Mobile energy storage agent

Can mobile energy storage systems be coordinated?
A resilience driven coordination of mobile energy storage systems is proposed. The coordinated problem is formulated as a Partially Observable Markov Game. A parameterized multi-agent deep reinforcement learning approach is proposed. Both transportation and power networks are considered.

Why are mobile power sources used in current electrical systems?
Specifically,mobile power sources (MPSs) (e.g. mobile energy storage systems (MESSs) and mobile emergency generators (MEGs)) have been gradually deployed in current electrical systems for resilience enhancementdue to their significant advantages on mobility and flexibility compared to static energy resources .

Can rail-based mobile energy storage help the grid?
In this Article, we estimate the ability of rail-based mobile energy storage (RMES)--mobile containerized batteries, transported by rail among US power sector regions--to aid the grid in withstanding and recovering from high-impact, low-frequency events.

It"s the latest mobile energy storage launch in the industry from a growing number of providers. Lion Energy launches ESS products ahead of LFP factory push. While KORE Power is building a 12GWh US battery Gigafactory in Nevada, Lion Energy, a Utah-headquartered solar and battery pack supplier has established a subsidiary of its own to make ...

As illustrated in Figure 9, due to the uncertainty of photovoltaic output, there are two charging methods for the charge and discharge strategy of mobile energy storage: one is during 3:00-7:00 when the electricity price is lower, mobile energy storage utilizes grid electricity for charging; the other is during 14:00-16:00 when the load is ...

Mobile energy storage systems, classified as truck-mounted or towable battery storage systems, have recently been considered to enhance distribution grid resilience by providing localized support to critical loads during an outage. ... Prabawa, P.; Choi, D.H. Multi-Agent Framework for Service Restoration in Distribution Systems With Distributed ...

This paper presents a multi-agent system (MAS)-based approach for service restoration in a distribution system with distributed generators (DGs), static energy storage systems (SESSs), and mobile ...

A new and completely distributed algorithm for service restoration with distributed energy storage support following fault detection, location, and isolation and two case studies on the modified IEEE 34 node test feeder will be presented. The goal of this paper is to present a new and completely distributed algorithm for service restoration with distributed ...

Abstract: Mobile energy storage systems (MESSs) provide mobility and flexibility to enhance distribution system resilience. The paper proposes a Markov decision process (MDP) ...

This paper presents a multi-agent system (MAS)-based approach for service restoration in a distribution system with distributed generators (DGs), static energy storage systems (SESSs), and mobile energy storage systems (MESSs). In comparison with existing MAS-based service restoration approaches in a two-layer cyber-physical architecture, excluding the dispatch of ...

Spatio-temporal and power-energy controllability of the mobile battery energy storage system (MBESS) can offer various benefits, especially in distribution networks, if modeled and employed optimally. ... stochastic scheduling of plug-in electric vehicles as mobile energy storage systems for resilience enhancement of multi-agent multi-energy ...

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The battery energy storage system provides battery energy storage information to the agent. The initial battery energy corresponds to the half of the total battery capacity, and the maximum charge/discharge energy per period is one-fifth of the total battery capacity . The total battery capacity is set to 6.75 MWh.

3 · Networked microgrids (NMGs) enhance the resilience of power systems by enabling mutual support among microgrids via dynamic boundaries. While previous research has optimized the locations of mobile energy storage ...

After considering the mobile energy storage characteristics of EVs, a large number of EVs from Building 1 and Building 3 are parked around Building 2 from 00:00 to 05:00 according to the parking generation rate in Appendix B1. ... Cooperative operation method of wind-light-hydrogen multi-agent energy system based on Nash negotiation theory ...

Mobile energy storage systems, classified as truck-mounted or towable battery storage systems, have recently been considered to enhance distribution grid resilience by providing localized support ...

SESS Static Energy Storage System. MESS Mobile Energy Storage System. SOC State of Charge. LA Load Agent. SA Switch Agent. HSA Head Switch Agent. DA DG Agent. BSDA Black Start DA. NBSDA Non-Black ...

Shared energy storage has the potential to decrease the expenditure and operational costs of conventional energy storage devices. However, studies on shared energy storage configurations have primarily focused on the peer-to-peer competitive game relation among agents, neglecting the impact of network topology, power loss, and other practical ...

Mobile energy storage agent

Mobile energy storage has the advantage of mobility, which can dynamically adjust the energy storage capacity and power of each node according to the demand (W.-L. Shang et al., 2020), so as to realize the effective sharing and utilization of flexible resources, especially in the scenario of high proportion of new energy grid connection.

This paper proposes a practical and effective planning approach that takes advantage of the mobility and flexibility of mobile energy storage systems (MESSs) to increase distribution system resilience against complete area blackouts. MESSs will be very useful for boosting the system"s resilience in places affected by disasters when the transmission lines ...

The framework of energy management system is depicted in Fig. 3. This system operates under the governance of two agents: the IES agent, responsible for regulating the power of devices within the IES system, and the EVCS agent, which manages the formulation of charging and discharging schedules for the EV fleets.

DOI: 10.1016/j.apenergy.2022.118575 Corpus ID: 246575834; Multi-agent deep reinforcement learning for resilience-driven routing and scheduling of mobile energy storage systems

dg;m is the energy of equivalent DG. E t dg;m and Et dg;m are the energy capacity and minimum energy reserve in microgrid m. Constraints (7)-(8) describe the active/reactive power balance at microgrid m in interval t. It takes into account the power generation of dispatachable DG and mobile energy storage by considering if the location of MESSs.

DOI: 10.1016/j.apenergy.2021.117921 Corpus ID: 244584142; Resilience-driven optimal sizing and pre-positioning of mobile energy storage systems in decentralized networked microgrids

The stability problem of the power system becomes increasingly important for the penetration of renewable energy resources (RESs). The inclusion of electric vehicles (EVs) in a power system can not only promote the consumption of RESs, but also provide energy for the power grid if necessary. As a mobile energy storage unit (MESU), EVs should pay more ...

Downloadable (with restrictions)! Extreme events are featured by high impact and low probability, which can cause severe damage to power systems. There has been much research focused on resilience-driven operational problems incorporating mobile energy storage systems (MESSs) routing and scheduling due to its mobility and flexibility. However, existing literature focuses on ...

Ahmadi, S. E., Marzband, M., Ikpehai, A. & Abusorrah, A. Optimal stochastic scheduling of plug-in electric vehicles as mobile energy storage systems for resilience enhancement of multi-agent multi ...

YAN Haoyuan, ZHAO Tianyang, LIU Xiaochuan, DING Zhaohao. Modeling of Electric Vehicles as Mobile

Energy Storage Systems Considering Multiple Congestions[J]. Applied Mathematics and Mechanics, 2022, 43(11): 1214-1226. doi: 10.21656/1000-0887.430303

DOI: 10.1016/j.apenergy.2021.118507 Corpus ID: 246191563; Distribution system restoration after extreme events considering distributed generators and static energy storage systems with mobile energy storage systems dispatch in transportation systems

In contrast, mobile storage only discharges energy on demand, and can do so instantly; they don"t need to idle at all. This can dramatically lower energy costs, especially combined with their ability to charge off-peak at 10-15 cents per kWh. Beyond fuel savings, mobile storage batteries require much lower maintenance than diesel generators.

However, in distribution systems with high renewable energy resources penetration, the application of mobile energy storage systems for distribution system operations can jeopardize a few of the advantages of energy storage systems like power variability management, peak demand reduction, ramp rate control, and/or voltage regulation while ...

Jiao et al. [22] considered EVs as mobile energy storage devices, but did not consider their interaction with multi-source energy systems. Moreover, the aforementioned model-based methods rely on forecasting load, generation, and EV travel during the scheduling process. ... Novel Data-Driven decentralized coordination model for electric vehicle ...

To date, various energy storage technologies have been developed, including pumped storage hydropower, compressed air, flywheels, batteries, fuel cells, electrochemical capacitors (ECs), traditional capacitors, and so on (Figure 1 C). 5 Among them, pumped storage hydropower and compressed air currently dominate global energy storage, but they have ...

SS: <State Sets (Agent State Sets)>: Mobile energy storage agents have seven basic attributes--vehicle ID, battery capacity, initial state of charge (SOC), driving speed, energy consumption per kilometer, charging power, and discharging power--along with four variable attributes--departure location, destination, SOC, and remaining available ...