

Powering Railways and Metro Networks

Traction substations, wayside energy storage, power quality and electrical protection for more efficient and sustainable rail transport.

TRACTION RECTIFIERS

High-power DC substations for railway and metro traction networks.

■ 750V / 1,500V / 3kV DC Systems

Traction substations adapted to all DC voltage levels used in metro, commuter rail, and conventional railway networks.

■ Reversible Substations with IGBT

IGBT technology for regenerative braking that returns energy to the grid, reducing total consumption by 15-20%.

■ Transformer-Rectifier Units 2-30 MVA

Power groups from 2 to 30 MVA in 12-pulse and 24-pulse configurations for minimum harmonic distortion.

■ Containerized Deployment

Pre-assembled substations in ISO containers for rapid installation and reduced civil works.

WAYSIDE ENERGY STORAGE (WESS)

Battery and supercapacitor systems alongside tracks to maximize energy efficiency.

■ Regenerative Braking Capture

Li-ion and supercapacitor systems capturing train braking energy, delivering 15-30% savings in energy consumption.

■ Voltage Stabilization

Maintains catenary voltage within operational limits in areas far from substations, improving service reliability.

■ Substation Peak Shaving

Demand peak reduction allowing 20-40% smaller transformer sizing, saving on CAPEX.

■ 15-20% CAGR Growth

Rapidly expanding market. Containerized solutions ready for deployment in under 72 hours.

POWER QUALITY FOR RAIL

Harmonic filtering, reactive power compensation, and flicker mitigation at substation AC intake.

■ Active Harmonic Filters

Filtering at AC intake of 6-pulse substations with 25-30% THDi. Reduction to <5% for regulatory compliance.

■ Flicker Mitigation

Active flicker control from intermittent train operation, protecting nearby consumers.

■ SVC/STATCOM Reactive Compensation

SVC and STATCOM systems for dynamic power factor correction and voltage stabilization on the distribution grid.

■ EN 50160 / IEEE 519 Compliance

Solutions designed to meet European and international electrical supply quality standards.

RAILWAY ELECTRICAL PROTECTION

Surge protection, DC circuit breakers, and UPS systems for critical signaling.

■ Surge Protection

Catenary and traction equipment protection against atmospheric and switching surges.

■ Signaling UPS

Uninterruptible power supply systems for critical signaling, communication, and control equipment.

■ DC Circuit Breakers

High-speed DC circuit breakers for traction feeder and substation protection.

■ AM-X with 5G/WiFi Monitoring

AM-X protection with real-time 5G/WiFi monitoring for early fault detection and predictive maintenance.

SOLAR INTEGRATION

Photovoltaic solar energy integrated into depots and stations to feed the DC traction bus.

■ Depot Rooftop Solar

Solar rooftops on railway depots and workshops generating clean energy for auxiliary operations and train charging.

■ Station Solar + Storage

Solar installations at stations with batteries feeding directly into the DC traction bus, reducing grid dependency.

KEY FIGURES

750V - 25kV

Voltage range

15-30%

Energy savings with WESS

<72h

Containerized deployment

10+ years

Battery lifespan

TARGET CUSTOMERS

- Adif / Renfe (Spain)
- Madrid, Barcelona, Bilbao Metro
- Latin American metro operators
- EU-funded rail projects

ENERGY SOLUTIONS FOR YOUR RAIL NETWORK

Our engineering team designs traction substations, WESS systems, and power quality solutions tailored to your operation.

Eneraq

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European technology · In-house R&D