

# Development of adaptive logistic model for managing energy saving processes

## Desarrollo del modelo logístico adaptativo para gestionar procesos de ahorro energético

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### Abstract

The subject of the study is organizational and economic relations arising as a result of continuous improvement of energy conservation management processes and determining parameters of logistic management model adapted to dynamic changes in business environment. The purpose of the study is to develop a logistic model for managing energy saving processes adapted to dynamic changes in business environment. The research methodology is based on system, process, integrated, logistic, resource-saving and matrix approaches. An adaptive logistic model for managing energy saving processes is proposed. It provides efficiency of energy saving projects and programs implementation based on spatio-temporal optimization of implementation sequence. The application of the proposed model will allow focusing efforts on the dominant areas of energy conservation, minimize resource and time costs, optimize the sequence of measures implementation and adjust energy saving processes quick enough to achieve energy efficiency targets.

**Key words:** adaptive logistic model management, energy saving processes, elements of energy saving system, energy efficiency.

### Resumen

El tema de estudio son las relaciones organizativas y económicas que surgen como resultado de la mejora continua de los procesos de gestión de conservación de energía y la determinación de los parámetros del modelo de gestión logística adaptado a los cambios dinámicos en el entorno empresarial. El objetivo del estudio es desarrollar un modelo logístico para gestionar procesos de ahorro de energía adaptados a los cambios dinámicos en el entorno empresarial. La metodología de investigación se basa en sistemas, procesos, enfoques integrados, logísticos, de ahorro de recursos y matrices. Se propone un modelo logístico adaptativo para gestionar los procesos de ahorro energético. Proporciona eficiencia en la implementación de proyectos y programas de ahorro de energía basados en la optimización espacio-temporal de la secuencia de implementación. La aplicación del modelo propuesto permitirá enfocar los esfuerzos en las áreas dominantes de conservación de energía, minimizar los costos de recursos y tiempo, optimizar la secuencia de implementación de medidas y ajustar los procesos de ahorro de energía lo suficientemente rápido como para alcanzar los objetivos de eficiencia energética.

**Palabras clave:** gestión adaptativa del modelo logístico, procesos de ahorro de energía, elementos del sistema de ahorro de energía, eficiencia energética.

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## 1. Introduction

In modern business conditions, characterized by high rates of information development and communication technologies, growing competitive pressure in sales markets and requirements for environmental friendliness and manufacturability of production processes and equipment, issues of energy conservation and improving energy efficiency, as an important condition for the development of Russian economy are particularly relevant. Digitalization and automation processes provide opportunities for transition to a sustainable development model and transform management processes including those in the field of energy conservation which requires development of logistic models for managing energy saving processes adapted to the conditions of dynamic changes and capable of optimizing resource-time costs and streaming processes within energy-saving projects.

A comparative analysis of studies on energy saving processes presented in scientific literature made it possible to identify a number of main reasons for low efficiency of these processes which include the lack of systematic approach, clear statement of mechanisms and models for managing energy conservation processes, and, as a rule, management of energy saving processes is situational in nature (Eltyshev, Khoroshev, 2014; Eltyshev, Khoroshev, 2014).

There are other reasons for low energy efficiency of economic activity (Eltyshev, Khoroshev. N.I. ,2014; Karpenko, Demin, 2014, Kychkin, Musikhina, Razepina, 2014; Frank, Kychkin, Musikhina, 2014):

- high degree of depreciation of fixed assets which is confirmed by regional statistics (the degree of depreciation of fixed assets in the Saratov region at the end of 2017 was 57.6%, in Samara region - 56.3%, and in Orenburg region - 62.8 % (Rosstat, 2018);
- lack of proper control of energy consumption;
- high level of energy consumption and, as a result, high energy intensity of production processes;
- lack of information database for assessing the current state of energy efficiency of research objects;
- low level of employees' motivation to implement energy conservation programs, etc.

### 1.1. Literature review

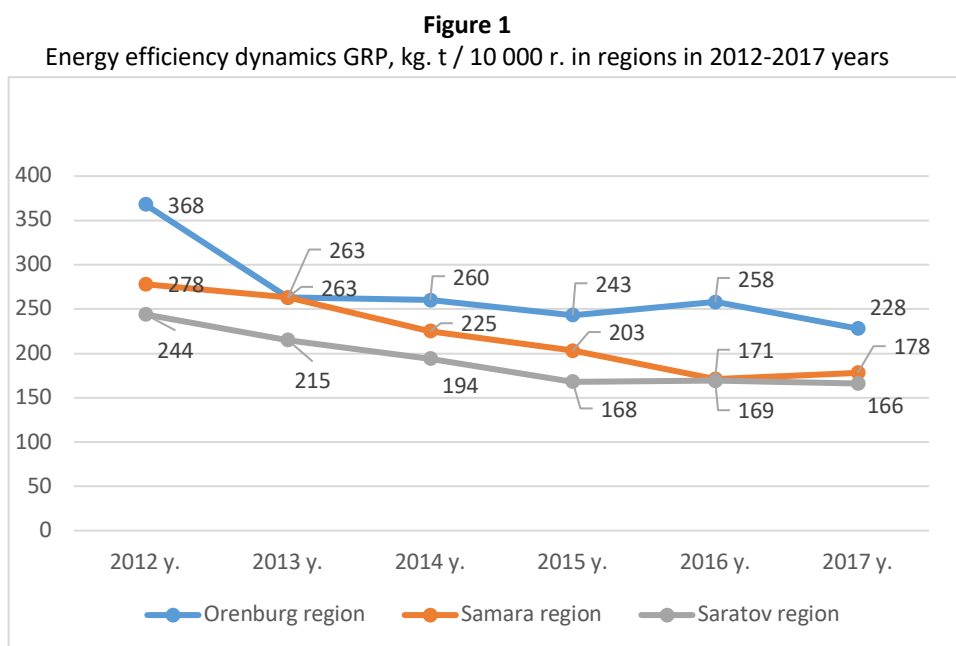
Problems of managing energy saving processes to solve problems of increasing energy efficiency and rational use of energy resources are of great theoretical and practical importance. In modern conditions the solution to the problems of improving mechanisms and models for managing energy conservation processes that can ensure a quick payback on financial resources invested in energy conservation and further reinvesting these funds in subsequent measures to increase efficiency and competitiveness of economic activity in general is of utmost importance.

No less important in the context of the issue under consideration are studies of inter-functional and inter-organizational logistic coordination in relation to management of energy saving processes in conditions of constant changes in the requirements of energy market to increase functional efficiency of organizations' energy economy in various fields of activity and optimize energy flows parameters (Polubotko, 2016).

Particular attention in the study of I.A. Bashmakova and A.D. Myshak (2016) is devoted to the problems of qualitative assessment of regional energy intensity which is based on the development of unified fuel and energy balances. The assessment of regional energy intensity will help to identify energy-saving potential of the region

and to develop high-quality forecasts and programs to increase regional efficiency. The authors note that implementation of high-quality procedures for assessing regional energy intensity “contributes to creation of integrated long-term regional energy efficiency programs in terms of resources, mechanisms and tasks” (Bashmakov, Myshak, 2016). Also, the study focuses on the need to improve methodological support of assessment procedures (in terms of eliminating problems with statistical monitoring tools) and use of statistical data on energy intensity at comparable prices which will provide, within the framework of algorithmic calculation model, identification of the real picture of target indicators performance to provide energy saving and energy efficiency both in regional aspect and in the Russian Federation in general.

In connection with the above, a study should be made of energy intensity dynamics of the gross regional product (hereinafter - GRP) by region. Saratov, Orenburg and Samara regions were chosen for analytical procedures as an example (Figure 1).



Source: Compiled by the authors on the basis of the (Rosstat: Regions of Russia. Socio-economic indicators, 2018)

The analysis of GRP energy intensity dynamics in Saratov, Samara and Orenburg regions in 2012-2017, presented in Fig. 1, revealed the following:

- in Saratov region, GRP energy intensity indicator in 2012-2015 has a stable downward trend with a slight increase in this indicator in 2016 by 0.59% compared to the previous period;
- a similar trend was observed in Orenburg region where energy intensity indicator of GRP steadily decreased from 2012 to 2015, and in 2016 an increase of this indicator by 6.17% was recorded compared to 2015;
- in Samara region GRP energy intensity indicator in 2012-2016 also has a stable downward trend, and in 2017 this indicator recorded increase of 4.09% compared to 2016.

Comparison of GRP energy intensity data for Saratov, Samara and Orenburg regions in 2012-2017 indicates that the highest value of this indicator is recorded in Orenburg region, and the lowest energy intensity of GRP was in Saratov region. It should be noted that official statistics (Rosstat, 2018) indicates decrease in GRP energy intensity

for the period under review in Saratov region by 31.97%, in Samara region by 35.97%, and in Orenburg region by 38.04%. At the same time, in comparable prices (2012 is taken as the model one), the reduction of the indicator in question is significantly lower than 7%, 8% and 17%, respectively (Ministry of Economic Development of the Russian Federation, 2018).

It is completely obvious that in order to realize the tasks of energy conservation and increase energy efficiency in various fields of activity, it is necessary to develop a strategy for managing energy conservation processes taking into account the variety of conditions and factors affecting these processes (Eltyshev, Khoroshev, 2014). Namely, it is necessary to take into account the features of the energy system of the object under research; specifics and industry features; opportunities for the use of energy resources and efficiency of their use; current state of energy system of the studied object; amount of investment in energy saving processes implementation; types of energy-saving technologies and equipment used, etc.

Active discussions are being held concerning the need for an integrated approach to implementation of sustainable development of energy and water supply systems (Fan, Kong, Zhang, 2018; Kumar, Kanchikere, Mallikarjun, 2018; Kuzminov, Berezhnoy, Bakhtin, 2017). The interdependence of energy and water systems is proved which requires implementation of integration processes of these systems and comprehensive measures to neutralize factors that impede integration and, above all, fragmented policies in the field of energy and water supply at the national and local levels.

At the same time, it should be noted that a number of scientific publications investigate issues of distributed generation and cogeneration based on renewable energy sources which require transformation of control systems (Filippov, 2018; Filippov, 2009; Filippov, Dilman, Ionov, 2015). New control systems (cyber-physical systems) should be based on network technologies and sensors. A key role in this process is assigned to embedded systems, the use of which will ensure (Bieber, Ker & Shah, 2018; Filippov, 2018; Filippov, 2009; Filippov, Dilman, Ionov, 2015):

- continuous monitoring and forecasting of the state parameters of dissimilar objects for making managerial decisions in the field of functional use, modernization or decommissioning of the object, as well as, if necessary, adjusting energy saving processes based on the results of the obtained estimates;
- determination of the optimal mode of interaction with the external and internal environment to implement the policy of minimizing fuel consumption and energy resources and harmful effects on the environment.

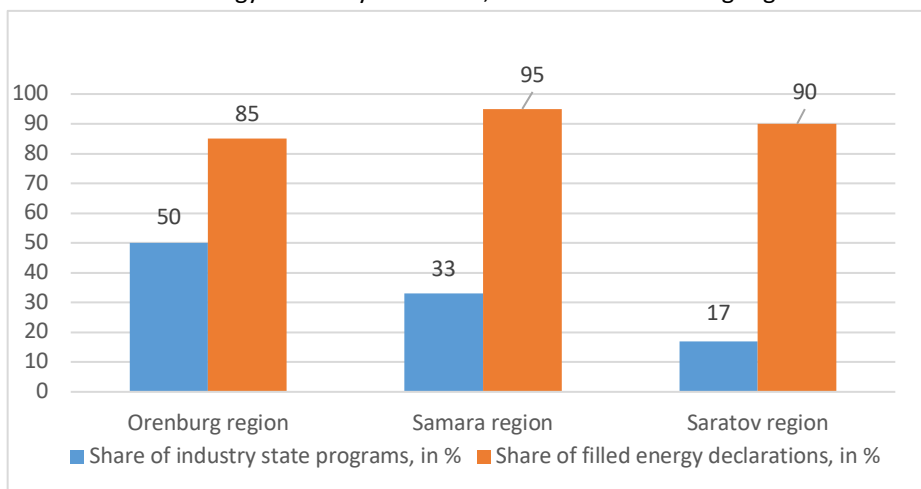
An interesting approach, according to the authors, is presented in (Bianco, 2018), where strategic models of electricity sector are considered taking into account four scenarios ("scenario 1 - slow progress; scenario 2 - limited progress; scenario 3 - "national green revolution"; scenario 4 - "European green revolution"). Four strategic models were proposed depending on the scenario: "traditional generation", "innovative generation", "green generation" and "energy services", which are "addressed to the appropriate business context and designed to maximize its productivity". The use of scenario forecasting of energy market parameters is provided if information databases of the sector is relevant and can serve the basis for developing strategic long-term goals (Horner, de Paula Oliveira, & Bressan Rocha, 2016; Kuzminov, Berezhnoy, Bakhtin, 2017).

Despite importance and relevance in digital economy of solving the problems of implementing energy saving processes in various fields and areas of activity as well as availability of financial support for projects and programs for energy saving and improving energy efficiency, it should be noted that effectiveness of energy saving processes and the resulting energy-saving effects are ambiguous and have a regionally heterogeneous

character due to lack of information transparency in the field of energy-saving technology as well as lack of a unified approach to the creation of these programs, setting targets and leveled values for different industries and occupations.

In particular, let us consider the implementation of key areas of state policy in the field of energy conservation and energy efficiency in the Saratov, Samara and Orenburg regions for 2017, which is presented in Figure 2.

**Figure 2**  
Implementation of key areas of state policy in the field of energy conservation and energy efficiency in Saratov, Samara and Orenburg regions in 2017



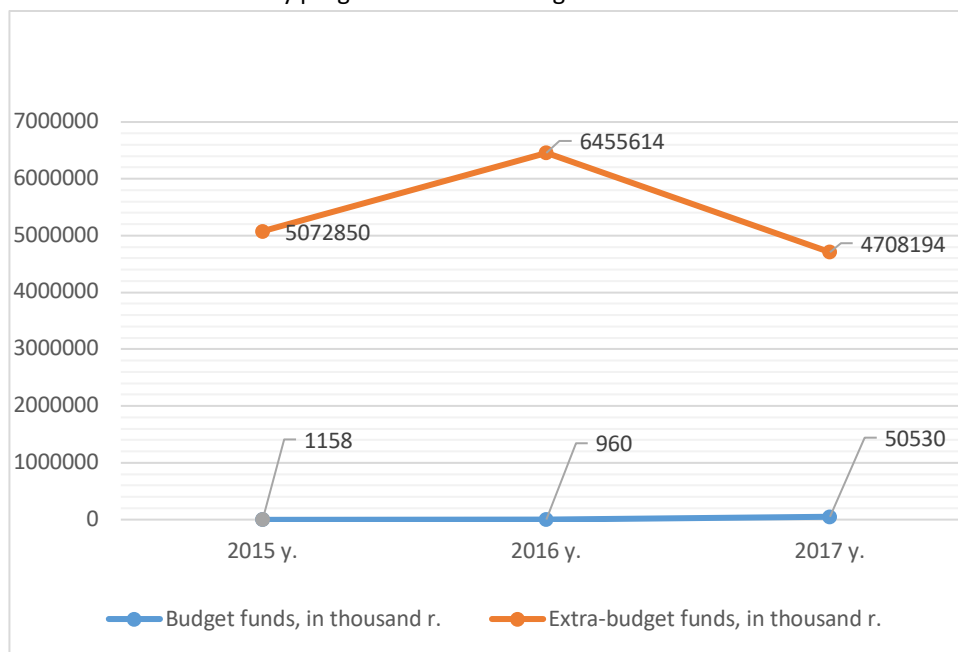
Source: Compiled by the authors on the basis of the (Ministry of Economic Development of the Russian Federation, 2018)

Data analysis in Figure 2 showed that in Saratov region the share of state-owned government programs, including energy efficiency indicators in 2017 was 17%, in Samara region - 33%, and in Orenburg region - 50%. Experience has been gained in introducing the mechanism of energy declarations in the public sector. So, in Fig. 2 in Saratov region, the share of completed energy declarations according to the results of surveys in 2017 was 90%, in Samara region - 95%, and in Orenburg region - 85%, which, if they are not required, is a high indicator in the direction of state policy implementation in the field of energy conservation and energy efficiency (Ministry of Economic Development of the Russian Federation, 2018).

From the point of view of analyzing financial issues of energy-saving programs, there is a regional heterogeneity in the structure of allocated financial resources. Figure 3 shows the dynamics of energy-saving programs financing in Saratov region in 2015-2017 with differentiation of the budget volume and extra-budgetary funds.

A comparative analysis of financing energy-saving programs in Saratov region in 2015-2017 showed a significant excess of extra-budgetary funds over budget funding. At the same time, the volume of budget funds aimed at financing energy-saving programs are unstable. So in 2016, the volume of budget financing decreased by 17.1% compared to the previous period, and in 2017 - increased by 49570 thousand rubles.

**Figure 3**  
Dynamics of financing volumes of energy saving and energy efficiency programs in Saratov region in 2015-2017



Source: Compiled by the authors on the basis of the (Ministry of Economic Development of the Russian Federation, 2018)

It should be noted that financing of energy saving and energy efficiency programs in Samara and Orenburg regions for the period under review was carried out only in 2015 and 2016 from budgetary funds. At the same time, in 2016 compared to 2015, the amount of financing of energy-saving programs from budgetary funds in Samara region increased by 74.76%, and in Orenburg region decreased by 13.33%.

The conducted studies allowed us to identify a number of problem areas in the field of energy conservation:

- lack of effective organizational mechanism for energy conservation and dispersal of tasks for energy-saving projects implementation in various structural divisions leads to decrease in effectiveness of energy conservation processes in organizations in various fields of activity (Rachmanina, 2008; Sergeev, 2013; Energy Saving at Industrial Enterprises, 2000);
- in the formation of planned tasks for conducting energy surveys, due attention is not paid to the process of optimizing the costs of energy conservation measures which reduces the quality of the surveys (Rachmanina, 2007; Sviderskaya, 2016);
- the lack of systematic accounting and control of energy saving processes makes it difficult to identify weaknesses and optimization potentials of affected processes (Rachmanina, 2007);
- internal and external factors that influence efficiency of energy saving processes are not fully taken into account which increases the degree of uncertainty and risk in the implementation of energy-saving programs (Rachmanina, 2007; Sviderskaya, 2016);

- energy saving projects development and their implementation often no clearly established mechanism for staff motivation (Sergeev, 2013; Energy Saving at Industrial Enterprises, 2000);
  - duplication and delay of information processes and exchange between the hierarchical levels of the object of study during energy saving projects implementation lead to decrease in management processes efficiency (Rachmanina, 2008; Rachmanina, 2007);
  - lack of awareness of new energy-saving methods, energy-efficient technologies, instruments and devices (Sergeev, 2013; Sviderskaya, 2016; Sibikin, 2012; Frank, Kychkin, Musikhina, 2014);
  - presence of economic and financial barriers that impede implementation of energy conservation programs including high investment costs, long payback periods for energy conservation projects, insufficient funds for these projects implementation, difficulty of obtaining affordable external financing (Sergeev, 2013; Sibikin, 2012);
  - lack of developed methodological support for evaluating processes and mechanisms for managing energy conservation processes (Sergeev, 2013; Sviderskaya, 2016; Energy Saving at Industrial Enterprises, 2000).
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## 2. Methodology

In order to minimize the degree of influence of many conditions and risks of the factor environment, as well as to increase energy saving processes adaptability to digital and managerial transformations, it is necessary to create conditions for energy-saving technologies introduction and equipment, to improve energy-saving management mechanisms and models based on system, process, integrated, logistic and resource-saving approaches.

The application of these approaches to energy saving management processes will provide:

- systematic nature of solving problems in the field of energy saving process management in order to increase energy efficiency growth rate in various fields of activity, regions and Russian economy as a whole;
- realization of energy efficiency potential while synchronizing integration processes within the framework of the state policy in the field of energy conservation at the federal and regional levels;
- optimization of energy flows with a steady reduction in energy costs;
- intensification of the processes of energy-saving technologies introduction and implementation of systemic measures to increase energy efficiency, taking into account objective forecast of the growth of industrial and domestic consumption of energy resources.

To solve the problem field, it is necessary to develop an adaptive logistic model for managing energy conservation processes and use a matrix approach as an effective tool for evaluating energy conservation processes that are multifaceted and represent an interconnected set of technological, organizational, technical, economic, and economic processes. A matrix approach in assessing the level of elements development in an energy-saving system will ensure the formation of a portfolio of possible alternatives with the subsequent identification of dominant areas for improving the process of implementing energy-saving measures (Energy Saving at Industrial Enterprises, 2000). Therefore, it is necessary to develop criteria for ranking energy-saving measures to identify priority areas taking into account their impact on the target setting of energy policy of organizations in various fields of activity.

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### 3. Results

An important aspect in energy-saving projects and programs implementation is to optimize the sequence of energy-saving measures taking into account the selected ranking criteria which will ensure focus on key dominant elements of energy-saving process. Figure 4 presents a diagram of the proposed adaptive logistic model for managing energy conservation processes based on spatio-temporal optimization of implementation sequence of energy-saving measures.

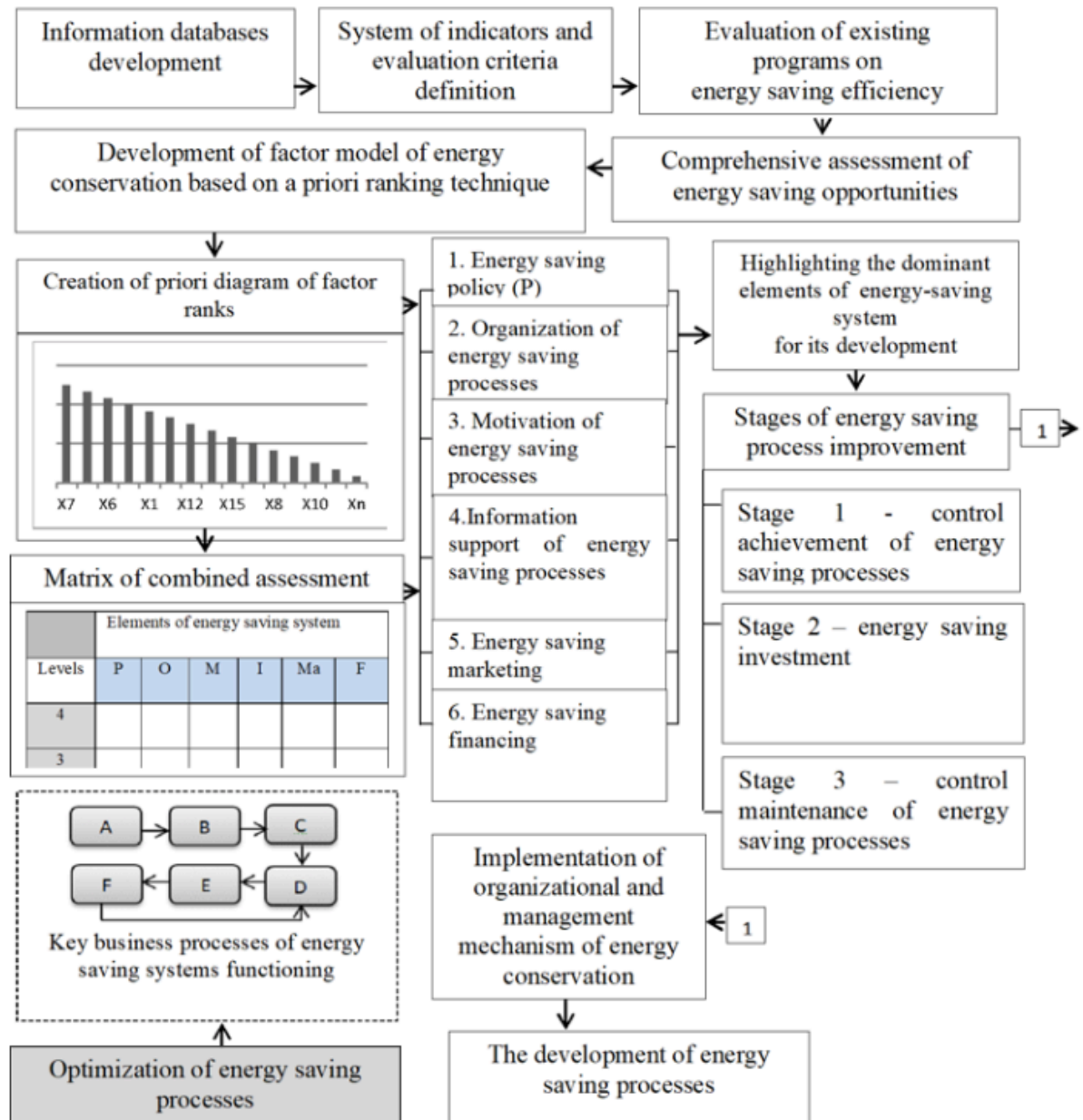
Based on the results of energy audit, a database is formed that includes the following information: energy consumption; movement of energy flows; ranking of energy consumption objects by the level of their energy efficiency for energy conservation programs implementation; effectiveness of energy-saving measures and their impact on key indicators of economic activity; levels of efficiency in the use of energy and investment resources in energy-saving measures implementation.

A comprehensive assessment of energy-saving opportunities will ensure identification of latent energy-saving potential in order to obtain maximum financial effect, increase stability and competitiveness from introduction of energy-saving measures, and will also determine the likelihood of stable development of organizations in various fields of activity in the long term.

An important component in achieving the effectiveness of energy-saving programs and realizing potential for energy conservation in various fields of activity is to take into account the variety of factors affecting energy saving and development of energy conservation factor model based on a priori ranking technique. The diagram of methodology stages for a priori ranking of factors affecting energy conservation processes is presented in Figure 5. The application of this methodology, according to the authors, will allow us to identify and systematize factors that influence energy conservation process efficiency provided that the questions are correctly posed, factors are selected and the quality of organization of expert procedures is ensured.



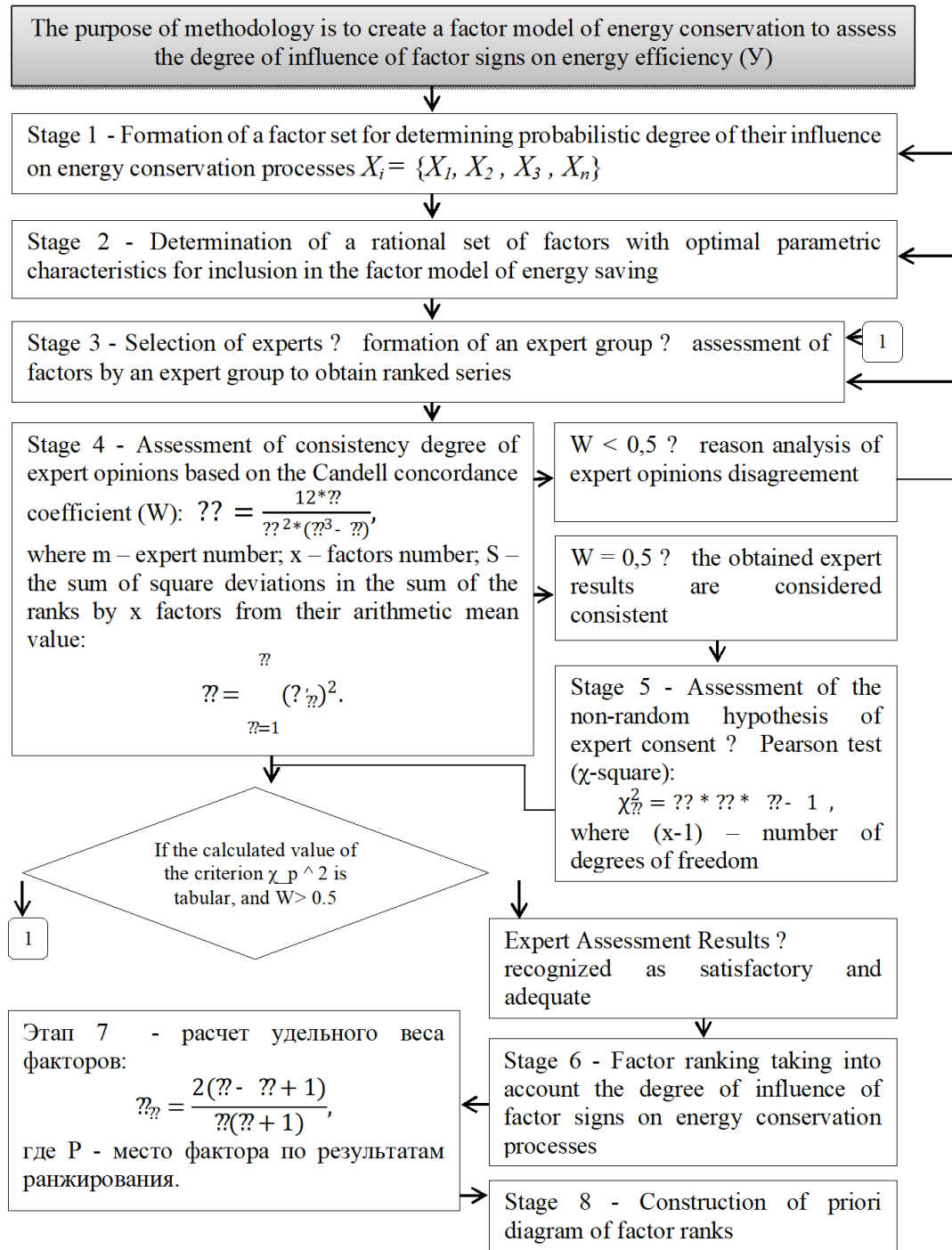
**Figure 4**  
Scheme of adaptive logistic model of energy saving process management



Source: elaboration of the authors

Legend: A - creating technical capabilities for information support of energy consumption process; B - collection and systematization of information on the actual consumption of energy resources; C - methodological support for ranking energy consumption objects according to their energy efficiency level for highlighting dominant objects for energy conservation programs implementation; D - selection of technical and organizational mechanisms for ensuring energy conservation processes, setting goals and objectives; E - implementation of energy-saving projects, programs; F - assessment of the achieved effects of energy conservation measures and the adjustment of target settings and methods for achieving the planned energy efficiency indicators.

**Figure 5**  
Diagram of priori ranking methodology for factors affecting energy conservation processes



Source: elaboration of the authors

To evaluate energy saving processes, it is proposed to use a combined assessment matrix (see table 1), which will allow us to establish the current level of elements development in energy saving system for the subsequent implementation of processes for improving its elements.

**Table 1**  
Matrix of combined assessment of energy saving system elements

Levels	Elements of energy saving system					
	P	O	M	I	Ma	F
4	P4	O4	M4	I4	Ma4	F4
3	P3	O3	M3	I3	Ma3	F3
2	P2	O2	M2	I2	Ma2	F2
1	P1	O1	M1	I1	Ma1	F1
0	P0	O0	M0	I0	Ma0	F0

Source: elaboration of the authors

Six elements of the energy-saving system (ESS) are distinguished: energy-saving policy (P); organization of energy saving processes (O); motivation of energy saving processes (M); information support of energy saving processes (I); energy saving marketing (Ma); energy conservation processes financing (F).

As presented in table 1, the development levels of the elements of the energy saving system have a scale from 0 to 4. Moreover, the zero level corresponds to absence of the element in question, and the fourth level corresponds to maximum development of the element (Energy Saving at Industrial Enterprises, 2000). In accordance with table 1, the level development of elements of energy-saving system can have the following gradations:

- P0, O0, M0, I0, Ma0, F0 - there are no elements in energy saving system;
- P1 - there is no documentary regulation of energy conservation policy, O1 - a number of tasks on energy saving are carried out by employees with limited official capabilities, M1 - there is no official motivation for the results of energy-saving projects, I1 - information base consists of reports on energy costs, Ma1 - measures are being taken to commercial promotion of energy conservation (use of informal information channels), F1 - financing of low-cost energy conservation is carried out;
- P2 - there is no officially adopted energy conservation policy, O2 - there are employees responsible for implementing energy saving processes, but management structure and their powers are not defined, M2 - non-financial methods of stimulating energy saving predominate, I2 - energy indicators are used that are meant to develop energy saving budget, Ma2 - a number of employees are trained, F2 - energy-saving measures are financed with a minimum payback period;
- P3 - the official energy conservation policy statements are written down (there is no interest from the top management), O3 - organization of energy saving processes is controlled by the management, M3 - the incentives for employees in motivation system for implementing energy-saving measures and rational proposals in this direction are clearly spelled out, I3 - energy consumption and costs are monitored in all components of the logistics system, Ma3 - regular activities are being implemented to promote energy projects and programs; better safety for employees, F3 - financing of energy-saving measures carried out on the basis of the criteria adopted;

- P4 - energy conservation policy is considered as part of the overall development strategy, O4 - responsibilities for energy saving processes implementation are clearly fixed (SE is integrated into the overall structure of the logistics system), M4 - regular reviews and adaptation of the elements of motivation system are carried out during energy saving projects implementation, I4 - An integrated information system has been created that provides control of energy consumption and estimates of savings, identification of various discrepancies and registration Yu expenses, Ma4 - internal and external marketing of energy efficiency, F4 - priority is given when allocating financial resources in favor of environmentally friendly schemes.

The introduction of organizational and managerial mechanism of energy conservation will increase the activities efficiency in the field of energy flow management to achieve energy efficiency targets.

It should be noted that optimization of the sequence of energy-saving measures implementation in organization should be carried out taking into account industry specifics of the activity, features of system development, existing restrictions on the resource-time basis, risks within the framework of these projects or programs as well as external and internal factors affecting the effectiveness of these events.

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## 4. Discussion

In the current context of traditional energy sources shortage, a global problem and a strategic direction for the development of various fields of activity is increasing energy efficiency and implementing energy-saving measures in order to modernize technological base, increase innovative potential and competitiveness of various fields of activity (Eltyshev, Khoroshev, 2014; Karpenko, 2014; Polubotko, 2016).

Digitalization of various fields of activity leads to transformation of management processes, including energy management processes which requires the search for new mechanisms, models and tools for implementing management tasks to improve energy efficiency at the local, regional and federal levels (Sibikin, 2012; Bieber, Ker, & Shah, 2018).

Quite a lot of attention from scientists and specialists is paid to the issues of rational use of energy resources. This problem is in the focus of scientific research of domestic and foreign scientists and is considered in relation to macro, meso and micro levels. An important role in this is played by the research of theoretical and methodological plan within the framework of which the essence and content of energy-saving processes at various levels are revealed, the development and implementation of energy-saving equipment, technologies, energy management system in control structures as well as consideration of information analytical system development for monitoring energy efficiency indicators and assessing potential for energy saving in various fields of activity (Karpenko, Demin, 2014; Sviderskaya, 2016).

A number of studies are focused on identifying and systematizing factors of external and internal nature that influence energy saving processes to implement proactive managerial impacts on emerging obstacles in achieving the goals set in the framework of energy saving programs (Eltyshev, Khoroshev, 2014; Kychkin, Musikhina, Razepina, 2014; Rachmanina, 2008; Rosstat, 2019).

There are developments in the field of long-term and medium-term forecasting of energy component development in economy and processes of energy conservation, rationing and standardization of indicators of energy resources use (Bashmakov, Myshak, 2016; Eltyshev, Khoroshev, 2014; Kychkin, Musikhina, Razepina, 2014; Filippov, 2018).

Despite the existing development, practice of implementing energy-saving measures in various fields of activity and the state policy in the field of energy conservation, many scientists agree on the need for a balanced approach to this activity and introduction of organizational and management mechanism for energy conservation, taking into account factors affecting efficiency of energy saving processes and the likelihood of risks of various typologies as well as management models development for energy saving processes adapted to the changing conditions of the factor environment. The identification of energy-saving effects requires a comparative analysis of intensity, parameters of energy flows. Strong dependence of the size of the obtained effect on the current state of the energy-saving system is also observed (Elyshev, Khoroshev, 2014; Bieber, Ker & Shah, 2018).

The problems of forming a system of key energy efficiency indicators and their target levels taking into account industry specifics and areas of activity, as well as issues of assessing the effectiveness of investments in energy conservation, have not been sufficiently studied and require further scientific development (Rosstat, 2018; Sviderskaya, 2016).

All available studies indicate that in the context of dynamic changes in business environment it is especially important to increase energy-saving programs efficiency by creating an adaptive logistic model for managing energy saving processes taking into account industry specifics, technological process characteristics and parametric characteristics of energy flows which will ensure a reduction in energy consumption, saving energy costs, reducing the level of volatility and the degree of harmful influence environmental impact and, as a result, increased environmental safety, profitability and competitiveness of economic activity (Rachmanina, 2007; Energy Saving at Industrial Enterprises, 2000; Filippov, 2009).

According to the authors, the following studies may become important directions for further developments in the field of increasing energy saving processes efficiency at various levels:

- improvement of organizational and managerial mechanism of energy conservation (Karpenko, Demin, 2014) and the development of comprehensive methodological apparatus that provides a systematic solution to problems during energy-saving programs implementation, providing a comprehensive and complete analysis of the situation, identifying the main factors affecting energy saving processes, assessing the degree of their influence, establishing priority when solving management tasks;
- the development of a system of key indicators of energy saving processes by industry and field of activity with the selection of indicative target indicators of energy efficiency and establishment of zone of their acceptable values, etc.;
- development of a mechanism for stimulating energy saving processes with an integrated information and analytical system will ensure popularization of energy saving processes and accelerate development and implementation of corporate standards and technical regulations that take into account energy efficiency requirements of economic activity when achieving specified parametric characteristics of energy saving process.

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## 5. Conclusion

Thus, in the course of the study, the following results were obtained:

1. The need for technical and technological re-equipment based on energy saving processes implementation to increase the growth rate of regionally heterogeneous energy efficiency, reduce structural imbalances in regional development and GRP energy intensity has been identified.
2. In order to increase energy saving efficiency and synchronization processes adopted at the federal and regional levels in this area, it is necessary to form a unified adaptive logistic model for managing energy conservation processes with identification of energy-saving zones, targeting energy-saving measures and using a balanced approach to intensify this activity which will ensure maximum energy-saving effect, optimization of resource and timing energy-saving processes and minimize energy costs.
3. A prerequisite for ensuring effectiveness increase and sustainability of industrial and commercial activities due to introduction of energy-saving measures is information transparency of energy-saving policies, taking into account variety of factors affecting energy-saving processes through development of factor model of energy-saving based on a priori ranking technique. The creation of factor model of energy conservation will ensure identification of dominant factor signs that affect energy conservation processes efficiency as well as identification of latent potential to increase competitiveness and stable development of the organization in the long term.
4. Practical application of the proposed adaptive logistic model for managing energy saving processes based on spatio-temporal optimization of the sequence of energy-saving measures implementation will ensure timely adjustment of energy-saving processes in case of deviations from the planned parameters and identify priority areas for improving energy-saving system elements, as well as optimize the sequence of energy-saving implementation events, time costs for their implementation and processes of information exchange between the links of the object of study in energy conservation programs implementation. When optimizing the sequence of energy-saving measures implementation in organizations of various fields of activity, it is necessary to take into account the influence of a variety of factors of external and internal nature on the measures effectiveness, the sector of the research object, the level of subsystems development and the technologies used, limitations and likelihood of risk situations of various typologies.
5. The introduction of organizational and managerial mechanism of energy conservation will allow for a systematic approach to energy conservation management processes development, including procedures for analyzing, generating and monitoring of energy saving projects implementation, monitoring the achievement of energy efficiency targets, accounting and analysis of energy consumption, etc. and will increase the efficiency of activities in the field of energy flow management in order to achieve energy efficiency targets.

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