# Requirements for companies' energy saving programs under the conditions of digitalization of Russian economy

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# Requirements for companies' energy saving programs under the conditions of digitalization of Russian economy

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**Abstract.** The research has been done in the field of organizational aspects of the program approach application to manage the processes of energy saving and energy efficiency improvement at enterprises in the context of shaping digital economy. The analysis of existing standards in the area of program management allowed formulating the main requirements for their adaptation with regard to the conditions under consideration. It also allowed determining key priorities needed in order to provide the necessary organizational changes. The concept of energy saving and energy efficiency improvement positioning in the enterprise management priority system was employed as the host methodological platform for the research. When implementing the suggested approach, the processes under study were viewed, first, from the point of solving the current problems of the energy utilities functionality at the enterprise; second, from the point of one of the possible concepts of solving tactical objectives for production and commercial operations efficiency improvement at the enterprise; third, from the point of one of the strategic directions of the enterprise development focused on its competitive growth. For each variant under consideration, requirements were formulated for establishing organizational support of measures on design, implementation and commercialization of energy-efficient innovations. Implementation of the suggested approach will foster integration of the energy saving and energy efficiency improvement processes as well as the processes of innovation development in the framework of the single control path. Results of the conducted research can be employed by enterprises that belong to various sectors and business profiles when forming energy saving and energy efficiency improvement programs in the context of Russian economy digitalization with different variants of the processes under study positioning in the management priority system.

## 1. Introduction

Innovations in the area of energy saving and energy efficiency improvement constitute the most important factor of economic development in the context of digital economy [1]. At the same time, a whole range of issues concerning design, implementation and commercialization of energy-efficient innovations still remain unresolved [2, 3]. This is why importance is being increasingly attached to employment of modern approaches in the management of energy-efficient innovations [4, 5]. Among them, a special place is given to the program-oriented and goal-oriented approach [6]. The most widespread in Russian and foreign managerial practice are program management standards of P2M (Project and Program Management for Enterprise Innovation) [7] and PMI (Project Management Institute) [8]. Yet, they determine only general requirements for program management, without considering specific operation procedures for energy saving and energy efficiency improvement at the

enterprise in the context of its innovative modernization, which, in turn, predetermines the need for further research.

## 2. Research objective

The research focuses on considering organizational aspects of shaping the energy saving and energy efficiency improvement program at the enterprise within the scope of its innovation development from the perspective of Russian economy digitalization. As a result of this research, requirements shall be devised for organizational support of the program. They will also complement the requirements of program management standards employed at present with the aim of their adaptation from the perspective of the problem under study.

## 3. Methods

The concept of energy saving and energy efficiency improvement positioning in the enterprise management priority system was adopted as the host methodological platform for conducting the present research. By positioning we shall mean the critical managerial decision of the enterprise administration concerning the place of energy saving and energy efficiency improvement in the company management priority system, taken with regard to goals, requirements and intended outcomes of measures on energy saving and energy efficiency improvement implementation [9]. The positioning thus carried out predetermines the possibility of considering the place and role of energy saving and energy efficiency improvement in the corporate development plan from different points of view. First, from the point of solving the current problems of the energy utilities functionality at the enterprise [10]; second, from the point of one of the possible concepts of solving tactical objectives of production and commercial operations efficiency improvement at the enterprise [11]; third, from the point of one of the strategic directions of the enterprise development focused on its competitive growth [12]. In this respect, each variant of positioning of energy saving and energy efficiency improvement will differ in the character of organizational changes in the enterprise performance, which will adequately reflect the different degree of integration of the operation procedures for energy saving and energy efficiency improvement with the operation procedures for innovative activities.

## 4. Results

As a result of the program management standards analysis, we pointed out the following possible concepts of effecting organizational changes at the enterprise. The first one comprises building the system of goals and their decomposition between different links; the second, changes in organizational structure of management; the third, reconfiguration of tasks and functions among different departments; the fourth, redistribution of responsibilities, reallocation of rights and reauthorization within the organization; the fifth, optimization of the employed information flow and the current workflow system at the enterprise. Figure 1 represents variants of energy saving and energy efficiency improvement positioning we suggest from the point of possible concepts of effecting organizational changes and defining the goal-oriented innovative solutions.

The first variant of energy saving and energy efficiency improvement positioning, as a rule, aims at introduction into manufacturing of only such innovative solutions that have already proved to be efficient, gained recognition in the sector and is at the stage of their implementation in the enterprise production operations. It is such innovative solutions that directly promote decrease of the energy-output ratio. In this setting, modernization of technological base of manufacture is implemented, as a rule, in the framework of existing manufacturing departments and does not imply administering any changes in the current enterprise management structure.

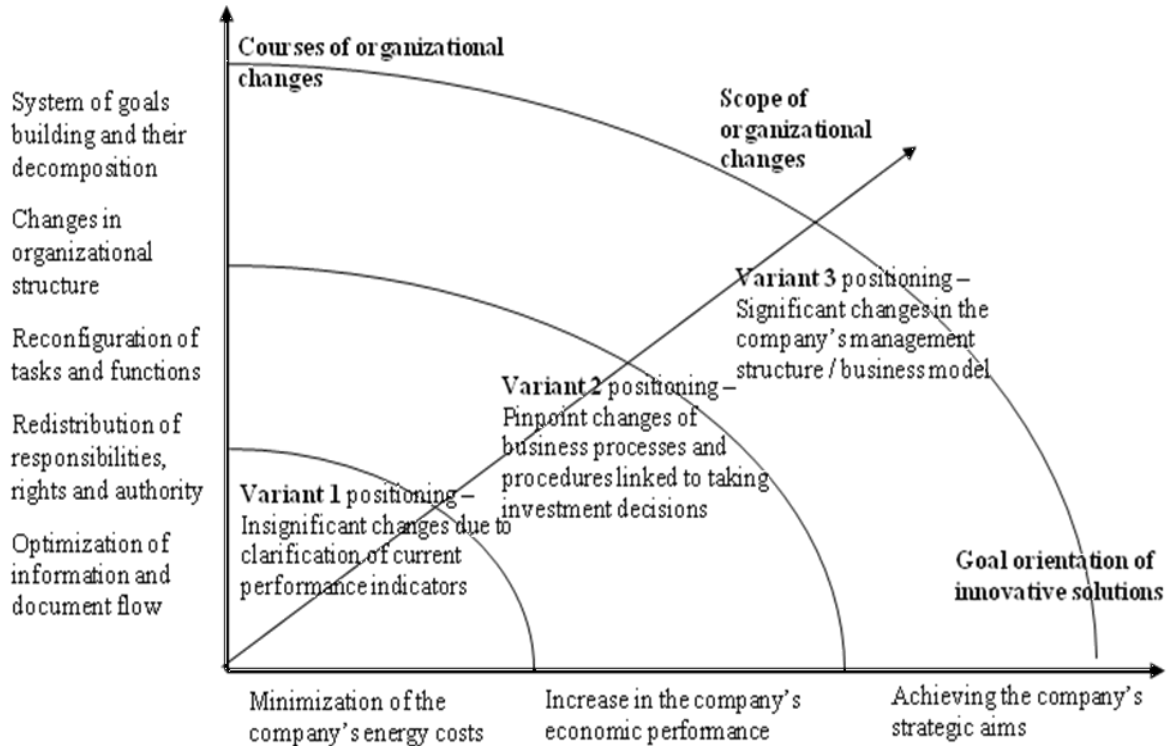


**Figure 1.** Variants of energy saving and energy efficiency improvement positioning in the enterprise management priority system.

Considering the second variant of energy saving and energy efficiency improvement positioning, we can mention its focus on enterprise performance efficiency improvement when realizing investment programs as a result of selection of the most effective pattern of finance investment. Investment in energy saving and energy efficiency improvement is compared to any other possible alternative investment. Such alternatives can be, for example, capital investment with the aim to found new ventures, release new products, etc. This is why the second variant of positioning implies the possibility of introducing the necessary changes in existing business processes at the enterprise.

The third variant of energy saving and energy efficiency improvement positioning shows distinct focus on solving tasks of the enterprise strategic development. The possible courses of achieving its strategic aims can be grouped as follows. The first course is connected with energy infrastructure digitalization, including development of the smart metering systems for energy pathways [13], distributed automatic process control systems, control systems for equipment operational status and energy supply quality [14], shaping digital models for optimal planning of functionality and development of the energy system [15]. The second course aims at optimum balance between great, distributed and autonomous power engineering [16–18]. The third course is based on technologies of intelligent management and engineering, including employment of methods and tools of "weak" (applied) artificial intelligence for automatic process control and automatic commercial relations control, as well as for automated engineering, adjustment, recovery of management systems [19]. And finally, the fourth course is defined by creating new opportunities for end users, service providers, regulators, including creation of open service platforms, development of Internet of Things (IoT) practices, active shaping of new values and new customer behavioral patterns [20, 21].

It should be noted that organizational changes that go along with the third variant of positioning are seen as the most complex and large-scale ones. To a greater extent it is due to the fact that it predetermines the need for corporate restructuring of the enterprise management structure, which will allow to integrate the operation procedures for energy saving and those for innovative activities into the

single control path. In order to make this possible, it is necessary to establish interrelation between the processes under study in compliance with the requirements specified for providing organizational support of measures on design, implementation and commercialization of energy-efficient innovations (figure 2).

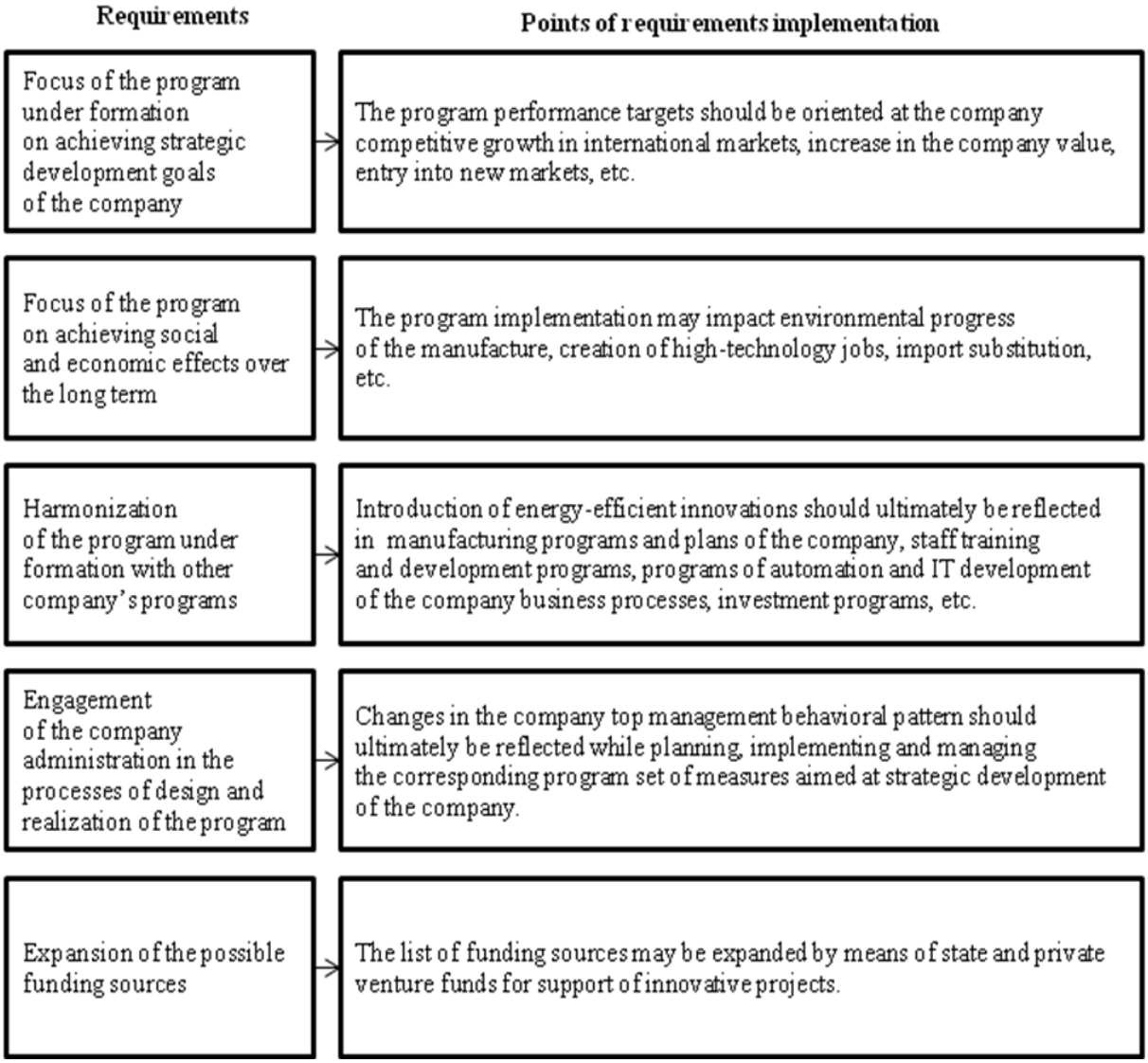


**Figure 2.** Requirements for organizational support of the program under formation.

Among them, the following should be highlighted. First, focus of the program under formation on achieving strategic aims of the company development. Second, focus of the program on achieving social and economic effects over the long term. Third, harmonization of the program under formation with other programs of the enterprise. Fourth, engaging the company administration in the processes of design and realization of the program. Fifth, expansion of the possible funding sources. The requirements we have formulated for the energy saving and energy efficiency improvement program design at the enterprise aim at the fullest potential realization of energy saving and energy efficiency improvement as the priority trend of the enterprise innovative development.

## 5. Conclusions

The established requirements aim at adaptation of the employed program management standards of P2M and PMI with regard to specific operation procedures for energy saving and energy efficiency improvement at the enterprise within the conditions of its innovative modernization. The suggested courses of making organizational changes can be employed by enterprises of various sectors and business profiles while shaping the energy saving and energy efficiency improvement programs in the context of Russian economy digitalization under different variants of the processes under study positioning in the management priority system.

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