

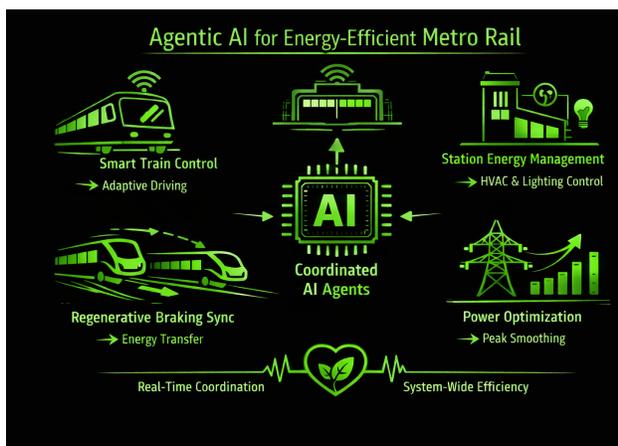
## Agentic AI solutions for continuous, self-improving energy efficiency in metro operations

Verit Alworx delivers predictive, self-optimizing AI systems that cut O&M costs by 4%–12% beyond classical AI, prevent failures before they happen, and unlock real-time decision intelligence for railways, metro systems, telecom, ports and defense.

Energy costs constitute **25–35% of total operating expenditure (OPEX)** in metro rail systems. energy inefficiency is not due to lack of automation, but lack of **coordination and adaptivity**.

Major energy-consuming subsystems include: Traction (train acceleration, cruising, braking), Auxiliary systems (HVAC, lighting, onboard electronics), Stations (escalators, lifts, lighting, ventilation) and Signaling and communications. Conventional energy management relies on: static timetables, rule-based driving profiles, and, Manual or semi-automated control decisions. These render the Current systems are **reactive and siloed**, unable to coordinate energy optimization across trains, stations, and power infrastructure in real time.

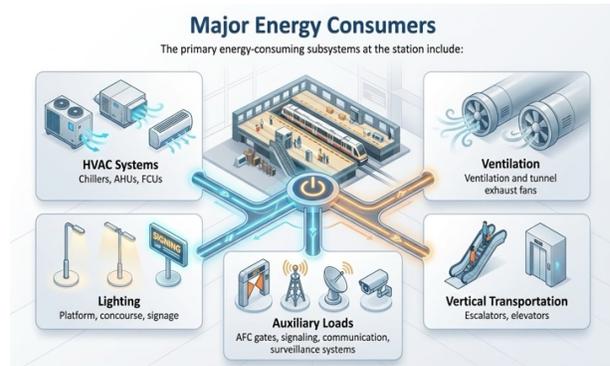
Agentic AI offers a powerful new approach to reducing energy consumption in metro rail systems by enabling intelligent, real-time coordination across trains, stations, and power infrastructure. Unlike conventional rule-based or centralized optimization systems, agentic AI deploys multiple autonomous, goal-driven agents that continuously adapt operating decisions—such as train acceleration, coasting, braking, and station energy usage—based on real-world conditions including passenger load, network congestion, and power availability. This allows energy efficiency to be addressed as a system-level coordination problem rather than as isolated optimizations.



By synchronizing regenerative braking with accelerating trains, smoothing peak power demand, and dynamically managing station systems such as HVAC and lighting, agentic AI can deliver sustained reductions in both traction and station energy consumption without compromising safety, punctuality, or passenger comfort. The approach is scalable, infrastructure-aware, and designed to operate within certified safety envelopes, making it well suited for large, complex metro networks. In doing so, agentic AI supports metro operators in advancing long-term sustainability and net-zero objectives.

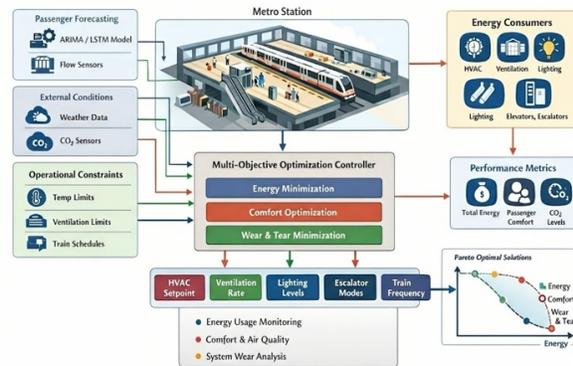
## AI-based Metro Station Energy Management

Metro stations are energy-intensive infrastructures, with HVAC and ventilation systems accounting for the majority of operational energy consumption. Our AI-based energy management system is a data-driven, multi-objective energy management framework that balances energy efficiency, passenger comfort, and operational constraints.



Our solution architecture allows for three modes of operation: **Energy-optimal mode**; **Comfort-priority mode**; and, **Balanced mode**. While the Energy-optimal mode aims to minimise energy consumption during off-peak hours, the Comfort-priority mode focuses on passenger comfort. The Balanced mode is best suited for normal loading hours. The agentic AI system is locally autonomous and can choose between the three modes based on the occupancy data.

The optimization framework is implemented as a supervisory decision-support system that leverages a large set of optimizing variables to autonomously switch between the operation modes or suggests the switch to the human operator. The system operates in parallel with the control systems, ensuring no compromise to safety. The approach is scalable and can be extended to stations across the network. Further, the local AI agents can seamlessly integrate and cooperate with the network-wide agentic system.



We recognize the critical importance of energy saving in Metro operations, not only from an economic point of view, but also, more importantly, from the environmental impact standpoint. Modern energy systems generate (or, can generate) large amounts of high-frequency data that can be fed into machine learning models and AI-based decision support systems for autonomous decision making aimed at saving energy consumption.

Verit AI engineering team will be delighted to co-create with you pathbreaking agentic AI solutions that deliver persistent ROI and elevated quality of service!

Contact us today for a meeting or demo: Web: [www.veritaiworx.com](http://www.veritaiworx.com) | Email: [info@veritaiworx.com](mailto:info@veritaiworx.com)