

How a smart energy management strategy is needed for the railway system?

Smart energy management strategies will thus be required for reliable and energy-efficient operation of the railway system. On the other hand, innovative paradigms for the supply system, such as inductive power transfer technology, will unfold alternative solutions to onboard energy storage for long-range wireless operation of rail vehicles.

Should rail vehicles have onboard energy storage systems?

However, the last decade saw an increasing interest in rail vehicles with onboard energy storage systems (OESSs) for improved energy efficiency and potential catenary-free operation. These vehicles can minimize costs by reducing maintenance and installation requirements of the electrified infrastructure.

What is a wayside energy storage system?

Wayside energy storage installation can be a more efficient and cost-effective solution for off-board braking energy recuperation. They can reduce the energy provided by the AC grid and stabilize the DC grid voltage through proper peak-shaving action. Moreover, their design is not affected by space and weight restrictions.

How a railway system can be more energy efficient?

Policies and ethics The huge power requirements of future railway transportation systems require the usage of energy efficient strategies towards a more intelligent railway system. With the usage of on-board energy storage systems, it is possible to increase the energy efficiency of...

How can we reduce energy consumption in the rail sector?

Despite low energy and fuel consumption levels in the rail sector, further improvements are being pursued by manufacturers and operators. Their primary efforts aim to reduce traction energy demand, replace diesel, and limit the impact of electrified overhead infrastructures.

How to reduce energy demand in railway systems?

Comparison among different approaches for energy demand reduction in railway systems [18, 19] On short to medium ranges, charging times are not an issue and can be effectively accomplished under catenary on electrified sections and at stops through dedicated fast-charging facilities.

A problem of peak power in DC-electrified railway systems is mainly caused by train power demand during acceleration. If this power is reduced, substation peak power will ...

This article provides a detailed review of onboard railway systems with energy storage devices. In-service trains as well as relevant prototypes are presented, and their characteristics are ...

In this article is proposed a top-level charging controller for the on-board and wayside railway energy storage

systems. Its structure comprehends two processing levels: a real-time fuzzy logic ...

Electrified railways are becoming a popular transport medium and these consume a large amount of electrical energy. Environmental concerns demand reduction in energy use and peak power demand of railway systems.

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Advanced rail energy storage (thus "ARES") can absorb that excess energy, using it to power electric trains that pull giant slabs of concrete up a gentle slope. In effect, the ...

This Exploratory Topic seeks to develop a set of publicly available planning tools for identification, evaluation, and prioritization of energy storage-related technology developments whose ...

On this basis, the regenerative braking energy utilization technology in urban rail transit based on inverter feedback and energy storage feedback was systematically and comprehensively...

This paper focusses on WESSs for railway application. It was proposed as a method to assess the energy consumption of railway infrastructures and the potential impact of using a battery energy storage ...

Advanced rail energy storage (thus "ARES") can absorb that excess energy, using it to power electric trains that pull giant slabs of concrete up a gentle slope. In effect, the trains convert ...

With the usage of on-board energy storage systems, it is possible to increase the energy efficiency of railways. In this paper, a top-level charging controller for the on-board ...

To further reduce energy demand and greenhouse gas emissions, onboard storage devices are being integrated into the propulsion system of light and conventional rail vehicles at an increasing pace. On high ...

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