



OPTIMAL RELIABILITY LEVEL ESTIMATION FOR DISTRIBUTION NETWORK CONSIDERING DIFFERENT TYPES OF LOAD

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ABSTRACT

Nowadays era of electric quality dependant equipment is coming and this fact requests higher reliability level of power supply. On the other hand, taking into account liberalisation of electricity market and as the result – separation of electricity producing and transmitting (and also distributing) companies, Distribution and Transmission System Operators (DSOs and TSOs) are not participating in the market and are regulated by state regulatory institutions. Such regulated state of DSOs and separation from electricity producing companies can result in lower reliability level, because having regulated tariff and no ability to get financial assistance from electricity producing companies, DSOs can try to diminish their reliability costs.

This work gives methodology for Total Reliability Costs (TRC) calculation taking into account both customer and utility reliability costs. Utility reliability costs usually are well known, but problems occur with assessment of economical benefits from reliability improvements for the utility. Because of the fact, state regulatory institutions are thinking of introducing reliability targets and penalties for utilities in case if they don't meet the targets. The main problem in this situation is to define appropriate level of penalties that would be dependent on customer reliability costs. Previously mentioned methodology of TRC calculations includes new approach for finding electrical power interruption costs depending on the share of customers in electricity consumption and their geographical allocation. As a result of analysis of sectors of customers, substations with typical load or Typical Substations are defined. The work shows that the new approach allows one to estimate costs of energy not supplied more precisely.

Taking into account reliability improvement costs and the share of customers in electricity consumption combining with their costs of electrical energy not supplied, TRC calculation methodology allows to find optimal reliability costs with high accuracy and in such way defines optimal reliability level that in its turn increase society benefits.

Keywords: Reliability of power supply, energy not supplied, reliability costs, penalties, optimal reliability level.