

*Polarium*

# Enabling People to Connect Hassle- Free



Battery



## POLARIUM

# In a World Where Everything Is Connected, Connection Must Never Be Lost

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In a world where everything is connected, connection must never be lost. At the same time, the world needs to shift from fossil fuels to clean green energy. This is where Polarium comes in.

The telecom network of the future needs to be smarter, greener, and more cost-effective. The roll-out of 5G will add millions of new nodes to already rapidly expanding networks. With 5G, more and more critical systems and applications will depend on always-on connectivity. Simply put, the connected world needs great power backup.

Telecom battery backup has long been a costly and challenging issue. Conventional batteries need to be changed frequently, diesel is costly and pollutes

the environment, and actual backup time and life expectancy of batteries is uncertain due to lack of intelligence. But not any-more. Our products are small, light and maintenance-free. Polarium's telecom battery backup solutions are sustainable, due to their extraordinarily long lifetime, fully recyclable materials, and the fact that they can be remotely controlled and monitored.

Today, telecom battery backups are mostly seen as an insurance policy, but we are striving to transform them into revenue generators by optimizing lithium batteries for smarter energy use. Our solutions let you focus on your core business and save money – helping to save our planet at the same time.

# Our Solutions Let You Pour Your Energy Into What Is Important to You

# Our Solutions

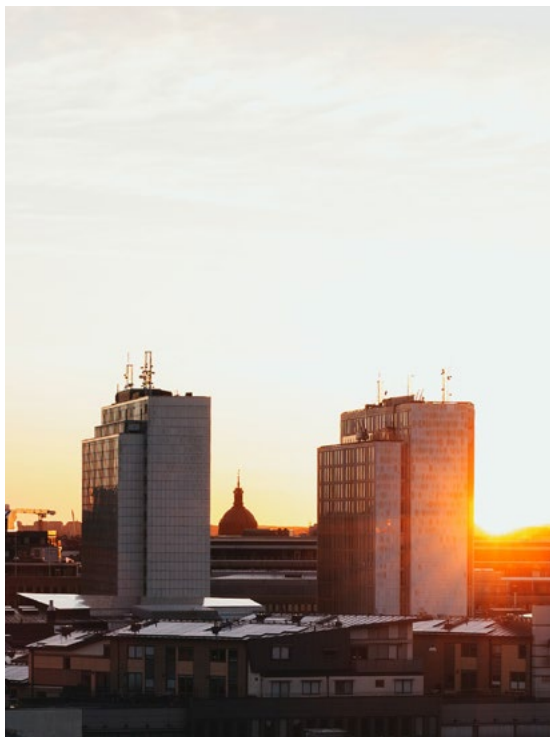
## BACKUP

### Keeping Your Network Up-and-Running No Matter What

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The connected world needs great power backup – and lots of it. We created our series of smart lithium battery solutions to solve your telecom backup challenges. We enable hassle-free communication and sustainable technology for the energy-intensive telecom business. Our backup solutions are of superior quality and implemented all across the globe, even in the toughest environments. The implementation of 5G will increase the need for energy further, and we want it to be safe and sustainable.

Compared to lead-acid batteries, Polarium's lithium batteries have many benefits, such as half the volume, a quarter of the weight and five times higher energy density. Our game-changing patented technology gives you full control and helps you save money whilst cutting carbon emissions.







## HYBRID

# Maximize the Use of On-Site Energy

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No matter what site or energy sources you are using, Polarium's advanced modular technology is flexible and made easy to use. Connect our hybrid solution directly to your on-site energy source and in a few simple steps you are good to go. Our lithium batteries have high energy density and are of superior quality, meaning longer service life of up to 6,000 charge and discharge cycles.

By integrating Polarium's hybrid solution to on-site solar panels, you can use energy from the sun to keep your network running on green energy at night. Or you can use it to reduce your dependency on fossil fuels if the power grid fails. We created our series of smart lithium battery solutions to let you focus on your core business - while saving money and helping our planet at the same time.

# Premium Products Designed in Sweden

# Our Products

## Battery

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Our smart lithium Battery range is in use on all continents and in all climate zones – from the equator to the Arctic. Our Battery modules are built with cells from the world's leading lithium cell manufacturers. Compared with lead-acid, Polarium's lithium batteries offer multiple benefits, such as half the volume, a quarter of the weight, and five times higher energy density than conventional batteries. Our game-changing patented technology gives you full control and helps you save money whilst cutting carbon emissions.

### Battery Indoor & Outdoor

Polarium's indoor solutions are designed for IP20 applications. Polarium's outdoor solutions are designed for IP55/65 applications. Products range from 50 to 250 Ah, Outdoor 8-50 Ah in a variety of sizes, mechanical formats, and cell chemistries (nickel-based or iron-based). Other capacities can be discussed upon request.

### Key Features of Our Range

- Smart batteries specifically designed for the telecom environment.
- Variety of form factors to fit most standard enclosures.
- Intelligent features to allow easy replacement of lead-acid batteries without complicated settings or adaptations.
- Ease of use - plug-and-play installation.
- Each battery has a battery manager that can interface with remote site management systems.
- Our charge-control makes the batteries independent of current control from the power system.
- Anti-theft feature to disable use of battery if removed from system (optional).

# Battery Indoor Range

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Nickel-Based



## Battery 19"/2U Module

Available in:  
50 Ah

Nickel-Based



## Battery 19"/4U Module

Available in:  
100 Ah  
150 Ah  
200 Ah  
250 Ah

Nickel-Based



## Battery 23"/2U Module

Available in:  
100 Ah  
200 Ah

Iron-Based



## Battery 19"/4U Module

Available in:  
50 Ah  
100 Ah  
150 Ah



# Battery Outdoor Range

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Nickel-Based



**Large  
Battery  
Outdoor**

Available in:  
43 Ah

Nickel-Based



**Small  
Battery  
Outdoor**

Available in:  
08 Ah

# Digital Services

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## Studio

Studio is a PC based SW tool for direct access to Polarium batteries via an RJ45 port. Studio is useful where a more in-depth analysis of battery data and performance is required. It is not used in standard installations but is perfect for battery evaluation or analyzing batteries as part of a general site diagnostic exercise. With Studio, we also offer our customers a Remote Access Third Line Expertise Support.

## Connect – Bridge

Connect Bridge is an advanced communications interface that translates the standard ModBus used in our batteries to various communication protocols. The Bridge comes with CAN, TCP/IP and can be fitted with customized protocols. Additionally, it provides Bluetooth access to the battery system for installation and maintenance staff.

## Connect – Alert

Connect Alert is an extended alarm interface which communicates with our batteries and translates information or alarms to operate two configurable dry connector relays. Additionally, it can provide Bluetooth access to the battery system for installation and maintenance staff.

Using the Polarium Mobile App or Studio, you can access the Connect Alert to monitor alarms and battery performance data. You may also configure alarm settings in the Polarium Mobile App as well as record charge/discharge sequences during battery performance tests with Studio.



INSIGHT

# Tower of Power

Enabling endless energy

## INSIGHT

# Tower of Power – Rethinking Power Backup to Fight Climate Change

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**It is time for mobile operators to rethink power backup for telecom towers. From an insurance policy that is critical to have but only used for a fraction of time, to the best friend in reducing energy bills and fighting climate change.**

If 4G gave us smartphones and all the information in the world at our fingertips, 5G will give us a truly connected world. One where not only humans are connected via their phones, but where everything is connected: from cars and refrigerators to industrial robots and 3D printers. And in a world where everything is connected all the time, connectivity must never be lost.

The implications of the 5G paradigm for mobile operators are profound. They need to guarantee close to 100 percent uptime, as operating without interruptions is crucial as more and more critical applications are connected. Meanwhile, 5G requires a denser network infrastructure, with more base stations in a given area. In addition, carbon emissions need to be reduced to reach sustainability goals and offset expected increases in carbon pricing.

Energy consumption already amounts to 20-40 percent of network operating expenditures and networks make up 80 percent of mobile operators' greenhouse gas emissions. 5G networks will devour at least twice the amount of energy as today's networks.

Mobile operators must therefore rethink how they use power backup. It is currently an underutilized asset, especially in those parts of the world where the grid is stable. Rather, power backup should be seen as the operator's best friend in reducing their energy bill and fighting climate change.

Lithium-powered backup solutions can be used to store renewable energy. The main challenge with renewable energy is that it might not be produced when it is needed most. By storing energy when it is abundant and cost-efficient, to then be used when it is scarce and expensive, the telecom industry can cut costs and reduce fossil fuels from their networks.

In this way, tower sites become power sites that help solve some of mobile operators' most pressing issues: enabling connectedness, reducing energy costs at a time when energy consumption is expected to double, and making the world more sustainable.



# Our Technology

## Safe

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Our top priority is – and always will be – safety. All our products are designed with your safety in mind - thoroughly verified and certified for safe operation. We have a completely redundant safety system in our BMS, including electronically controlled circuit breakers, and thorough control in the design and manufacturing of every system component. We also have advanced solutions for propagation prevention. The batteries are protected during transportation, installation, and use, even in the toughest conditions. Polarium is safe every step of the way.

## Simple

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In a few simple steps, you're good to go. Advanced technology made easy to use, giving you complete control. Easy installation and zero maintenance – just connect the cables and turn it on. Our products are plug-and-play compatible with existing power systems due to our patented charge control function. Configuration and testing are automatic. Polarium's solutions are designed to support a wide range of deployment configurations and integration partners, with low and high voltage battery systems.





## Strong

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We have installations in more than 50 countries, from the equator to the Arctic. Our products are strong, robust, and of superior quality with a guarantee to provide a long-lasting life. They just keep working, even in the most extreme conditions and environments. The robust design includes optional ingress protection of the electronics. A wide range of lithium cell chemistries targeting different site conditions make our offering stronger than any other alternative on the market.

## Smart

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Due to the embedded intelligence of our lithium batteries, you always know the state of charge (available capacity in real time) and the state of health (available life for optimal planning and usage). With its remote management system, our lithium-powered backup solution is maintenance-free and gives you full control. You can also manage your on-site climate control system based on the internal temperature of your lithium batteries or you can shut down non-prioritized loads. With the smart information already embedded in your lithium batteries, you can control, plan, reduce costs, and reduce environmental impact.



## Secure

You can feel secure, knowing that your Polarium solution is protected. In many parts of the world, lead-acid batteries are stolen for scrap metal, private use, or re-sale. Polarium's lithium battery modules eliminate the first two reasons for theft. To make resale unattractive, we have developed multiple anti-theft features for our batteries, which prevent discharge of battery modules if removed from installations. In addition, our batteries are prepared for our optional GPS tracker and marking options for recovery in case of theft.



### Anti-Theft Systems

#### Theft protection solutions

- Anti-theft features

#### Theft recovery solutions

- Tracker
- Branding
- Engraving

## Sustainable

Polarium's lithium batteries are fully recyclable and meet all RoHS, WEEE and REACH requirements. Energy turn-around losses typically amount to only a few percent points, which is better than other lithium batteries (which normally record turn-around losses of up to 5%) and lead-acid batteries (normally up to 30%). All our solutions and products are designed to have exceptionally long lifetime. Our low-carbon manufacturing and installation, efficient operations, and the fact that our products are recyclable – all contributes to a circular business model.



[www.polarium.com](http://www.polarium.com)