

DOI: 10.1016/j.energy.2022.123263 Corpus ID: 246202306; Power dynamic allocation strategy for urban rail hybrid energy storage system based on iterative learning control @article{Wang2022PowerDA, title={Power dynamic allocation strategy for urban rail hybrid energy storage system based on iterative learning control}, author={Xin Wang and Yingying ...

1 INTRODUCTION. A large amount of energy is consumed for urban rail transit trains at acceleration while a large amount of regenerative braking energy is generated when braking [].Due to the short distance ...

With the rapid development of urban rail transit in China, the problems of increasing operating energy consumption and large voltage fluctuations of the traction network have become increasingly prominent. In recent years, energy storage-type regenerative braking energy absorption and utilization devices with the purpose of energy-saving and voltage regulation ...

Urban rail transit can solve the current inconvenient transportation problem for China's large urban population. A compound onboard energy storage system can meet vehicles" traction ...

Impact of battery energy storage system operation strategy on power system: an urban railway load case under a time-of-use tariff. Energies, 10 (1) ... Control strategy of supercapacitor energy storage system for urban rail transit based on operating status of trains. Trans. China Electrotech. Soc., 32 (21) (2017), pp. 16-23. View in Scopus ...

Graber et al. [26] undertook a comprehensive study on the sizing and energy management of on-board hybrid energy storage systems (H-ESS) tailored for urban rail transit. Their design integrated a ...

In this paper, a novel architecture of urban rail transit based on hybrid energy storage system (H-ESS) is proposed. Supercapacitor (SC) and UPS are used to smooth the pulse power of the metro train. The H-ESS integrated by high efficiency, three-port isolated bidirectional DC-DC converter (IBDC) module are parallel connected to the DC traction network.

The hybrid energy storage system (HESS) which consists of battery and ultracapacitor can efficiently reduce the substation energy cost from grid and achieve the peak shaving function, due to its characteristics of high-power density and high-energy density. The sizing of HESS affects the operation cost of whole system. Besides, operation stability (like ...

In this paper, a power allocation strategy based on optimal temperature tracking is proposed for the contactless urban rail hybrid energy storage system. First, the maximum power is limited by the charge and discharge capacity factors to prevent overcharging and discharging of system. Second, a power allocation method based

on optimal temperature tracking under minimum ...

In order to reduce the peak power of traction substation as much as possible and make better use of the configuration capacity of battery energy storage system (BESS) in urban rail transit, a ...

With the rapid expansion of urban rail transit, energy demand is continuously increasing. Integrating photovoltaic (PV) systems into hybrid energy storage systems (HESS) to form a rail transit PV hybrid energy storage system (RTPHESS) is an effective energy-saving and emission reduction measure.

Battery energy storage system (BESS) can achieve good effect of energy saving and voltage stabilization in urban rail transit system. In order to make better use of the capacity of the battery, this paper put forward an improved control strategy based on state of charge (SOC) tracking to achieve peak load shifting. The mathematical model of the traction power supply network ...

This paper mainly studies the optimal allocation method of HESS in the urban rail traction substation, and the real-time control strategy of the charge and discharge power of the storage battery and the super capacitor in HESS. The main conclusions are: a. After applying HESS to the urban rail traction power supply system, it has good economy.

Abstract: In order to reduce the peak power of traction substation as much as possible and make better use of the configuration capacity of battery energy storage system (BESS) in urban rail ...

This paper focuses on the urban rail transit energy storage recycling method based on the utilization of regenerative braking energy, studies the basic working principle of the energy storage ...

A brief description of the most common and promising battery configurations available for energy storage in urban rail systems is given below. ... The system consists of a Sitras® MES mobile energy storage unit and a traction battery made of NiMH cells provided by Saft. This solution has been tested in passenger operation at MTS network (Metro ...

A single-objective optimization energy management strategy (EMS) for an onboard hybrid energy storage system (HESS) for light rail (LR) vehicles is proposed. The HESS uses batteries and supercapacitors (SCs). The main objective of the proposed optimization is to reduce the battery and SC losses while maintaining the SC state of charge (SOC) within ...

Many studies and surveys about energy storage systems and multimodal propulsion concepts are found in the literature. In, the authors review onboard and wayside applications of electrochemical batteries, supercapacitors (SCs), and flywheels in urban rail systems. Particular detail is given to the analysis of standard techniques for the energy ...

The first results carried out on real case studies can be very promising, evidencing peaks of about 38.5% of

Urban rail battery energy storage system

total energy sold back to the grid [].Differently, the installation of energy storage equipment in the RSO's power system can be considered. "on-board" and "wayside" solutions are widely proposed [8-11] the first case, trains are equipped with on ...

Most of the current researches on optimal control methods for HESS focus on rail transit and microgrid systems [[9], [10], [11]].Aiming at energy saving for train traction, onboard ultracapacitors have been used in Ref. [12], where the mean square voltage deviation at the train pantograph and the power loss along the line are minimized, and the DC grid voltage is ...

With the rapid development of urban rail transit, power consumption has increased significantly. In 2021, the total electric energy consumption of China's urban rail transit reached 22.8 billion kWh, with a year-on-year increase of 6.9 % [1, 2].Reducing the traction energy consumption of urban rail transit is critical for society to achieve energy conservation ...

Energy Transfer Strategy for Urban Rail Transit Battery Energy Storage System to Reduce Peak Power of Traction Substation Qiangqiang Qin, Student Member, IEEE, ... ration capacity of battery energy storage system (BESS) in urban rail transit, a BESS control strategy based on energy transfer is proposed. Based on the actual subway line data, the ...

At present, previous studies have shown that regenerative braking energy of urban rail transit trains can reach 30-40% of traction energy consumption [].If the energy storage system equipped on the train can recycle the braking energy, the economical and environmental protection of urban rail transit systems will be greatly improved.

In recent years, the introduction of Energy Storage System (ESS) into rail transit has increased the ratio of regenerative energy recovery. However, the investment of energy storage devices and ratio of energy saving varies due to different types of ESS. To overcome the problem, hybrid energy storage system (HESS) is an effective solution to ...

efficiency through the examination of different locations for battery energy storage. Further, the paper suggests the utilisation of Electric Vehicle (EV) batteries at existing ... To date, there have been a number of studies of lineside storage on urban light rail systems. Barrero et al. (2008) studied the Brussels metro line 2 which has a total

transit, this paper builds a simulation model of urban rail power supply system including energy storage device. The urban rail transit DC traction power supply network structure is shown in ...

Considering that connecting the energy storage system to electrified railway can effectively reduce energy consumption and improve system stability, a comprehensive review on energy storage system of electrified railway is performed. ... Energy management and capacity allocation optimization of urban rail transit battery ESS based on energy ...

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