

## European Solar and Energy Storage Solutions

# High-speed rail energy storage box



## Overview

---

What is advanced rail energy storage?

Advanced Rail Energy Storage (ARES) uses proven rail technology to harness the power of gravity, providing a utility-scale storage solution at a cost that beats batteries. ARES' highly efficient electric motors drive mass cars uphill, converting electric power to mechanical potential energy.

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.

How energy storage solutions are implemented onboard railway vehicles?

Ragone plot of implemented energy storage solutions onboard railway vehicles. The blue dotted lines are constant energy-to-power contours: each line is a locus characterized by the discharge time displayed above it. Supercapacitors have short charging and discharging times, comparable to braking times of urban light rail vehicles.

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.

What are the advantages of a hybrid storage system?

On electrified sections, the storage devices contribute to accelerations and high load conditions so that pantograph current is reduced, and line voltage

fluctuations are minimized. During braking, the hybrid storage system can be employed for more efficient regeneration of kinetic energy.

Should a stationary storage system have a higher energy capacity?

A SESS, compared to an on-board one, should have a higher energy capacity; on the other hand, there's more freedom regarding the sizing of the system. A stationary storage system should have both high power and energy capacity together with a long charge/discharge life cycle . 3.

## High-speed rail energy storage box

---



### Onboard Energy Storage Systems for Railway: Present and Trends

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 ...

### Review of Studies on Energy-Efficient Train Operation in High-Speed ...

Energy-efficient train operation (EETO) in high-speed railways (HSRs) is an extra cost-effective and flexible means to promote energy-saving. This paper first examines ...



### High Speed Rail (HSR): History, Benefits and Challenges

According to the International Union of Railways (UIC), high-speed rail is eight times more energy efficient than airplanes and four times more efficient than automobiles. Implementing high-speed rail can keep billions of ...



### Advanced Rail Energy Storage: Benefits and Future ...

Advanced Rail Energy Storage Introduction.

Advanced Rail Energy Storage (ARES) is a type of energy storage system that uses gravity and rail technology to store and release energy. It involves placing heavy trains on ...



## **(PDF) Onboard energy storage in rail transport: Review of real**



Onboard energy storage in rail transport: Review of real. Between 2005 and 2016, high - speed rail tracks increased. by 187% in Europe, while China has built two thirds of ...

## **Energy efficiency in high-speed train operation**

Reduction of energy consumption has become a global concern, and the EU is committed to reducing its overall emissions to at least 20% below 1990 levels by 2020. In the transport sector, measures are focused on ...



## **Contact Us**

For catalog requests, pricing, or partnerships, please visit:  
<https://ssab-proiect.eu>