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Research Article

FORMATION OF THE ENERGY MANAGEMENT SYSTEM OF THE ENTERPRISE IN ACCORDANCE WITH THE ORGANIZATIONAL AND METHODOLOGICAL SUPPORT OF THE PROCESS

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ABSTRACT

The article developed the recommended organizational structure of the energy management system of the enterprise, the documentation of the energy management system, the program of measures for the implementation of the energy management system at the enterprise, The Matrix of responsibility developed for the measures, the stages of assessing the effectiveness and efficiency of the energy management system, the algorithm for assessing the efficiency and.

KEYWORDS

Energy efficiency, energy resources, energy management systems, organizational structure, fuel and energy resources.

INTRODUCTION

Global energy sources are gradually decreasing and prices are constantly increasing. A sharp increase in energy resource needs and an exacerbation of environmental problems associated with energy resource consumption all over the world are advancing energy conservation issues in all areas [1, 2]. Reducing the cost of products by saving energy resources is one of the main factors in increasing the competitiveness of our production in the external and internal markets. The main directions for solving this task are: the application of technological machines with high efficiency and a rational power supply system that supplies energy, as well as the automation of energy use processes [2, 3]. A high level of responsibility for the implementation of the principles of sustainable development and the achievement of its goals is

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associated with the activities of organizations in the field of energy efficiency. In this regard, the formation of energy management systems is the most relevant.

METHODS

The process of forming an energy management system in an industrial enterprise requires the development of organizational and methodological support corresponding to its goals. The study showed that in its composition it is necessary to develop and confirm at the enterprise:

- organizational structure,

- documentation system of energy management system,

- system implementation activities program,

- matrix of responsibility for the implementation of activities,

- algorithm for estimating the resultativity and efficiency of the system[4].

Based on the study of the basic organizational structures (standard units of industrial enterprises, which are most involved in solving the issues of energy saving and energy efficiency) and modern approaches to the formation of an energy management committee, an organizational structure of an energy management system was built (Figure 1), recommended for introduction in industrial enterprises.

According to ISO 50001, special requirements are imposed on the documentation of the energy management system. The main documents are the energy policy of the enterprise (its model project was developed) and energy management.

RESULTS

When developing the structure of energy management, it is recommended to bring it as close as possible to the structure of the ISO 50001 standard. This ensures that all elements of the energy management system are included in this document.

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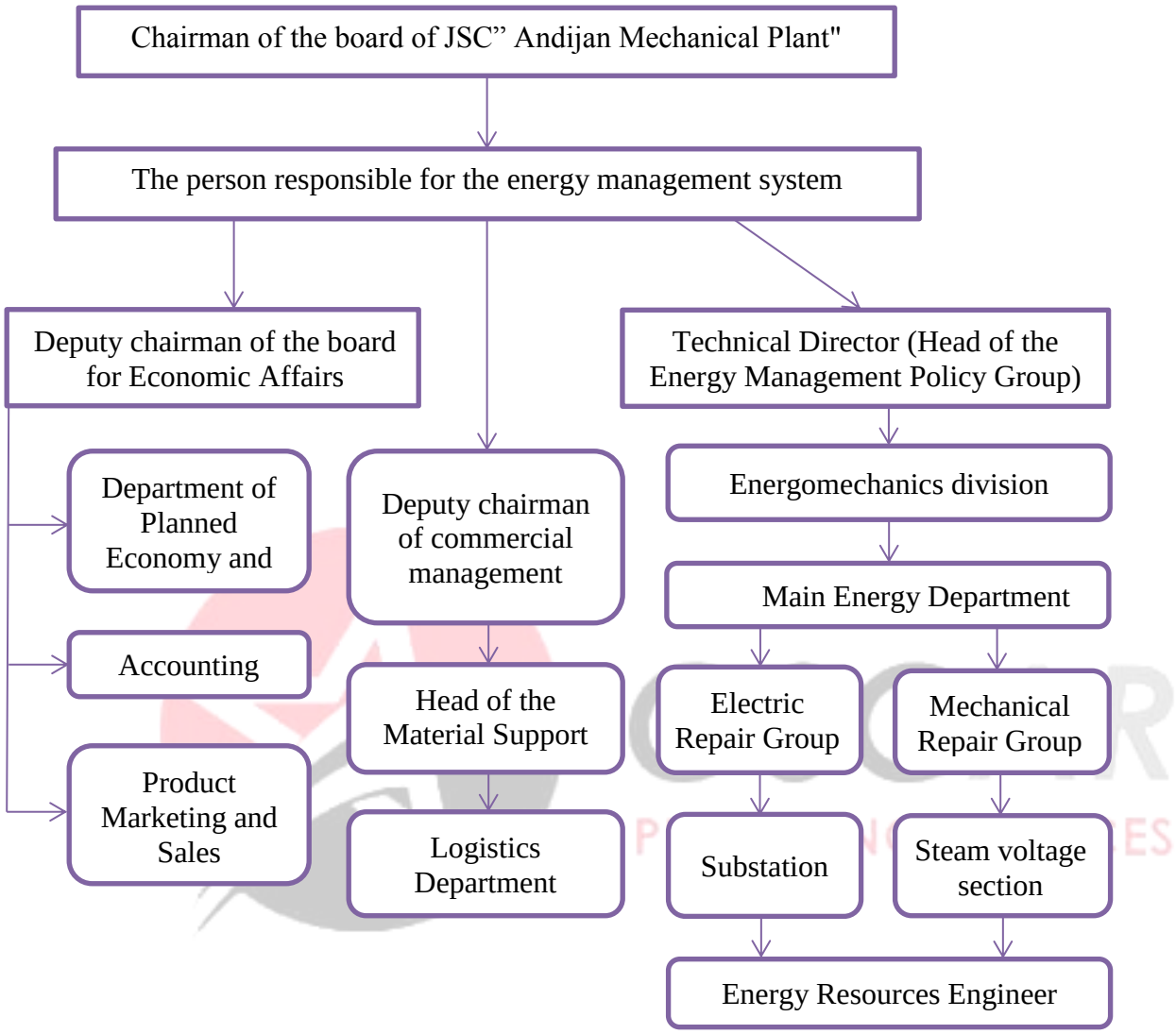

Figure 1. Recommended organizational structure of the company's energy management system.

Along with energy management, it is necessary to develop, approve and implement into the current activities of an industrial enterprise a number of documents supporting it

Table 1
Documentation on the energy management system

Name of the document	Compliance with ISO

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	50001 requirements
Quality Policy	P 5.2
Corporate context	P 4.4
The management of the responsible person for the energy management system	P 7.2
The procedure for managing and identifying energy consumers Risk management procedure Internal audit management procedure Instructions for motivating employees of the enterprise for the economical and efficient use of energy resources Guidelines for the development, financing, implementation and study of energy management system measures	P 7.5.3
The list of the main energy consumers in the enterprise	P 6.6
Instructions for the procurement of energy resources and power grids	P 7.5.3

The formation of the organizational structure and documentation system corresponds to the stage of development of the energy management system. At the stage of its implementation, it is necessary to carry out a number of measures to adapt the developed system to the working conditions of the enterprise (Table 2).

Table 2

The program of measures for the implementation of the EnMS at the enterprise

Safety precautions	Responsible persons	Deadlines for completion
Approval of the order on the introduction of EnMS	The Supervisory Board (with the status of Chairman)	Within a week from the date of development of the EnMS project
Employee training	Head of the EnMS Implementation Team	Within two months after the approval of the order on the introduction of EnMS
The context of the energy management policy and measures for the implementation of EnMS to activate	Head of the EnMS Implementation Team	No more than two months after staff training
Confirmation of activated documents	Head of the EnMS Implementation Team	Within a week after the activation of the documents

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Familiarization of employees with approved documents	Head of the EnMS Implementation Team	Within a week after the approval of the documents
Setting up EnMS activities	Head of the EnMS Implementation Team	For 1 or 2 quarters

The developed matrix of responsibility for measures to implement the energy management system, taking into account the proposed organizational structure, is presented in Table 3. Table 3 does not highlight such an important role of the participants in the process as responsibility. In this regard, the decision should be clear that all responsibility for the events lies solely with the head of the energy management committee

Table 3
The developed matrix of responsibility for the implementation of the energy management system

Events	Divisions				
	Obser-vation board	Head of the EnMS Implementation Team	Financial, management reporting and planning group	Main Energy Department	Supply and Purchase Group
The order on the introduction of EnMS	Approval	Consent, participation, development	Realization	Realization	Realization
Employee training	Approval	Consent, participation	Realization	Realization	Realization
Activation of measures aimed at the implementation of energy management, energy policy and EnMS	Approval	Consent, participation, development	Development, implemen-tation	Develop-ment, implemen -tation	Develop-ment, implemen-tation
Activate confirmation of the package of documents	Approval	Approval			
Familiarization of the organization's employees with the documents		Attendance	Participation	Participati on	Participation

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Analysis of EnMS activities		Consent, participation	Development	Develop-ment	Development
Audit results	Analyse	Coordination, analysis	Analyse	Analyse	Analyse
Analysis of audit results	Approval	Analyse	Analyse	Analyse	Analyse
Activation measures	Approval	Preparation for approval and approval	Development, implementation	Develop-ment, implement ation	Development, implementation

The overall result of the implementation and operation of the energy management system should be an economic effect, therefore it is necessary to identify the stages of evaluating the efficiency and effectiveness of the energy management system aimed at reducing the consumption of fuel and energy resources. (Table 4)

Table 4
Stages of evaluating the efficiency and effectiveness of the energy management system

Stages	Evaluation elements
Evaluation of investment projects	Modernization of machines and equipment in order to reduce the consumption of fuel and energy resources
Evaluation of the operational characteristics of machines and equipment	Measures to reduce the consumption of fuel and energy resources using existing machines and equipment: - constant monitoring of the energy-efficient operation of machines and equipment; - setting up an orderly setup of machines and equipment; - reducing energy losses
Assessment of the culture of using fuel and energy resources	Keeping records of fuel and energy resources consumption; control of the consumption of fuel and energy resources in the production units of the enterprise; focus on employee motivation

On this basis, it seems advisable to create an algorithm for evaluating the energy management system (Fig. 2).

1. Identification of the main energy consumers

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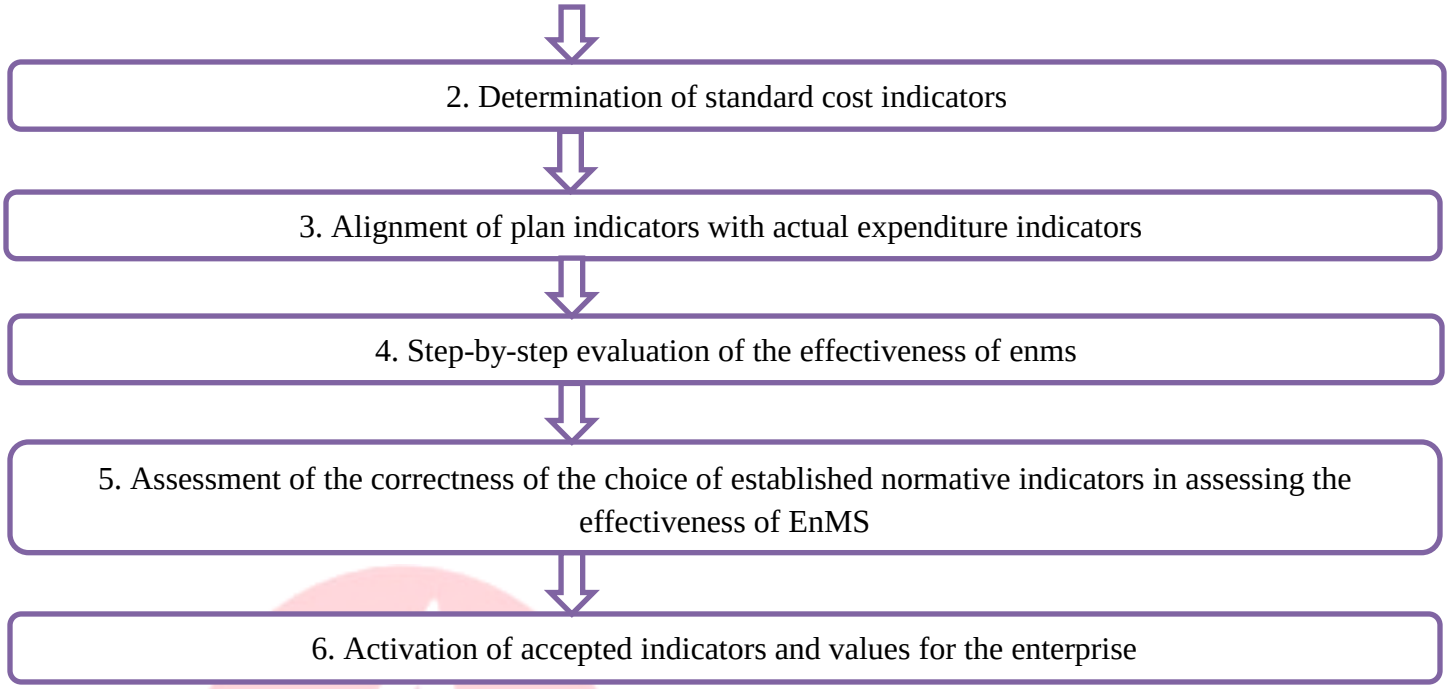

Figure 2. Algorithm for evaluating the efficiency and effectiveness of the energy management system

The first and third stages can be considered preparatory, the fourth - calculated, the fifth - estimated, the sixth is aimed at improving the estimated performance of the system. The use of the proposed algorithm for evaluating the energy management system makes it possible to identify those types of activities that have the greatest economic impact.

DISCUSSION

In general, experts in this field argue that energy as a management system is an important tool for achieving the sustainability of an organization's development. This study has shown that the introduction of EnMS organizations that meet the requirements of modern international standards can create a sufficiently effective system that ensures the implementation at the strategic level of certain principles of sustainable development of the organization.

A model of the proposed process of forming an industrial enterprise energy management system based on a functional modeling technique is constructed.

The recommended organizational structure of the like-minded energy management system was presented, as well as the Energy Management Committee, and its role in meeting the requirements of ISO 50001 was determined.

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The main provisions of the energy policy of an industrial enterprise are substantiated and a list of mandatory documents for the implementation of an energy management system at an industrial enterprise is developed.

CONCLUSION

The task of the energy management system is to include the criterion of energy efficiency in the daily practice of decision-making at all levels, and the purpose of the standard is to offer a number of considerations that are carried out honestly. The company is guaranteed to receive a system that will ensure a constant increase in energy efficiency, that is, first of all, energy savings[5].

A matrix of responsibility for the implementation of measures for the implementation of an energy management system has been developed.

An algorithm for evaluating the efficiency and effectiveness of the energy management system has been developed, and the elements to be evaluated have been identified.

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