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Photovoltaic and energy-storage joint control microgrid

Overview

Do photovoltaic grid-connected systems have energy storage units?

Due to the characteristics of intermittent photovoltaic power generation and power fluctuations in distributed photovoltaic power generation, photovoltaic grid-connected systems are usually equipped with energy storage units. Most of the structures combined with energy storage are used as the DC side.

What is the energy coordination control strategy for the integrated dc microgrid?

For the integrated DC microgrid, the designed energy coordination control strategy should meet the following conditions: Ensure the power supply of the EV charging unit. Ensure the charging and discharging power of the energy storage device is below the limit. Maximize the use of PV energy as much as possible.

What is integrated standalone dc microgrid?

The integrated standalone DC microgrid is modeled, which contains PV, hybrid energy storage system EV charging. For the PV power generation unit, an MPPT control based on a variable step perturbation observation method is proposed to increase the tracking speed at the maximum power point and reduce the power oscillation during the tracking process.

Can photovoltaic and electric vehicles charge in integrated DC microgrids?

The power of photovoltaic (PV) and electric vehicles (EV) charging in integrated standalone DC microgrids is uncertain. If no suitable control strategy is adopted, the power variation will significantly fluctuate in DC bus voltage and reduce the system’s stability.

How energy storage unit regulates power balance in integrated dc microgrid?

The energy storage unit regulates the system power balance in the integrated DC microgrid. When the output power of the PV generation unit is larger than

the absorbed power of the load, the energy storage unit absorbs the energy in the system by charging; conversely, the energy storage unit provides energy to the system by discharging.

Why is energy storage important in a dc microgrid?

The energy storage unit is essential to maintain the stable operation in the standalone mode of the integrated DC microgrid. When the system power changes, the bus voltage will also change. An effective control strategy for the energy storage unit in the microgrid is needed to stabilize the bus voltage within a specific range.

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Distributionally Robust Capacity Configuration for ...

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Distributed Control Strategy for DC Microgrids of Photovoltaic Energy

Energies 2016, 9, 2637 4 of 19 according to whether they are connected to large power grids or not. The structure of a typical PV-ESS DC microgrid in off-grid operation is shown in Figure 2.

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