



TELECOMMUNICATIONS POWER SOLUTIONS



With Eaton® as your power solutions provider you are never alone

Keeping you in power – continuous, clean power is the core foundation of any dependable communications network. Our focus is to provide smart, efficient, reliable and innovative solutions to ensure that network power is always on while also striving to help you meet your other business objectives.

Ready, available and supported – Eaton makes this happen by providing you with the very best quality of products, global infrastructure and people. Our support network means that you are never alone when it comes to your power needs.



YOU'RE NOT ALONE

Empowering you – Comprehensive Product and Service Solutions

Your network power system is a power chain that can be managed just like a supply chain. Eaton has a first class capability to ensure that you get a seamless and high quality power solution right along your power chain.

Powerware range: including AC and DC power systems, power management software, cabinets and enclosures, batteries and other products.

Heinemann range: offers both thermal circuit breakers for low-current applications and hydraulic-magnetic circuit breakers for high-performance high-current applications.

Services: Eaton offers a wide range of services anywhere in the world including site investigation and support, design, installation, remote monitoring, project management and full turnkey integration services.

Global Partner with Local Focus

A locally based and local knowledge telecommunications power solutions company with an on-site presence from installation right through to maintenance servicing.

Regional sales headquarters are located in USA, Asia and Europe, with sales offices in over 30 countries and representation in over 100 countries.

A **global player** in the telecommunications power industry and part of Eaton Corporation – a global diversified industrial manufacturer and leader in electrical power quality, distribution and control.

Always thinking – Intelligent and Reliable Power Systems

Reliability is paramount. Eaton offers very high reliability power systems through

- Six Sigma design
- accelerated life cycle testing
- field environmental protection
- rigorous field follow-up

Eaton power systems offer a complete solution for intelligent remote control and monitoring of batteries, fuel cells, and ancillary equipment. Systems offer flexibility, precision, reliability, efficiency and automation – without added complexity.

By your side – Technical Expertise and Support

For **more than 40 years** Eaton has been providing tailored standby power management solutions for telecommunications networks around the world.

We are proud of our excellent reputation for strong pre- and post-installation service support including design, integration and operational skills, and our field proven practices. Quick response is ensured through a network of fully trained on-site technicians and regional Eaton repair sites strategically positioned around the globe for fast turn around.

Green Technology Innovation and Stewardship

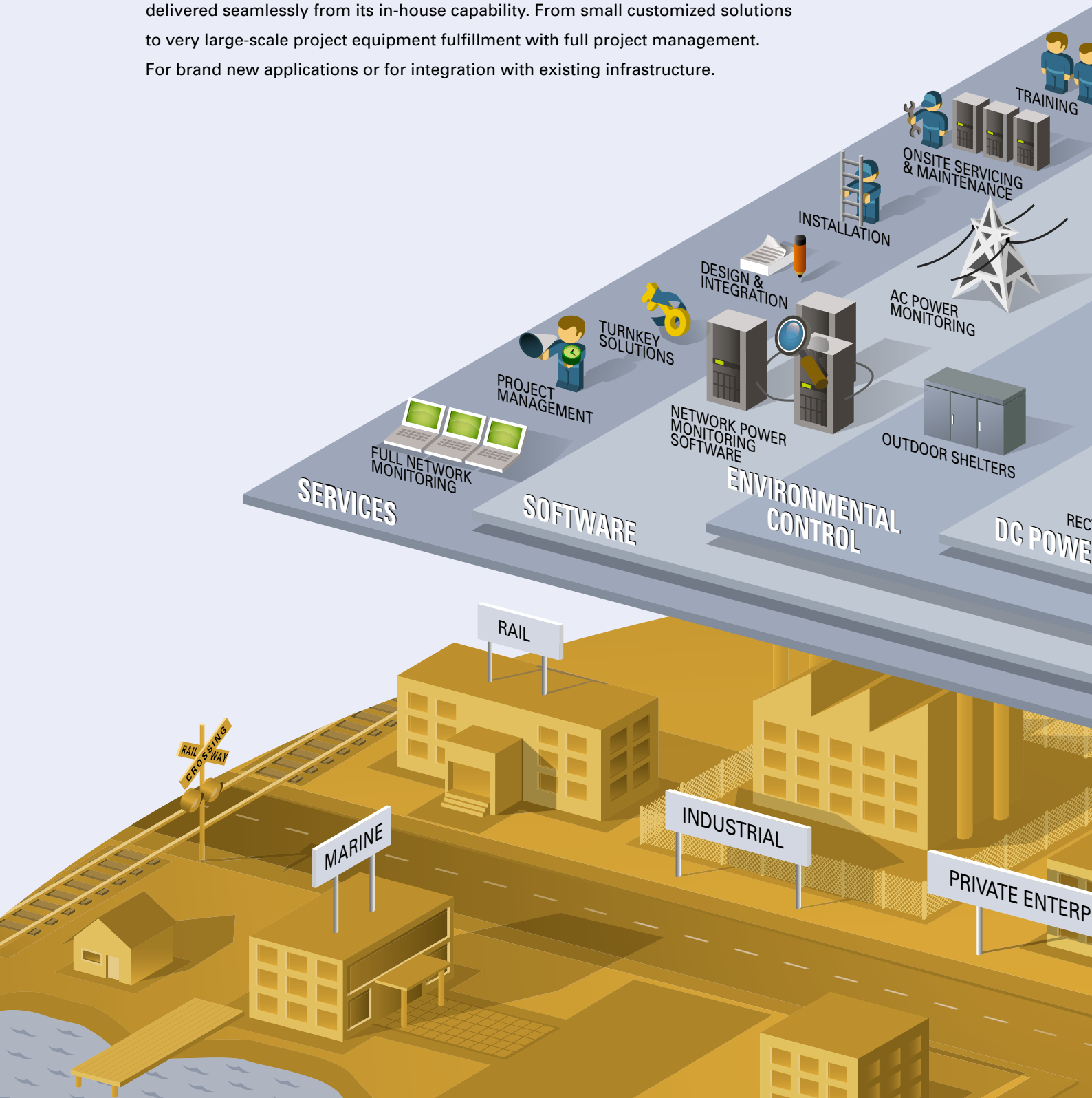
Eaton strives to provide customers with greener solutions through smarter and more efficient system designs that extend the life of rectifiers, batteries and ancillary equipment. We are a leader in developing new technologies such as integrated clean fuel-cell backup power solutions; generator startup optimization software (see case study); and support services like our "Green Building" project – all aimed at helping our customers achieve their green efficiency goals.

Leading by example: embedded in our philosophy is the consideration of the environment and our communities, and the environmental sensitivity of how we conduct our own business worldwide is of prime importance. Virtually all of Eaton's facilities worldwide are ISO 14001 compliant - a rigorous standard for managing and improving environmental performance. Eaton also participates in a variety of volunteer government partnership green programs, including helping our suppliers to be greener. Furthermore, Eaton has pledged to reduce its own greenhouse gas emissions intensity by 18% (adjusted for production) by 2012.

CAPABILITIES OVERVIEW

A complete range of secure power products and services ensures a seamless solution

Eaton can provide a complete range of fully integrated localized solutions, delivered seamlessly from its in-house capability. From small customized solutions to very large-scale project equipment fulfillment with full project management. For brand new applications or for integration with existing infrastructure.



Products and Services

Eaton's product and service range and experience extends right along the power chain. A wide range of high quality Heinemann and Powerware AC and DC power products, enclosures and software tools combined with a comprehensive service offering ensures the right solution is identified for your current and future network power needs and can be fully supported thereafter.

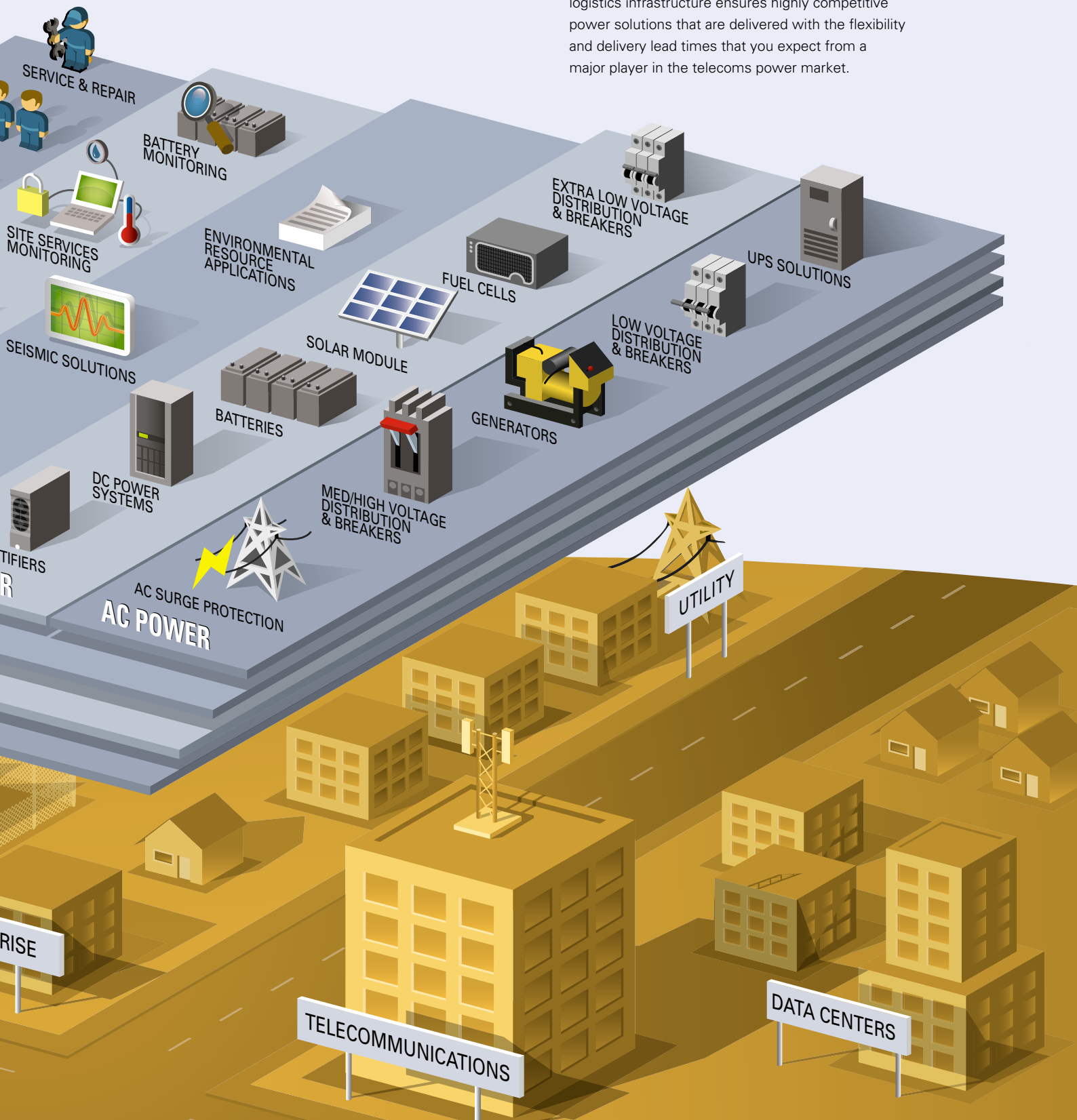
Markets

Expertise in quality secure power solutions to the following market sectors:

- Telecommunications
- Data centers
- Utility
- Rail
- Marine
- Industrial
- Private enterprise

Global Manufacturing and Logistics

Eaton's global manufacturing capability and world-class logistics infrastructure ensures highly competitive power solutions that are delivered with the flexibility and delivery lead times that you expect from a major player in the telecoms power market.



DC PRODUCT RANGE AND APPLICATION

Eaton has a solution for every telecommunications network power need

EAT•N | Powerware

Powerware DC Power Solutions Range

A comprehensive range of Powerware DC power solutions make it easy to select a solution for any application – big or small. They are fully scaleable and modular which conveniently allows for changing power requirements in the future.

Expert advice is available on the system that will best suit your needs, from small-medium private enterprise network power requirements to any situation in a large-scale core network.

Backup power – A range of backup power options including batteries, fuel cells and generators can be integrated to optimize any solution.

Outdoor Enclosures – Outdoor cabinets and enclosures are available to suit most applications.

Heinemann Electrical Protection Solutions

Eaton offers a full range of hydraulic-magnetic circuit breakers and integrated panel solutions ideally suited for telecom applications. Ranging from 0.1 to 1200 Amps, the individual breakers carry 100% of rated current without nuisance trips at elevated temperatures, provide precise trip characteristics across a very broad temperature range and will trip instantaneously upon short-circuit.



METRO POWER SOLUTIONS*

Powerware Metro Power Solutions provide high power density solutions that range in size from 1.8 - 72 kW (30A – 1500A) as single cabinet solutions that are suitable for end-of-row or centralized architecture.

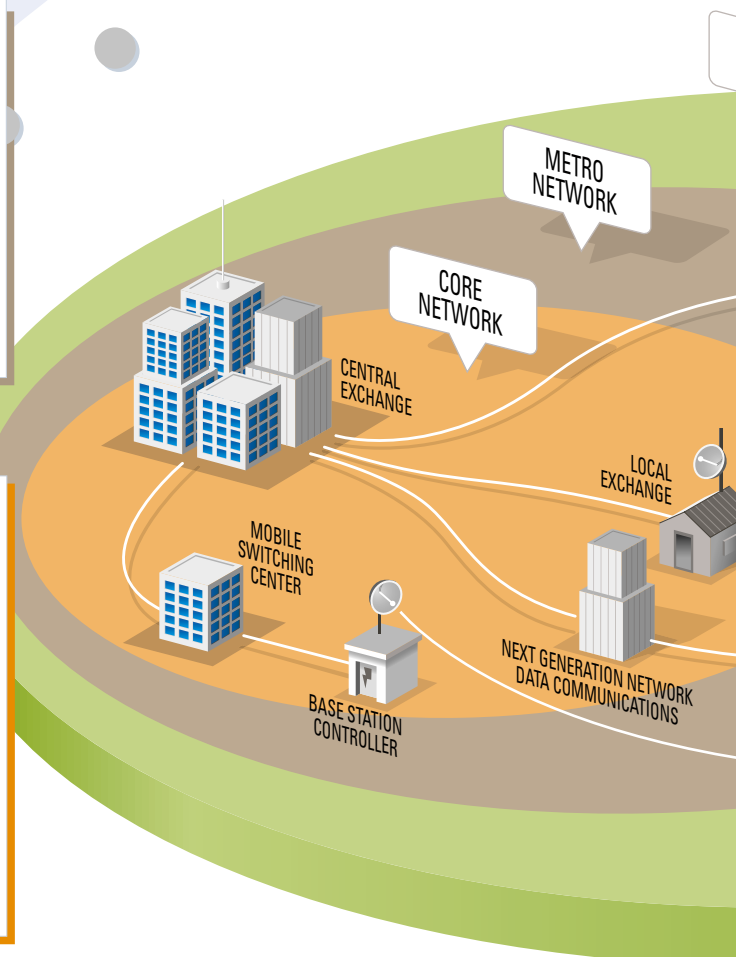
Up to 72 kW



CORE POWER SOLUTIONS*

Powerware Core Power Solutions provide high reliability and security of power. Systems range in size up to 750kW (1000A - 15000A) with flexible AC and DC distribution options available. At the heart of the system, Eaton Powerware rectifiers are based on a design architecture that is proven in the field over thousands of millions of hours.

Up to 750 kW



Technology Advances

Eaton's 3G products are new and innovative, allowing us to provide you with more solution options than ever before. Features of Eaton's 3G products are designed to save network OPEX and CAPEX. They include increased power and enhanced power density for space critical applications, greater system flexibility, greatly enhanced user interface, and expanded intelligent control and monitoring options.

ACCESS POWER SOLUTIONS*

Powerware Access Power Solutions offer high power density solutions ranging in size from 1.8 – 21.6 kW (37.5A – 450A) in single cabinet solutions with or without integrated battery backup and a wide range of power distribution options. Eaton Access Power Solutions have a user-friendly interface making them easy to install and commission, and suitable for rapid deployment.

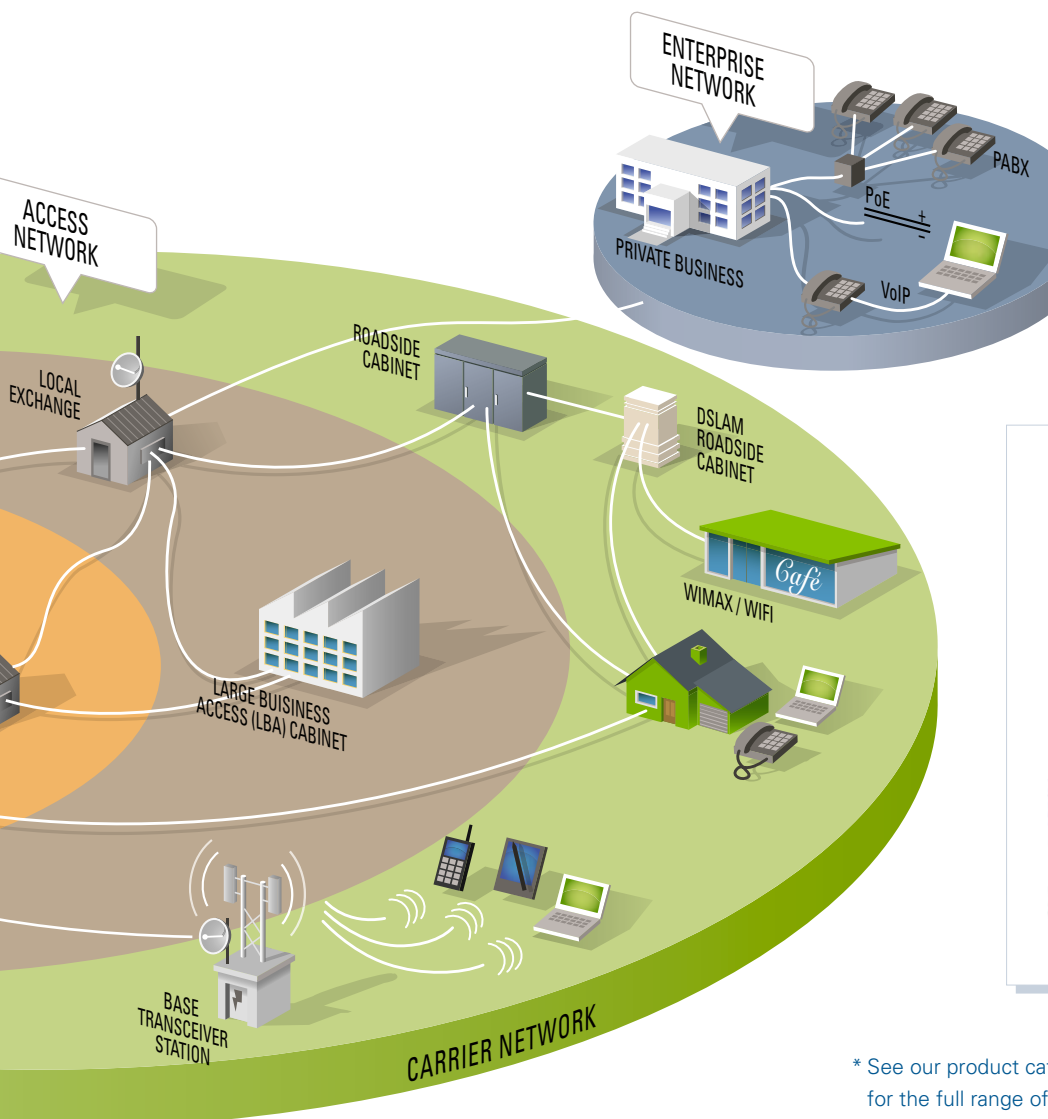
1.8 → 21.6 kW



ENTERPRISE POWER SOLUTIONS*

Powerware Enterprise Power Solutions offer the perfect solution for the modern business. Solutions range in size from 900W - 4.5kW (18.75A - 93.75A) and offer intuitive plug-and-go installation, and maintenance free operation. The slim line profile option makes it suitable for limited space situations such as server rooms. Product applications include: PABX, PoE, VoIP/IP PBX for any business network.

900W → 4.5 kW



OTHER INTEGRATED POWER OPTIONS

- Fuel cells
- Batteries
- Solar modules
- Gen sets
- Inverters
- Converters
- Circuit breakers
- UPS

ENCLOSURES

Eaton offers a wide range of outdoor enclosures. From small and unobtrusive "Pedestal" cabinets ideal for DSLAM rollouts through to large roadside cabinets for broadband WiFi nodes and micro cell sites. Enclosures come with a range of heat exchange and air conditioning options.



* See our product catalog or visit www.Powerware.com/Telecom for the full range of Powerware DC Products

GLOBAL SERVICES CAPABILITY



Eaton offers a comprehensive range of network power services

Design and Consultation Services

Skilled engineering staff can provide a full design service for power systems to specifically suit individual applications and sites. Eaton can also provide extensive network PowerChain Management™ consulting expertise to help you achieve targeted reductions in network capital (CAPEX) and operating expenses (OPEX) with existing network infrastructure.

Integration Services and Installation

Telecommunications integration services provide a complete install, testing and integration service for any type of communications or other electronic equipment to world leading standards of quality. Integration of equipment with an appropriate power system and batteries into one of Eaton's own range of outdoor enclosures or into a custom designed enclosure can be carried out on-site or in an Eaton factory. Fully trained Eaton customer service engineers can carry out all installation tasks or supervise and assist local staff. Typical projects Eaton has completed include the integration of network access equipment into roadside cabinets and the on-site installation and commissioning of telecommunications equipment.

Network Monitoring

Full 24/7 power system and battery monitoring and reporting services offered by Eaton provide remote diagnostics for performance maximization.

Training

A comprehensive range of training courses designed to provide the right level of product knowledge with practical demonstrations and hands-on learning. Courses can be arranged at an Eaton location or at a customer's site.

After-Sales Service and Repairs

Eaton Regional Repair Sites, staffed by fully trained technicians, are strategically located around the world to provide rapid turnaround times. Individually tailored service contracts are available so customers can choose the ongoing service package that best suits their requirements. Options include extended warranty periods, unlimited out-of-warranty repairs, immediate replacement, on-site maintenance and battery testing and conditioning.

Project Management

See the case study with British Telecom (opposite) as an example of our extensive experience in full project management.

Customer Case Study: British Telecommunications plc (BT)

Eaton's project-based relationships with the BT Group's businesses, BT Wholesale and Openreach, are an example of how Eaton can perform as a global supplier, to ensure important large-scale projects with critical timelines can succeed.

This is an example of Eaton project management demonstrating flexibility, reliability, delivery and implementation speed.

The Background: BT's Local Loop Unbundling

As a result of BT Group's undertakings to the UK telecommunications regulator, Ofcom, BT has committed to unbundle the local loop against a challenging timeline, allowing communications providers fair and equivalent access to its exchanges and network services. In line with the regulatory strategy, the physical exchange environment has had to change considerably. BT chose Eaton to help with these challenges because it understood the value of close project-based relationships.

The Challenge: Unbundle the local loop against a tight timeline

With the requirement of BT Group to eventually unbundle the whole of its Local Access Network, Eaton was tasked with providing the resources, flexibility, project management and quality products and services that this huge undertaking has demanded. Eaton provided products and services solutions into BT's local exchanges – including DC power systems, distribution systems, power monitoring systems and installation solutions. This has enabled BT to meet a demanding schedule of secure and well-managed exchange access for communications providers. **Within the first 20 months alone, Eaton installed over 20MW of power plant. With a 15-day turnaround** between order receipt and site completion, Eaton has consistently achieved **99-100% on-time delivery**. Now, with growing UK consumer and business demand for network services, Eaton is tasked with **mobilising hundreds of projects in parallel**.



MONITORING, CONTROL AND OPTIMIZATION

Maximum flexibility and network performance

Eaton power systems offer intelligent control and flexible monitoring features that increase network reliability, security, asset protection, and operating efficiency.

Intelligent System Control

The SC200 system controller lets you monitor all of your power systems using high-level communication capabilities (Ethernet, SNMP version 3 and Web configuration) for real time information at the click of a mouse. The built in intelligence of the controller automatically optimizes the efficiency of systems by managing the many highly customizable parameters.

Wide Ranging Site Monitoring and Control

SiteSure-3G™ is a suite of solutions for the monitoring and control of a wide range of external devices with either digital or analog inputs and outputs. Input/output expansion can be handled simply and easily by adding more SiteSure-3G™ modules.

Remote Battery Cell Monitoring and Fault Diagnosis

CellSure™ provides real time status information down to individual cell level. With many benefits including early warning of potential failures, information about reserve time remaining on discharge, and remote battery testing, it is a cost effective option for network wide deployment.

Monitoring Software: Remote Monitoring and Control Packages

Powerware systems are available with Eaton's own monitoring and control software package, PowerManager II™. Or you can use other industry standard packages such as HP OpenView and Netcool.

Optimization Features

Eaton can provide extensive network PowerChain Management™ consulting expertise to help you achieve targeted reductions in network operating expenses (OPEX), capital expenditure (CAPEX) and greenhouse gas emissions.

Eaton is constantly developing new and innovative automated control software to optimize network power asset life and efficiency. Examples include Load Based Rectifier Shutdown (LBRS) - designed to improve system energy efficiency and life span, in sites with large system backup capacity; battery life maximization protocols such as auto periodic equalize and thermal compensation; and Eaton Fuel Optimizer for optimizing operating costs between generators and batteries.





Eaton's Fuel Optimizer Technology Saves \$Millions – Case Study of an African Network Operator

Eaton's Fuel Optimizer (EFO) technology was developed for an African customer deploying GSM technology in remote areas where frequent AC supply outages are common. To maintain the network, the use of permanent backup generators at sites was necessary but costly. Optimizing the system between generator and battery would provide the opportunity for significant savings.

Eaton's EFO technology intervenes on the AC failure alarm, which is the typical generator start signal in preparation to take over AC grid supply and recharge the standby batteries. EFO intervention means that batteries will cover the outage for many short outages without generator startups. In longer AC outages, EFO allows extended battery backup to a predetermined depth of discharge (along with its known added cost to the battery life) before a generator start signal is given. The trade-off between battery life and associated generator savings is optimized.

EFO also controls how long the generator will run for where the AC grid supply has returned but where a periodic full battery charge or top-of-charge is required. Eaton's battery monitoring provides this information via the controller. Input from a shelter temperature alarm is also used to either trigger the fan to run (if outside conditions are appropriate) or to force the generator to start for AC powered air conditioning.

EFO can save network operating costs of frequent generator start-ups and repeated generator 'run-on time' and 'motor cool down' - associated with mounting diesel fuel and run-time-scheduled servicing costs. Avoiding frequent

periods of running generators under zero load may also avoid possible 'glazing' of the cylinders and resulting reduced useful generator life. Additionally, EFO reduces repeated and continuous short battery discharges with insufficient time to reach top of charge between cycles which, leads to a capacity 'staircase effect' and resulting "State of Charge" alarm activation. The above costs can easily contribute to a serious erosion of profits.

Results for the African Network Operator

With a baseline average of 1500 genset run-time hours per site per year, Eaton's EFO solution reduced run time hours per site by almost half. This equated to an annual reduction of diesel fuel usage of more than 2000 liters per site per annum, and 4.55 million liters saved annually across the network of 2,256 sites. With genset run time dramatically reduced, so were the costs of scheduled servicing. On a per annum basis there was an average of 2.88 fewer services required per site. That's 6,500 fewer service visits across the network. These fuel and servicing cost-savings more than compensated for the reduced battery life that added two thirds cost to the battery bill over an otherwise (conservatively estimated) five year battery life.

Based upon a diesel price of US\$0.37 per liter, EFO produced total operating expense savings (net of annualized battery cost increases), in excess of US\$1million per year across the network.

YOU'RE NOT ALONE

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