UDC 332

STREAMLINING THE TOOLS FOR ANALYZING THE EFFECTIVENESS OF THE STATE POLICY OF ENERGY EFFICIENCY IN THE RF REGIONS

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Purpose: development of tools for analyzing the effectiveness of the state policy of energy efficiency in the regions of the Russian Federation to increase the feasibility of decisions in the field of managing the economic and economic development of territories. *Discussion*: the state energy efficiency policy, actively pursued in the past 8-10 years, needs the performance monitoring. However, the Russian system of accounting for energy consumption and energy saving is characterized by an insufficient degree of development. In this regard, It is very actual to add for exists methods some new methods proposed by the author: methods for calculating and analyzing the index of the electrical intensity of the physical volume of GRP; method of decomposition analysis of the electricity consumption increase by main factors; methodology for assessing and analyzing generalized regional energy efficiency indices; method of classification of RF regions by types of their energy-economic development. *Conclusion*: application of proposed methods can contribute to the improvement of tools for impact analysis of state policy of the RF regions energy efficiency.

Keywords: energy efficiency improvement in the RF regions, the region's energy-economic development, efficiency of energy efficiency policy in the Russian regions.

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Introduction

Energy efficiency is one of the basic preconditions for social-economic development, enabling to find solutions to numerous social and economic problems, among which reduction of production costs, lower levels of domestic price increase and domestic producers competiveness enhancement of the competiveness of domestic producers. As a result of strong interrelationship between improvement of energy resource consumption efficacy and ensuring

of sustainable economic development, the government programmes have been developed and being currently implemented in the framework of the public policy of energy conservation and energy efficiency improvement in most countries including Russia.

«The Energy Strategy of Russia for the Period Up to 2030» [7], which lays out the foundations of energy efficiency policy in the RF, is currently in the process of phased implementation (the first phase – from 2005 to 2015 yy., the second phase – from 2015 to 2022 yy., the third phase from 2022 to 2030 yy.) The first phase implementation involves reduction of energy intensity, in particular electric intensity by the year 2015 by 22% and 16%. The project of the consequent strategy till 2035outlines the possible significant influence of structural shifts and economic growth on the achieved in that period energy intensity reduction of the RF economy. It is noted that the influence of technological factor was modest. However, it is the technological energy saving that plays the key role in the raising of energy efficiency of Russian economy [5, 8].

Thus, the state energy efficiency policy, actively pursued in the past 8-10 years, needs the performance monitoring. For these purposes, since 2014, Ministry of Energy of the Russian Federation has submitted the State Report presenting the assessment of energy-saving and raising of energy efficiency, which seeks to evaluate the effectiveness of measures implemented under the state policy at all levels of government.

As there is no unified method of impact assessment of the energy efficiency policy introduced, official documents, governing the policy, stipulate feasibility of independent studies to develop additional methods of energy intensity analysis for regional economies [9].

Literature review

In foreign countries the performance monitoring of state energy efficiency policy involves special accounting framework of energy consumption indicators, which attach strong importance to economical and statistical, economic and mathematical and econometric methods of analysis, allowing, amongst other things, to evaluate separately the impact of various factors on energy consumption dynamics. A number of foreign researchers developed a system of tools for energy sustainability assessment, based on the analysis of indicators and indices of energetic and ecological effectiveness [1, 6, 12, 15-17].

Research scientists from LEDS Energy Working Group World watch Institute presented overview of 18 tools and methods, application of those makes it possible to carry out an effective policy in the energy sector managing the ecological aspects (efficient production with low level of emissions). The group laid out the reference catalogue, which contains complete theoretical and practical information, structured/defined in the matrix with four subject areas for each tool [11].

Despite the difficulties with data collecting, quantitative analysis of energy consumption in various economic processes as a research area is being actively

promoted by Russian researchers. Energy saving is studied in national, sectoral, corporative and territorial breakdowns [2, 13, 14].

However, Russian accounting framework for indices of energy consumption and energy saving is peculiar is characterized by insufficient degree of development, there are no uniform methodological materials for all the regions of Russia. In this regard, the interregional comparisons of energy intensity indices of GRP are complicated. Moreover, factor analysis of GRP energy intensity dynamics is not currently conducted at the regional level. Thus, improvement of existing tools designed for research of impact of energy efficiency policy of the RF entities.

Research methods

It is proposed to supplement the existing research tools for evaluation of impact of energy efficiency increasing policy measures for economies of RF-entities with a number of methods, amongst which are the method for calculating and analyzing of volume indices of GRP as an overall indicator of energy consumption efficiency; decomposition analysis of increase in electrical power consumption based on the main factors; evaluation and analysis of general regional indices of energy efficiency; classification of the RF entities according to the type of energy-consumption development.

One of the commonly used main indicators of energy efficiency policy impact in the region is the GDP power intensity index (IX) [9]. It characterizes the dynamics of the indicator of energy intensity of GRP per unit for a certain period of time. [8] Energy intensity of a regional economy (X) along with energy intensity index (IX) depend on objective factors (economic growth and structural shifts) which are not directly related to the policy of energy efficiency as well as subjective ones – the technological factor that most relevantly reflect the policy results. That is why IX values, estimating the level of GRP energy intensity, fail to indicate the factors playing the key role in the dynamics of energy efficiency indicators. In this context, contribution of various factors on the dynamics of energy consumption can be determined by the means of decomposition analysis [1, 4, 6, 9].

The method of technological energy efficiency index estimation developed in [9] with regard to the regional studies of energy intensity is based on the index method of decomposition of relative growth in energy consumption, outlined in the work of I. Bashmakov and A. Myshak [2]. Additive form of decomposition allows to estimate the contribution of the technological factor to the dynamics of energy consumption in the form of Laspeyres index [9].

Interregional comparisons of energy efficiency indicators will be expedient to make taking into account the types of regional development of energy-consumption. Furthermore, in order to allow a proper comparison, time-varying classification of the RF-entities according to their type of energy-consumption development need to be considered. «Energy-consumption development» of an area means support of expanded reproduction, gradual positive qualitative and structural economic changes, competitiveness of territories based on the

more efficient management of energy resources as the most important factor of production [9].

In the work [10] the author developed the universal step-by-step method for classification of the RF-entities according to the type of development of their energy-consumption economic pattern, which is connected to the type of territorial economic development. The regions of each groups differ from other groups by the predominance of one or another enlarged sector in their GRP structure (compared to average GRP structure for the entire population of regions). Applying this method, 6 overlapping groups of regions were distinguished: agricultural-bioresource, budget-dependent, trade-financial, industrial, raw material and diversified regions with gross product structure close to the average across all the totality of the Russian regions.

Results

Thus, application of methods developed in [3,6,9,10] makes it possible:

- to take into account action of the technological factor while evaluating the impact of the energy efficiency policy in the region;
- to elicit that clusterization of regions according to the type of development of their energy-consumption factor can change in the course of time: a number of regions retain the same type, while other regions leave one group and join the other one;
- to define the regions that retain their type of development of their energy consumption economic pattern during the period under review – so-called nuclei of the group, the analysis of these nuclei gives a clear indication of typological characteristics of each group of regions;
- to draw up a conclusion on the role of main factors (the structural factor, the factor of economic growth, the technological factor) in reduction of the GRP energy intensity;
- to evaluate the results of regional programmes aimed at improving energy efficiency and energy saving of the RF entities according to the type of development of their energy consumption economic pattern.

Conclusion

Application of proposed methods can contribute to the improvement of tools for impact analysis of state policy of the RF regions energy efficiency.

Integral regional rankings on measures of central trends in the GRP energy intensity indices and indices of technological efficiency of electricity consumption for 2005-2014 yy showed that high rate of electricity consumption is specific to agriculture-bioresource regions, while higher than the average rate is typical for RF-entities of industrial and diversified types, ratings below average are characteristic of trade-financial and budget-dependent regions, raw –type regions have the low level of energy efficiency [9].

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УЛУЧШЕНИЕ ИНСТРУМЕНТОВ АНАЛИЗА РЕГИОНАЛЬНОЙ ПОЛИТИКИ ЭНЕРГОЭФФЕКТИВНОСТИ В РОССИИ

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Цель: разработка инструментов анализа эффективности государственной политики энергоэффективности в регионах Российской Федерации. *Обсуждение*: государственная политика в области энергоэффективности, активно проводимая в последние 8-10 лет, нуждается в мониторинге эффективности. Однако российская система учета энергопотребления и энергосбережения характеризуется недостаточной степенью развития. В связи с этим весьма актуально представляется дополнить существующие методы следующими: метод расчета и анализа индекса энергоемкости физического объема ВРП; метод декомпозиционного анализа, заключающийся в разложении потребления электроэнергии по основным факторам; метод оценки и анализа обобщенных региональных показателей энергоэффективности; метод классификации регионов РФ по видам их энергоэкономического развития. *Заключение*: применение предложенных инструментов может способствовать совершенствованию анализа влияния государственной политики в области энергосбережения и энергоэффективности регионов РФ.

Ключевые слова: повышение энергоэффективности в регионах России, энергоэкономическое развитие региона, политика энергосбережения и энергоэффективности.

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