

AGP Metro Polska, Poland

Reliable power supply to support Warsaw Metro



Innovative traction power supply solution incorporating the world's largest wayside energy storage system, which captures braking energy from decelerating metro cars and feeds it back to accelerating trains.

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01 New Metro Line 2
in Warsaw, Poland

In 2015, the 6.1 kilometers central section of the second metro line, called M2, was commissioned eight meters under the Vistula river and serves over 140,000 passengers a day on working days. It is powered by seven underground substations supplied by ABB that are working dependably.

ABB's solution

- Turnkey supply of five combined traction and auxiliary substations rated at 15 kV / 825 V DC / 400 V AC and two auxiliary substations rated at 15 kV / 400 V AC
- A 40 MJ (megajoule) wayside energy storage system (ESS) based on Envistore® super-capacitors to recuperate and reuse braking energy from metro cars. The ENVILINE™ DC wayside ESS is the largest of its kind in the world.
- Turnkey project including system studies and specifications
- Supply of complete range of substation equipment including AC and DC switchgear, transformers, rectifiers, substation automation, control and protection systems as well as supervisory control and data acquisition (SCADA) system

Customer benefits

- Enhanced energy efficiency of metro line through reuse of braking energy
- Continuous operation, high performance and productivity supported by reliable and high-quality power supply
- Improved ecological footprint and reduced operating costs of new east-west connection
- Scalable systems using state-of-the-art and proven technologies enabling future extensions
- Optimal solutions based on long experience and in-depth knowledge of the demands of the grid as well as storage technologies
- Proficient turnkey implementation by experienced system integrator



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02 World's largest DC
wayside energy storage
system recuperating
and reusing braking
energy from metro cars

03 Warsaw Metro
control room

ENVILINE™ ESS

ENVILINE ESS is a wayside energy management system that stores and recycles the surplus braking energy, feeding it back to the power line to assist the acceleration of trains, helping reduce the energy consumption up to 30 percent.

Whenever a metro car brakes, its kinetic energy is converted into electricity and returned on the traction power line. Most of the time, onboard loads and distant trains can only take a portion of this energy, and the surplus is wasted into onboard or wayside resistors. The ENVILINE ESS stores and recycles this surplus energy.

AC and DC traction power supply systems

ABB is an experienced turnkey partner for AC and DC traction substations for all types of applications.

- DC traction substations with standard voltages of 750 V DC, 1,500 V DC and 3,000 V DC
 - Complete substation packages including DC switchgear, transformers, rectifiers, substation automation, control and protection systems
- AC traction substations for 16.7, 25, 50 or 60 Hz applications
 - Comprising single- or two-phase feeder substations and switching posts, autotransformer stations, substation automation, control and protection systems



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MicroSCADA

The MicroSCADA system is integrated in the central section of the M2 line and enables real-time remote control of power equipment in the substations. Improving functionality and supervision for the operator along the entire metro line. MicroSCADA is a part of the ABB Ability™ portfolio of more than 180 digital solutions that help boost uptime, speed and yield. The system has set new standards for Warsaw metro's operations, providing added value to the operators at metro's central control room.

ABB's traction power supply offerings

- Complete electrification for main line railways, metros and urban transport systems
- AC and DC traction substations
- Reversible DC traction substations
- Wayside energy storage systems
- Static frequency converter stations
- Power quality systems
- Network management, substation automation, control, protection and telecommunications systems
- System studies and traction power supply simulations
- Turnkey project implementation from design to commissioning and maintenance

ABB is committed to sustainable mobility by promoting efficient public transport and has a track record of urban rail projects and metros in major cities around the world ranging from Delhi to Sao Paulo and Dubai to London.

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