



ENVILINE™ ERS

Energy Recuperation System for DC rail transportation

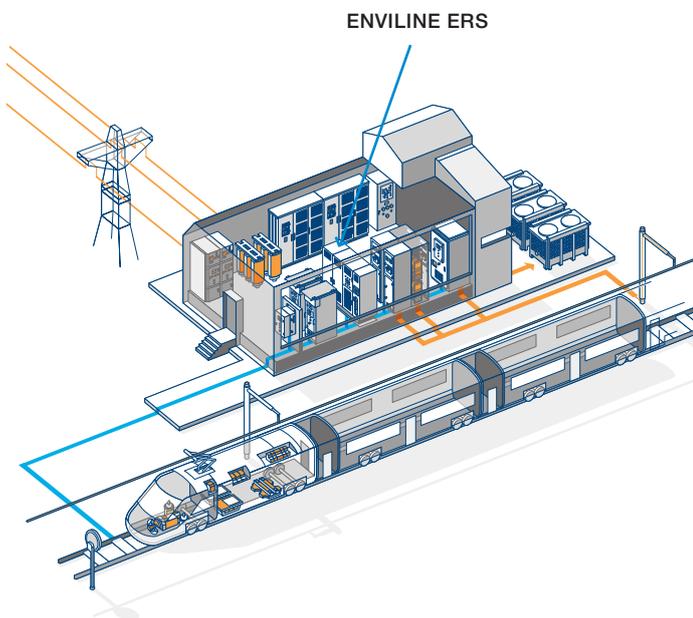
ENVILINE ERS – Energy Recuperation System

Reduce energy costs by returning the braking energy to the AC network

Metro, light rail and tram operators are under constant pressure to reduce operating costs. The regenerative braking systems, installed on nearly all traction vehicles, can achieve this by converting the kinetic energy of the vehicle into reusable electric energy. The use of the regenerated energy helps to reduce the overall energy consumption and CO₂ emissions. It is clearly the biggest opportunity to improve the energy efficiency and sustainability of rail transportation systems.

Start saving money instead of burning it

A moving train contains energy, known as kinetic energy, which needs to be removed from the train in order to stop it. Whenever a train brakes, its kinetic energy is converted into electricity and returned to the traction power line. The innovative ENVILINE ERS is a wayside energy management system that recuperates the surplus braking energy by feeding it back to the AC network. The ERS can reduce the total energy consumption of a rail transportation system by 10 – 30 percent.



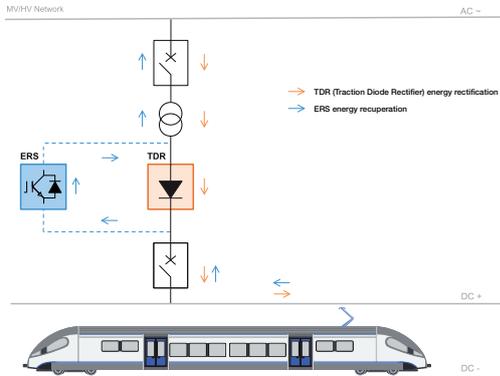
DC traction power substation

Key benefits

- + Low energy costs through energy recuperation
 - Improves the energy efficiency by 10 – 30 percent
- + Improves quality of AC power network
 - Harmonics and reactive power mitigation
- + Lowest upfront cost and maintenance cost
 - Smallest footprint, easy installation, low maintenance
- + Compatible with new and existing systems

Key features

- Energy recuperation lowers total energy costs
- Smallest footprint allows easy installation
- Low maintenance and long operating lifetime (over 25 years)
- Proven technology
- Localized service and support
- High overload capability
- Low harmonics content (TDD < 5 %)
- Reactive power mitigation when not recovering the energy
- Harmonics mitigation due to active filtering functionality
- Possible rectification boost (bidirectional operation of ERS)
- Easy integration with existing supply system
- Complete internal protection including E-STOP function
- Modular architecture allowing scalability of the system according to customer needs
- Energy flow monitoring according to customer needs



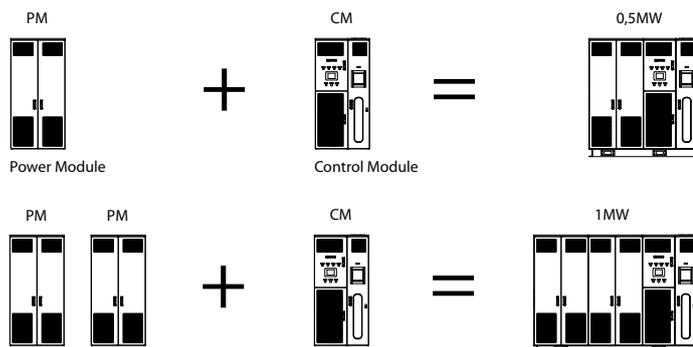
1 Diagram of a typical system setup | 2 ENVILINE ERS

How does the recuperation principle work?

When decelerating or braking, a traction vehicle (train, tram or trolleybus) is feeding the braking energy back into the DC power network. In a typical application if braking energy is not used by other vehicles in the network, it must be dissipated by the braking resistors. Instead of dissipating the energy using onboard resistors, the ERS is able to recuperate the braking energy by feeding it back to the AC network or by feeding local auxiliary systems like air-conditioning, heating, ventilation, lighting etc.

Opportunities beyond energy efficiency

Besides high energy efficiency, the ERS provides additional benefits. For example the ERS can mitigate the reactive power, when not pushing the energy back to the AC network. It can also provide active filtering, thus reducing the harmonics effect. Additionally the ERS can offer support for existing rectifiers thanks to the active rectification made possible by the bidirectional operation of the system.



The ENVILINE ERS modularity

Technical Data

ENVILINE ERS

Nominal TPS (Traction Power Supply)	600/750V _{DC} (1500 and 3000V _{DC} available soon)
Converter power range	0.5 to 1 MW (2 MW available soon)
Overload capability	up to 225%
Operating voltage range	500 to 1000 V _{DC}
Efficiency	97.5%
Cabinet dimensions (W x H x D)	2.0 x 2.2 x 1.0 m (width depends on configuration)
Maximum system dimension	4.6 x 2.2 x 1.0 m
Weight	2100 kg (basic configuration)
Storage temperature	-20° to 60°C
Operating temperature	0° to 40°C, no derating
Maximum temperature (with derating)	50° C
Elevation	1000 m
Enclosure	IP21 / IP32 (option)
Remote access	CAN
SCADA output	6 input contacts, 6 output contacts (basic)
EMC	EN 50121-5
Standards	EN 60146-1 / EN 50328
Certification	CE

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