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Virtual Power Plant Communication Base Station

Overview

What is virtual power plant (VPP) technology?

Virtual power plant (VPP) technology aggregates geographically distributed energy resources enabling the management of flexible capacity in the power network on a large scale while implementing local grid constrains.

Is VPP interoperable with other power system components?

In parallel to web-based protocols, the interoperability of VPP with other power system components must be supported. The IEC 61850 protocol suite—the dominant communication protocol for data exchange inside power system automation—is also considered for VPP implementation. The generalized architecture of a VPP is presented in Fig. 11.3.

What communication protocols are used in a VPP system?

Several communication protocols are used in current VPP systems; those frequently used are IEC 60870-5-104, OpenADR 2.0, IEC 61850, and Modbus (Ancillotti et al., 2013; Samad et al., 2016; Yang et al., 2011).

How does a VPP communicate with a DSO?

When the VPP acts as a TVPP to provide grid services on the distribution level, it needs to communicate with the DSO. In addition to the message exchange in Fig. 11.7, a VPP needs to receive operational data (power flows, voltage levels, network status, power quality measurements, etc.) from the DSO's SCADA or EMS systems.

How does a VPP work?

The VPP is closely connected to the electricity market and market-related data is exchanged between the VPP and market actors (retailors and aggregators). The VPP is receiving power measurements, curtailment capacity, and availability information from DERs.

How does a VPP communicate with a retailer?

To exchange and forward relevant market-related data, that is, bids to the retailer, who offers services on the electricity market (e.g., intraday, day ahead, balancing, or ancillary service markets), the VPP needs to communicate with a retailer, who operates market platform applications.

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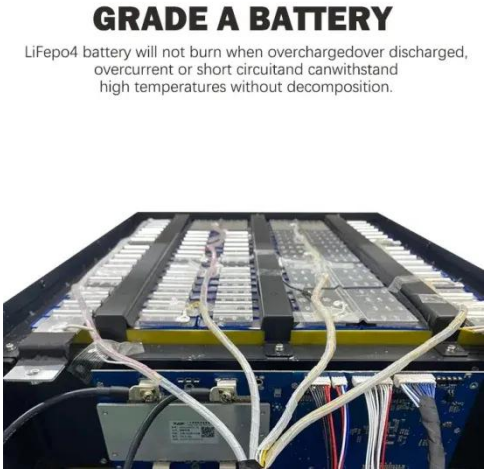

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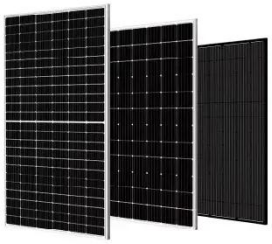

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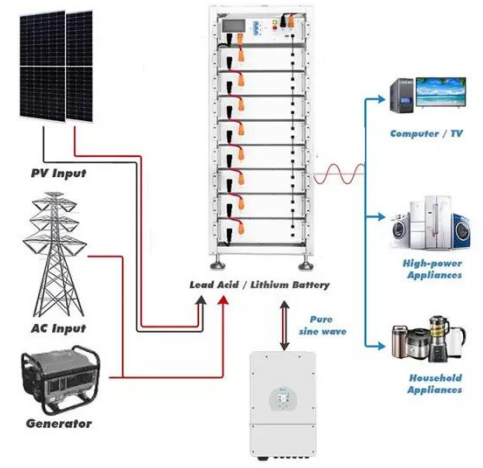

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