

Global Summit on Electronics and Electrical Engineering

November 03-05, 2015 Valencia, Spain

Multi-criteria decision analysis techniques in electric power system expansion planning

Nikolai Voropai

Energy Systems Institute, Russia

Expansion of large electric power systems (EPSs) embracing vast territories is very difficult to simulate due to a great number of significant factors. Internal structure of large EPSs is complicated because of different types of generation units with different technical and economic characteristics, constraints on transmission capacities of the main grid in some directions, importance of requirements to reliability of EPS operation and security of power supply to consumers, etc. The problem of expansion of large EPSs is rather sophisticated due to uncertainty of future development conditions and other important factors. The EPS expansion options can be estimated by several as a rule conflicting criteria (economic, technical, ecological, social, etc.) which represent different interests of subjects of relations. The paper deals with the general approach to multi-criteria decision analysis on EPS expansion which is a combination of several multi-criteria analysis techniques in terms of different preference relations in the analysis of decision. The approach is based on the fundamental concepts of the utility theory and development of concrete multi-criteria analysis techniques. Some multi-criteria game problems are considered. The approach is illustrated on the examples of expansion of the Unified Energy System (UES) of Russia.

Biography

Nikolai Voropai is the Director of the Energy Systems Institute (Siberian Energy Institute until 1997) of the Russian Academy of Science, Irkutsk, Russia. He has graduated from the Leningrad (St. Petersburg) Polytechnic Institute in 1966. He has received his degrees of Candidate of Technical Sciences at the Leningrad Polytechnic Institute in 1974 and Doctor of Technical Sciences at the Siberian Energy Institute in 1990. He is the Chairman of the International Workshop on Reliability Problems of Energy Systems, CIGRE Member and IEEE Fellow Member. He is the author of more than 460 scientific publications.

voropai@isem.irk.ru

Notes: