

VIRTUAL SOURCE OF REACTIVE POWER IN ELECTRICITY SUPPLY SYSTEMS OF HOUSEHOLD CONSUMERS

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ABSTRACT

The principle of distributed generation of reactive power is proposed in the structure of the basic principles of constructing smart grids for civilian objects. For its implementation at points of final distribution of electricity networks of buildings and structures should provide for the installation of individual reactive power compensation devices.

INTRODUCTION

Virtual Power Plant (VPP) is an efficient resource at the disposal of the smart grid operator to solve the problem of balancing active power. VPPs are formed on the basis of the following resources: a) Distributed (decentralized) sources of electricity, mainly, renewable sources of consumers; b) distributed resources for the accumulation of electricity (electric power storage); c) controlled electric receivers.

An important task of the operator of a smart grid (microgrid) is to provide a balance of reactive power and appropriate levels of voltage in the grid that meet the requirements of quality, cost effectiveness and reliability of electricity supply.

Recently, a number of publications appeared in which justified the expediency of compensation of reactive power in the distribution grids of civilian objects, and in the residential sector in particular.

THE PRINCIPLE OF CREATING VIRTUAL REACTIVE POWER PLANT

As a reactive power resource, it is expedient, by analogy with VPP, to create virtual reactive power sources (VRPP) that will accumulate the power of distributed reactive power compensation.

To obtain an additional reactive power resource by the operator of the distribution network (DSO), it is possible, by analogy with VPP, to attract a distributed compensation resource at the DSO at the voltage 0,4 kV, which can be described as a virtual source of reactive power.

Creating VRPP will mean providing the distribution network operator with consumer RPC devices to solve the problem of reactive power balancing.

OUR PROPOSALS

1. At the regulatory level, provide for distributed compensation of reactive power for each consumer by installing condenser batteries for compensation of reactive power, which will be managed by an information structure based on an intelligent counter.
2. To provide for the standard setting of condenser batteries in each surface switchboard for compensation of reactive power, which will be controlled by an information structure based on an intelligent counter.
3. The received resource of sources of the distributed generation of reactive power to transfer to the disposal of the distribution network operator for its use as a virtual source of reactive power.
4. In the era of the development of intelligent power supply, characterized by distributed generation, distributed accumulation and control of the work of electrical equipment, compensation of reactive power should be mainly based on the principle of distributed generation.



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