built in automatic transfer switch.
- Quantity 0-6 solar charges with input of 165V and 22A, able to support x6 580W solar panels each, as an example.

The majority of all possible site configurations can be supported by combining the units and a complete system can be formed by up to three units of any type. The converter units are easily installed on the sides of the cabinet with the pre-installed frames and cable ducts.



## Power Combiner Unit (PCU)

The Power Combiner Unit hosts all DC distribution, load disconnect contactors and MCB's. The main function is to act as an electrical connection interface for the batteries, the site load, and the Converter units. The standard version of the PCU supports up to 8 strings of Li-Ion batteries and has optional high and low priority load disconnect contactors.



## Remote Monitoring Control (RMC)

The Remote Monitoring and Control unit (RMC) controls up to three converter units and operates all site-related power functions. It acts as a gateway for storage and configuration of all site data and makes sure that this data is available to the integrated Illumience remote management platform, either via local site connection or server-to-server connection.



## Solar Panels

Clear Blue's Esite-Micro solution can support solar, grid, and generator power sources for large telecom sites. As the system is highly modular, the type, size, and number of panels required for each system may vary. The Clear Blue team will ensure the systems' solar panel configuration is built to fit the needs of the system with future upgrade capabilities possible as power requirements grow.



## Batteries

Esite-Micro is capable of supporting multiple battery types including Lead Acid and Lithium-Ion. The standard Esite-Micro system includes Clear Blue's 200 Ah x 48VDC batteries, sized for the amount of energy that can be generated in that geographic location, & the percentage of uptime required for the load.

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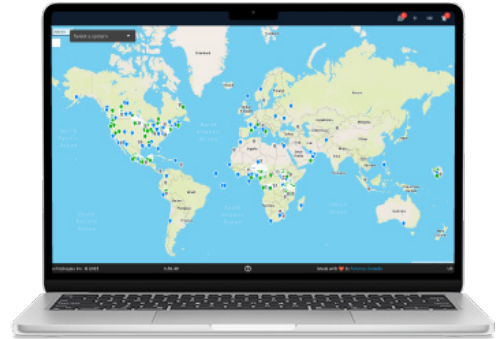
## Illumience: Power Monitoring and Management System



### Global Monitoring and Management

Performance analysis and management of systems remotely from anywhere in the world.

- Live and historical data for any system provided in a user friendly way.
- Local monitoring and management through Local WiFi App
- Manage settings remotely to optimize system performance.



### Energy Forecasting

Advanced analysis of energy capabilities for better energy management and reduction of downtime.

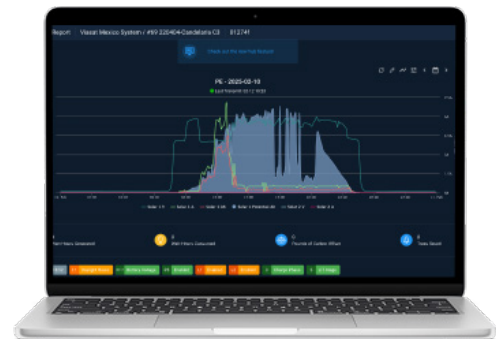
- Historical and live weather data.
- Multi-day weather forecast.
- Customizable load management to accommodate bad weather periods.



### Potential Energy

Greater uptime through advanced analysis of shading impacts and solar soiling.

- Measurements of the potential energy the system can generate versus actual energy generation.
- System degradation due to dust or shading.



### Battery Life Cycle

Variety of battery management features to maximize battery life and performance.

- Patented dynamic charging algorithms.
- Scalable battery pack.
- Support of multiple battery types.
- Remote battery monitoring and management.

