Microgrids and Smart Substations

Building temperatures generally move slowly, and by "smart" management of thermal loads, microgrids can effectively use buildings themselves as thermal storage to manage load shape. These and similar efficiency and energy ...

Smart grid technologies possess innovative tools and frameworks to model the dynamic behaviour of microgrids regardless of their types, structures, etc. Various control and estimation technologies ...

An improved biological excitation neural network (IBENN) method for path planning based on a detailed architecture and ontology framework is proposed, through which the single-point inspection, multipoint inspection, and full-area inspection tasks of substations in smart microgrids can be well completed. This paper investigates the substation inspection problems of ...

Smart Grids Start With Smart Substations. Automated substations make power grids smart, reliable, and efficient. Intel®-based smart grid solutions allow smart grids to integrate diverse energy sources such as renewables. Substation digitalization will drive the need for machine learning technologies for autonomous controls.

Applications for smart grids include renewables integration, smart appliances, distributed generation and related storage, electric car charging infrastructure as well as V2G facilities, ...

These remote microgrids are leveraging the same advances in power electronics, information and communications technologies, and distributed energy resources that are ...

The projects will add a total of approximately 39 MW/180 MWh of storage capacity at four company substations. "These clean energy projects will help our region become more resilient to the impacts of our worsening climate," said SDG& E Vice President of Energy Innovation Miguel Romero in a statement .

Proposals for optimization include smart microgrids, smart power grid, and intelligent grid. In addition to normalizing electric demand, the ability to manage power consumption peaks can support in avoiding brown-outs and black-outs when power demand exceeds supply, and allow for maintaining critical loads and devices under such conditions.

The modern grid will maintain stability when smart substations and other peripherals consider other distributed energy sources, such as microgrids, electric vehicles, rooftop solar and even data centers providing power to communities. Smart substations make it possible to connect these seemingly disparate renewable energy sources.

Downloadable (with restrictions)! The integrated renewable energy resources (RERs) based smart grid in the power distribution network (PDN) has financial and ecological benefits. However, the emergence of RER-based microgrids and substations without real-time monitoring of their power parameters leads to various challenges in the PDN, such as suboptimal resource allocation, ...

California substation in 2013 [132,133]. ... leapfrog to a world of smart microgrids, in the same way that mobile. communications allowed them to connect to each other and the outside.

This paper investigates the substation inspection problems of multimobile robots for large power stations in smart microgrids. Most multirobot inspection robots generally face the challenge of ...

Other main challenges in smart railway microgrids are control strategies and energy management systems, which should be employed to manage the flow of energy within the railway microgrid. ... Brenna, M.; Foiadelli, F.; Kaleybar, H.J.; Fazel, S.S. Smart Electric Railway Substation Using Local Energy Hub Based Multi-Port Railway Power Flow ...

other bidirectional distribution substations, microgrids or smart homes). The aim of this paper is to develop a new testing meth-od for the next generation distribution substations (smart substations), which includes optimization of re-quirement validation algorithms and testing scenarios (defined according to the rules of testing functions),

This paper investigates the substation inspection problems of multimobile robots for large power stations in smart microgrids. Most multirobot inspection robots generally face the challenge of path planning, while the current widely used biological excitation neural network (BENN) methods often have the defect of the neuronal active field near boundaries and ...

o Microgrids: Microgrids are small-scale power systems that can operate independently or in coor- dination with the main grid. Smart gr id technologies enable the efficient integration and manage-

In microgrids, WLAN is used for many applications. It can enhance the protection of distribution substations by smart supervision and control using sensors. In some ...

Substation equipment maintenance is a crucial way to guarantee the security of smart microgrids, increase the efficiency of power grid operation, and deliver high-quality services [46-49]. The majority of today"s ...

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Microgrids can help cities and businesses increase resilience, reduce emissions, and achieve other policy goals

such as brownfield redevelopment or smart city implementation. Private and public entities, including utilities, are taking a fresh look at the role microgrids ... to delay or defer building a $1.2 billion substation in Brooklyn or ...

By incorporating RE and improving grid dependability, these decentralized energy systems can help to create a more sustainable and resilient power grid. Smart grid ...

As a pioneer in energy management and optimization, ABB is a trusted partner in the evolving global energy ecosystem. ABB"s Smart Power solutions are leading energy innovation and transition to new ways of managing the energy, starting from commercial and industrial sites aiming to unlock new economic opportunities, up to utilities and service providers striving to ...

Smart meters provide real-time data on energy consumption and production, allowing prosumers to optimize their energy usage and contribute excess power back to the ...

The integrated renewable energy resources (RERs) based smart grid in the power distribution network (PDN) has financial and ecological benefits. However, the emergence of RER-based microgrids and substations without real-time monitoring of their power parameters leads to various challenges in the PDN, such as suboptimal resource allocation, poor load ...

Whereas a traditional, stationary microgrid is a common resilience tool comprising interconnected assets that can be disconnected and operate independently from the greater power grid, mobile microgrids are fully functional substation replacements that deliver reliable, on-demand power when infrastructure assets are unavailable.