Urban rail ground hybrid energy storage device

The use of supercapacitors (SCs) to store regenerative braking energy from urban rail trains is able to achieve a good energy saving effect. This paper analyzes the current balance method of stationary energy storage devices (ESDs). At the beginning of the paper, the mathematical model of the DC traction power system, which includes trains, ESDs and traction substations, is ...

The energy storage device state of charge (SOC) is considered, so as to realize the maximum usage of the ESS. ... Time-division control strategy of urban rail ground hybrid energy storage device ...

Recently, more and more urban rail transit systems are adopting energy storage devices (ESDs) to recover the regenerative braking energy, or to stabilize the traction network voltage. Batteries, flywheels, supercapacitors (SCs), etc., are typically used as ...

Fuzzy Logic Control for Ground Energy Storage System in Urban Rail Transit Yuyan Liu, Student Member, IEEE, Zhongping Yang, ... ducing the energy consumption of urban rail transit is of great ... distribution of hybrid energy storage system, the FLC was used to track the battery state of charge (SOC) curve which trained ...

Presently, rail transit primarily employs single energy storage devices [6]. Due to the differences in power density and energy density, these devices exhibit deficiencies in performance and cost-effectiveness. ... Study on Adaptive Energy Management and Optimal Capacity Configuration of Urban Rail Ground Hybrid Energy Storage System [J ...

A multi-variable synthetic optimization method is proposed to optimize the SCESS capacity, train operation diagrams and traction power system parameters collaboratively, and the pareto set of the multi-objective problem is obtained. The stationary supercapacitor energy storage system (SCESS) is one of effective approaches for the utilization of train"s ...

Iannuzzi, D., Lauria, D., Tricoli, P.: Optimal design of stationary supercapacitors storage devices for light electrical transportation systems. Optim. ... Time-division control strategy of urban rail ground hybrid energy storage device based on train operation status. Trans. China Electrotech. Soc. 34(S2), 760-769 (2019) Google Scholar. 11.

The application of a stationary ultra-capacitor energy storage system (ESS) in urban rail transit allows for the recuperation of vehicle braking energy for increasing energy savings as well as for ...

DOI: 10.1109/ESARS-ITEC.2018.8607728 Corpus ID: 58013455; A Novel Architecture of Urban Rail

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Transit Based on Hybrid Energy Storage Systems Using Droop Control @article{Liu2018ANA, title={A Novel Architecture of Urban Rail Transit Based on Hybrid Energy Storage Systems Using Droop Control}, author={Ran Liu and Lie Xu and Feipeng Liu and ...

Therefore, the proposed MOGOA is applied to the capacity configuration problem of the urban rail hybrid energy storage systems (with ground batteries and on-board ultracapacitors) of Changsha Metro Line 1 in China, aiming to achieve the minimum voltage fluctuations of DC traction network and the lowest life-cycle cost of HESS simultaneously.

The data in the table shows that installing wayside energy storage devices can effectively reduce the output energy of the traction substation and improve the energy-saving benefits of the ESS, but the regeneration failure rate is still high. ... of capacity configuration of urban rail transit ground-mounted supercapacitor energy storage system ...

From the simulation results shown in Fig. 7, it can be seen that the designed urban rail ground energy storage system can absorb and release energy according to the changes of train operating conditions and traction network pressure, reduce the fluctuation of network pressure, and further enhance the effect of regenerative braking energy ...

2 CURRENT STATUS OF THE RAIL SECTOR. Rail is already among the lowest-emitting and most efficient transport sectors. Despite a 9% share of total passenger and freight transport activity, railways account for less than 2% of direct and well-to-wheel greenhouse gas (GHG) emissions and about 3% of final overall energy use.

Abstract: With the rapid development of urban rail transit, installing multiple sets of ground energy storage devices on a line can help reduce train operation energy consumption and solve the ...

Realizing carbon peak and carbon neutrality is an overall and fundamental task in China"s economic and social development. "Carbon peak and carbon neutral" is an important challenge and historic task to realize the green development for urban rail transit, which is related to the overall situation of sustainable and high-quality development of rail transit [1, 2].

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