

Does onboard energy storage influence the optimal train driving strategy?

Eng.392 062115DOI 10.1088/1757-899X/392/6/062115 Energy-efficient train driving strategy is an effective way to reduce the energy consumption of train operations. Based on the classic energy-efficient driving strategy approach, this paper studies the influence of the on-board energy storage on the optimal train driving strategy.

Can onboard energy storage systems be integrated in trains?

As a result, a high tendency for integrating onboard energy storage systems in trains is being observed worldwide. 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 analyzed.

Can on-board storage systems be incorporated into train driving simulation models?

The previous on-board storage system model and energy consumption model (described in Sect. 6.2.1) can be incorporated into typical train driving simulation models for efficient-driving purposes. However, including track-side storage systems requires detailed electrical network models and multi-train simulation, as presented in Chap. 7.

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.

Which type of energy storage device is suitable for OESSs of trains?

Three typical types of energy storage devices have been widely investigated for OESS of trains, which are supercapacitors, NiMH batteries, and lithium-ion batteries [3,4]. Supercapacitors have high power density and low energy density, which are more suitable for metro trains with short running distance.

Do onboard energy storage systems reduce energy consumption?

Abstract: With the rapid development of energy storage technology, onboard energy storage systems (OESS) have been applied in modern railway systems to help reduce energy consumption.

where the coefficients (r_0) , (r_1) and (r_2) are all non-negative and depend on factors including the train mass, number of axles, train length and the aerodynamic efficiency of the train. Davis [1] developed formulas for estimating these coefficients from these more basic characteristics of the train. More recent work by Lukaszewicz [2] gives formulas for more ...

One of the key components of a hybrid electric vehicle (HEV) drive train is its secondary energy storage device. The automotive industry is still in the process of debating on the fact, as to which device provides the

best option in HEVs, for the purpose of load leveling. This paper aims at providing a fair idea with regards to the selection of secondary energy ...

Keywords: wayside energy storage, railway power management, regenerative power, train scheduling 1. Introduction ... e.g., design of driving strategy, smart train scheduling, development of vehicle and relevant systems are proposed(1)(2). Employing advanced power electronic technology and so-phisticated control strategy, power and energy management

With the rapid development of energy storage technology, onboard energy storage systems (OESS) have been applied in modern railway systems to help reduce energy consumption. In addition, regenerative braking energy utilization is becoming increasingly ...

Energy-efficient train operation (EETO) in high-speed railways (HSRs) is an extra cost-effective and flexible means to promote energy-saving. ... energy-efficient train timetabling, and EETO considering train timetabling and driving strategy. Next, the current research status and progress on three aspects of EETO in HSRs, namely optimization ...

German rail operator Deutsche Bahn and industrial group Siemens on Monday unveiled the world's first automated, driverless train in the city of Hamburg, billing it as more punctual and energy efficient than traditional trains.

Siemens shows first self-driving train ... Trains drive the perfect timetable automatically, accurate to the second and energy-optimised," said Dr. Roland Busch, CEO of Siemens AG. ... The technical storage or access is strictly necessary for the legitimate purpose of enabling the use of a specific service explicitly requested by the ...

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 ...

The high share of electric vehicles (EVs) in the transportation sector is one of the main pillars of sustainable development. Availability of a suitable charging infrastructure and an affordable electricity cost for battery charging are the main factors affecting the increased adoption of EVs. The installation location of fixed charging stations (FCSs) may not be ...

Flexible self-charging power sources harvest energy from the ambient environment and simultaneously charge energy-storage devices. This Review discusses different kinds of available energy devices ...

DOI: 10.1016/j.cie.2018.09.024 Corpus ID: 53779331; Train speed profile optimization with on-board energy storage devices: A dynamic programming based approach @article{Huang2018TrainSP, title={Train speed profile optimization with on-board energy storage devices: A dynamic programming based approach}, author={Yeran Huang and Lixing Yang ...

Different from the concept of energy consumption, the energy efficiency reflects the efficiency of using energy resource and the service-oriented business philosophy of railway transportation enterprises. The energy efficiency of high-speed train operation is mainly embodied in the operation stage of railway transportation system, but involves a number of factors during ...

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thermal energy storage-powered kilns for cement) or support complementary technologies (e.g., electric LDES with e-kilns for cement or thermal energy storage paired with concentrated solar power). FIGURE 1 Global industrial emissions addressable by LDES 3 Source: Our World In Data, IEA, Roland Berger Global industrial emissions Share addressable

In fact, some traditional energy storage devices are not suitable for energy storage in some special occasions. Over the past few decades, microelectronics and wireless microsystem technologies have undergone rapid development, so low power consumption micro-electro-mechanical products have rapidly gained popularity [10, 11].The method for supplying ...

Battery energy storage (BES) Train as mobile storage can transmit solar energy from site to load centers using a transport network while relieving lines from congestion. ... NG and losses are reduced by 16.5%, 22.9% and 21.5%, respectively. The self-adequacy of network is increased by 2.5 h and the electrical-heating load restorations are ...

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