Solar Energy South Africa

The relationship between virtual power plants and microgrids

Overview

What are microgrids & virtual power plants?

When connected, microgrids and Virtual Power Plants (VPP) can create a more reliable and sustainable electricity infrastructure while also delivering immense economic benefits.

What is the difference between a microgrid and a VPP?

Microgrids and Virtual Power Plants (VPPs) differ in several aspects. Microgrids are dependent upon hardware innovations such as inverters and smart switches, whereas VPPs are heavily dependent upon smart meters and IT. Microgrids encompass a static set of resources in a confined geography, while VPPs can mix and match among a diversity of resources over large geographic regions.

What is a virtual power plant?

A virtual power plant is a term frequently used interchangeably with 'microgrids'. It relies upon software systems to remotely and automatically dispatch and optimize generation or demand-side or storage resources in a single, secure Web-connected system.

What is the difference between a microgrid and a small power plant?

A microgrid is about boosting efficiency at the local level for electricity and heat recovery (through small CHP plants). In contrast, a small power plant focuses more on bulk power transmission level infrastructure. The microgrid paradigm also aims to provide heterogeneous power quality based on end-user customer needs and minimize investments in the bulk power transmission level infrastructure.

What is a virtual power plant (VPP)?

The virtual power plant (VPP) may improve the security and reliability of an electricity grid's operations through including energy storage, changeable

loads, and distributed energy resources (DER), among other characteristics. Consequently, a growing number of scholars tend to focus on VPP and providing recommendations for its improvement.

What is a microgrid and how does it work?

A microgrid is a system that can separate and isolate itself from the utility's distribution system during power outages. It is one choice to aggregate, manage, and deploy distributed energy resources in such situations.

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Architecture of (a) microgrid (b) smart grid (c) virtual power plant.

The idea of microgrid, smart grid, and virtual power plant (VPP) is being developed to resolve the challenges of climate change in the 21st century, to ensure the use of renewable energy in the

Integration of Renewable Energy Sources Using Microgrids, Virtual

Therefore, virtual power plants, microgrids or energy hubs could be used. This thesis presents these three concepts and gives an overview of today's applications. In the third chapter ten ...

A review on operation of micro grids and Virtual Power Plants in ...

This paper reintroduces the integration of distributed energy resources (DER), i.e. DGs, controllable loads and energy storages, into micro grid and virtual power plant (VPP) and also ...

Active Planning for Virtual Microgrids with Demand ...

Previous research on VMs has not clarified the relationship between similar concepts, including virtual power plant (VPP) and conventional microgrids (CM). These three technologies are all to deal with challenges from ...

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