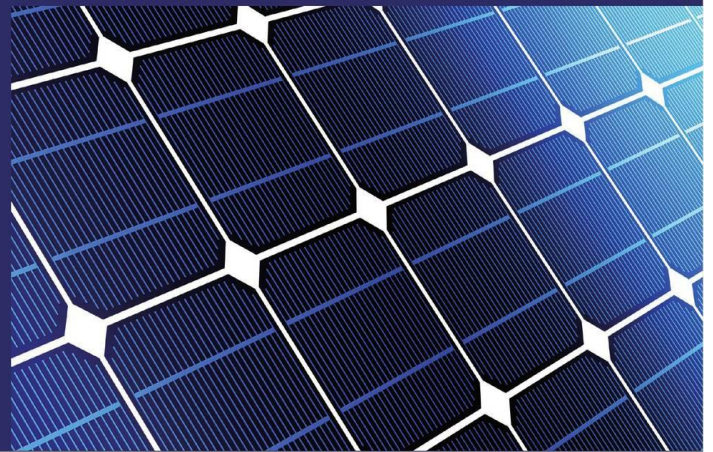


Modern global trends to decentralize power consumers that are associated with increasing cost of traditional fuel and manifested in the increasing proportion of distributed electricity production from distributed energy sources, lead to complications planning regimes of electric power systems and their operational management. In addition, the combination of the mentioned above processes with economic power engineering reform - implementation of bilateral agreements - virtually prevent to organize the effective functioning of the electric power systems without improving their information infrastructure with a gradual transition to the concept of intellectual power networks Smart Grid.

Distributed energy sources

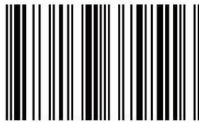


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Distributed energy sources in the local electrical systems

Using of distributed energy sources



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ELECTRICAL SYSTEMS**

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INTRODUCTION

Modern global trends to decentralize power consumers that are associated with increasing cost of traditional fuel and manifested in the increasing proportion of distributed electricity production from distributed energy sources (DES), lead to complications planning regimes of electric power systems (EPS) and their operational management [1-3]. In addition, the combination of the mentioned above processes with economic power engineering reform - implementation of bilateral agreements - virtually prevent to organize the effective functioning of the EPS without improving their information infrastructure with a gradual transition to the concept of intellectual power networks (Smart Grid) [4-6].

State support for development of distributed energy stimulates research on the design and operation of distributed energy to enhance energy security and reduce the impact of energy on the environment. However, the issue of transportation of electricity produced distributed energy and functioning regional electricity networks (REN) in the new operating conditions are often neglected in the design phase of distributes and place of their accession to power networks (PN).

Lack of research about the design and operation of distributed energy in modern conditions and their impact on modes of electric EM, inconsistency of the specified main equipment to the needs of these sources, lack of information about the typical decisions regarding remedies and automate process electricity production of electricity prevents make informed design decisions during their development, moreover, can't effectively exploit them [7-10]. Thus important is the development of methodical, information and technical support of operation. Important in this regard is the complexity and methodological unity in decision making to improve the performance of distributed energy in their work in electric networks.

In the design scheme of power delivery from the source to the end user raises the need to harmonize their work with the system, of which implemented the central power. That scheme should meet the requirements of reliability for ensure stable power supply and connectivity to provide DES as close to the center of power consumption that will

ensure minimum power losses at its transportation.

Based on this, one can identify a number of important technical aspects of the development of distributed energy in local electric systems, which currently are not sufficiently investigated:

- research and analysis of regulations on the operation of distributed energy sources in the local electric system based on the concept of Smart Grid;

- analysis of the known methods of optimization of electrical networks from distributed energy sources;

- development of methods for determining optimal installed capacity and optimal placement of distributed energy sources in the local electrical system using the integrated optimality criterion;

- development of optimization method daily modes of generating distributed according to predictable schedule loads the local electrical system (LES);

- development of mathematical models of optimum configuration LES conditions and method and optimal control laws schemes issuing power of distributed energy sources;

- development of optimization algorithms installed capacity of distributes and places joining in the local electrical system;

- development of optimization algorithm to daily modes of DES generation according to the predictable schedule loads of LES;

- development of optimal control algorithm of changing configuration scheme for issuing distributed electricity by the criterion of minimum power losses.

Thus, the actual task of optimization of DES in local electric systems solve a problem of design - to determine the optimal installed capacity, and as operational problem - to optimize the daily mode of generating DES and circuits issuance of power electrical energy by local electric networks with DES. This can increase the profitability of energy utilities and power generating companies by improving performance characteristics of electrical equipment in LES. The aim of our work is to improve the efficiency of distributed energy in electrical distribution networks by improving the methods and means of optimizing transport electricity produced.