Photovoltaic microgrid DC bus voltage

How to improve the stability of DC microgrids?
The inertia of the system can be increased by reducing the degree of bus voltage oscillations and solving the problem of large voltage deviations. Current methods for improving the stability of DC microgrids are positive and passive damping strategies.

How to increase the virtual capacity of a dc microgrid?
In [9,10,11],the virtual capacity of the system is increased by improving the port converter control strategyto enhance the inertia of the DC microgrid and reduce DC voltage fluctuation.

How does DC bus voltage affect voltage-sensitive loads?
As a result, DC bus voltage suffers from rapid changes, oscillations, large excursions during load disturbances, and fluctuations in renewable energy output. These issues can greatly affect voltage-sensitive loads. This study proposes an integrated control method for the bus voltage of the DC microgrid to solve the abovementioned problems.

What is dc microgrid droop control?
The DC microgrid has low inertia,and conventional droop controlis currently mainly used for the DC microgrid. Thus,the DC bus voltage can fluctuate quickly when constant power load changes or fluctuations in the output of renewable energy sources occur.

What is DC bus voltage drift?
The DC bus voltage with the conventional control method rapidly decreases to about 758 V, and the system inertia is insufficient. Meanwhile, the busbar voltage drift is greater than 5%, which is beyond the safe operating range.

What is the equivalent circuit of a dc microgrid?
Figure 2shows the equivalent circuit of a DC microgrid studied in this work. It consists of power supply units,a DC transmission line,and a constant power load unit. The DC/DC converters of both power modules adopt droop control and additional virtual inertia control.

In DC microgrids, however, the maximum power output of PV sources may exceed the local demand and any available energy storage (ES) capacity, and the consequent power imbalance may result in DC-bus ...

It is a significant challenge to maintain voltage for DC microgrids when integrating with EVs. The work aims to enhance voltage stability in a DC microgrid and the electric vehicle charging ...

Aiming at the problem of bus voltage stability in DC microgrid under complex conditions such as fluctuation, randomness, and random load switching of a new energy power generation ...

In Chen et al. 29 and Tani et al. 30 a frequency-based method to reduce DC bus voltage fluctuations is considered. ... The DC microgrid photovoltaic system consists of 22 solar panels in series and the maximum ...

This paper proposes a fast and efficient MPPT photovoltaic control strategy and a BESS bus stabilized power control method for the high-performance operation control requirements of ...

Vehicles, PV Array, DC Microgrid, Voltage Stability. Received: April 23, 2023. Revised: February 21, 2024. Accepted: March 27, 2024. Published: May 9, 2024. ... bus voltage 2.2 GaN ...

When t=0~0.25s, PV power generation is insufficient and unstable, and the energy storage system outputs current to fill a certain energy deficiency; when t=0.25~1, PV power generation ...

The DC bus voltage in a microgrid can be regulated by a variety of means. There have not been nearly enough studies to address several challenges. ... Chen, S.-M.; Liang, T.-J.; Hu, K.-R. ...

The solar DC microgrid system"s bus voltage serves as a reference point for assessing the system"s safety and stability [1]-[3]. Nonetheless, because of the unexpected and fluctuating ...

Due to the intermittent nature of renewable power generation, ensuring voltage stability of DC Microgrid (MG) is of outmost importance. In this paper, a novel fuzzy logic-based energy ...

The secondary control principle of PV mode is similar to that of energy storage mode, when there is an unbalanced power DP, and P pv < P load, it is manifested as a drop in ...

A DC microgrid has many advantageous features, such as low power losses, zero reactive power, and a simple interface with renewable energy sources (RESs). A bipolar DC microgrid is also highlighted due to its high ...

This article suggests a hybrid DC microgrid (HDCMG) with different levels of DC bus voltages to use for various types of loads. The available sources in the HDCMG are wind ...

DC Microgrid based on Battery, Photovoltaic, and fuel Cells; Design and Control Akram Muntaser 1, Abdurazag Saide, ... microgrids and DC microgrids depending on the nature of bus voltage ...

4.3 Effect of PV MPPT with DC bus control methods on cost Due to regional differences, solar resource distribution and its imbalance, modular PV distributed strategy is the solution to this ...