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ACTIVE-ADAPTIVE SMART GRIDS

The electric grid complex is one of the pillars of the developing economy of Ukraine; it provides transportation and distribution of electricity to all legal entities and individuals.

One of the problems of the electric power industry is a high level of accidents and failures at electric power facilities, and, consequently, a high level of economic losses, both in this and other sectors. The reasons for this lie in obsolete equipment and engineering networks, operating technologies of the latter, and the technically outdated level of automated process control. So, now the main scheme for organizing the operation of the electric network is focused, first of all, on the round-the-clock stay of operational personnel on them, monitoring the state of the facility and performing operational switching.

Relay protection and automation is mainly performed using electromechanical relays (~ 91%), which have a significant variation in the response characteristics of the relay by current and time, and have insufficient sensitivity. About 60% of all relay protection kits have been in operation for over 30 years.

A number of major system crashes in the United States and several other countries laid the foundation for the development of the Smart Grid concept in the 20th century. In this term, Smart – is a self-monitoring, analyzing and reporting technology; and Grid - power system, power grid.

Conclusion: the main intellectual task of our time is the creation of technology to solve the problems of increasing the reliability of equipment, the ability to control it from a distance. In the electric power industry, such technologies include: monitoring the status and the management of electrical equipment; automated accounting and consumer information systems; communication systems infrastructure for energy facilities; automation to increase the reliability and dependability of power supply; data management; management of operational field teams. Being in a single platform, the aforementioned technologies allow a radically new approach to the construction of electric networks, moving from a rigid “generation → network → consumer” structure to a

more flexible one in which each network node can be an active element. At the same time, the intelligent network is available to perform its reconfiguration when changing certain conditions not only in an automated, but also in an automatic mode.