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GENERAL SUBJECTS  
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# Methods for and Results from Estimating the Effectiveness of Accelerated Modernization of the Russian Electric Power Industry

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**Abstract**—The methodology for and results from evaluating the social effectiveness of the Program for Modernizing the Electric Power Industry of Russia for the Period Up to 2020 (which constitute one of its key components) are considered. The lines of technological modernization and ways of improving economic relations in the industry, which are two other components of the Program, will be addressed in separate publications.

**Keywords:** electric power industry, economic effects, investment planning, modernization of assets

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In 2010–2012, following the assignment given by the Government of the Russian Federation (RF), the RF Ministry of Energy organized work on drawing up a program for modernizing the electric power industry of Russia for the period up to 2020 (referred to henceforth as the Program or Modernization Program) aimed at speeding up technological renewal of the industry for making it more efficient, achieving more reliable supply of power to consumers, and enhancing the country's energy security.

The draft of the Program was prepared by specialists of the Power Engineering Institute (ENIN) (led by the Academician E.P. Volkov) with participation of nine principal industrial and academic institutions and with involvement of leading power engineering and machinery construction companies. Each stage of this work passed examination by the Scientific-Technical Council of the Unified Energy System (UES) of Russia under the chairmanship of A.F. D'yakov, a Corresponding Member of the Russian Academy of Sciences, and by the Working Group of the RF Ministry of Energy (under the chairmanship of A.N. Shishkin). Such openness of the Program development process and the extent to which interested parties were involved in it had no analogs during the activities on drawing up the previous documents for development of the Russian electric power industry. The latter circumstance is especially important because the Program, which is part of the state program “Energy Efficiency and Development of Power Engineering,” thus involves the industry into the regular process of earmarking budgetary allocations and checking their expenditure, whereas other documents on prospective development of the electric power industry [1] have the status of documents containing only information and recommendations.

The Draft of the Program determines the main lines, concrete ways, and means of *technological modernization* of the industry and all its sectors, including thermal, hydraulic, and nuclear generation, renewable energy, the Unified National Grid (UNG), and power distribution networks. Development of mechanisms for implementing the Program is one of its necessary components as part of the process of *improving the economic relations* in the industry. Since the Program for modernizing the electric power industry must be a constituent part of the budgetary program “Energy Efficiency and Development of the Power Industry,” the main attention in this paper is paid to assessing its *economic (social) effectiveness*, and technological modernization and improvement of economic relations in the electric power industry will be the subjects of other publications.

## METHODS FOR ASSESSING THE EFFECT FROM MODERNIZATION OF THE ELECTRIC POWER INDUSTRY

The following specific features of the electric power industry should be taken into account in assessing the effect brought from its modernization for the society.

(1) Despite the reforms carried out in the electric power industry, it still remains an integrated physico-technical system uniting hundreds of power stations in their operation on the combined schedule of the electric load of millions of consumers, with several thousands of centers for production, distribution, and consumption of electric energy interconnected by electric networks. Such structure entails the need of strictly coordinated scope and parameters of measures taken for retrofitting all entities of the industry over the