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MANAGEMENT OF INNOVATIVE DEVELOPMENT OF ENTERPRISES IN THE CONTEXT OF A CHOICE OF ENERGY SECURITY STRATEGY

The subject matter of the research in the article is the energy security strategy of enterprise, the choice of which for the enterprise is the basis of full functioning, further economic and innovative development. The goal of this article is to identify the conditions and criteria of a choice of energy security strategy of enterprises taking into account the factors and threats of the internal and external environment. In the article we used such methods and techniques of scientific cognition: methods of analysis and synthesis – to consider the essence of energy security strategy, method of theoretical generalization – to identify the formation stages of energy security strategy of enterprise in the conditions of innovative development, a taxonomy-analytical method – to classify the main components of the energy security strategy management of enterprise, method of logical generalization – to justify the relevance of the topic, goals and objectives of the research, method of transition from abstract to concrete – in the formulation and justification of proposals for the selection of energy security strategy in the conditions of innovative development of the enterprise. Tasks: to determine the choice of alternative strategic perspectives of energy security; to analyze the main approaches to formation of energy security strategy in the conditions of innovative development; to develop scientific and methodological recommendations for neutralization of threats of the energy strategy of enterprise in internal and external environment, revealed in innovation development process. The following results were obtained: defined the main selection criteria of energy security strategy of enterprise; the author’s interpretation of the concept “energy security strategy of enterprise” is proposed, which is based on the vector of innovative development of enterprise in the field of energy security, which is aimed at rational and efficient use of energy and natural energy resources for achievement of strategic innovation aimed goals of energy policy; a structure for the energy security monitoring of enterprise has been formed and the main tasks of the enterprise’s energy security subdivision have been defined. Conclusions. Management of innovative development of the enterprise involves the development and implementation of the concept, which is the basis for the formation of the enterprise economically grounded policy of improving the competitiveness of the enterprise. The dynamism and uncertainty of the market economy requires management of the enterprise quick adaptation to changing environmental conditions. Achievement of effective functioning of socio-economic systems is possible on the basis of efficiency and focus on reducing energy consumption of the enterprise. Consequently, management of innovative development of the enterprise which is based on energy security, may be the only way for domestic enterprises, which will provide a significant increase in competitiveness and form a new management paradigm in the long term.

Keywords: innovative development; management; energy security; threats; structure; strategy; energy efficiency; strategic analysis; energy audit.

Introduction

The current stage of development of the economy of the country characterized by instability of market trends, threats to economic, political and social direction necessitates a choice of directions of innovative development of socio-economic systems. Formation and management of economically sound policies of enterprises is impossible without taking into account their energy component and, therefore, ensure their energy security. Strengthening the crisis of the industrial complex of the state is inextricably linked with the internal problems in the country, as well as geopolitical factors. The uncertainty of the external environment determines the awareness of the top management of the enterprises of the new character changes and the ability to react quickly to the process. Operation of businesses define the conditions of instability and uncertainty. The economic environment in their composition contains a significant number of market participants that are characterized by complex structure and model behavior in accordance with market conditions. Collectively, these factors contribute to the need for adopting quality managerial decisions, which will minimize the level of influence of external and internal threats at the same time will create conditions to ensure an adequate level of energy security of enterprises.

The analysis of literary sources and recent research

It should be noted that the issue of innovative management development of enterprises is devoted to a number of works of both foreign and domestic scientists. Among foreign scientists a significant contribution to the solution of this problem belongs to I. Ansoff [1], P. Drucker, M. [6], Porter [16], K. Freeman [20] and others. Among domestic scientists’ great attention to the innovation management and strategic development of the enterprises devote: L. Antonuk [2], M. Voynarenko [3; 23], O. Gonchar [21], A. Griniov [4], S. Ilyashenko [8] and others. Problems of ensuring energy security of the companies was studied by many scientists both in Ukraine and abroad, which confirms the relevance of this field of study. A significant contribution to the development of the theoretical foundations of economic security and its composition of energy security of the enterprise was made by G. Kozachenko [12] A. Lyashenko [13], S. Kavun [9], S. Shcharlet, [19] etc.

The parts of the general problem that have not been solved

At the same time, the scientific literature has not fully disclosed issues of choice enterprises strategy according to ensure their energy security, taking into account the factors of external and internal impact in terms of innovative management development. A wide
range of issues relating to the alternatives of the strategic prospects of energy security, defining the content and the ways of improvement of innovative management activity of enterprises in the strategic context of their operation require further research.

The goal of the article lies in the choice of energy security strategy of enterprises, taking into account the influence of external and internal environment in the conditions of innovative development.

The basic material of innovation management development of the enterprise involves the adaptation of complex socio-economic system to the constant changes of the environment. Accordingly, there is a constant search and use of new ways of ensuring competitiveness of the enterprise. The realization of the potential of the enterprise in a changing environment, is impossible without the definition and adherence to the chosen strategy that provides for the priorities of the enterprise, its mission, main objectives and the allocation of resources to achieve them. One of the priority directions of development and functioning of the enterprise is the coordinated efforts of senior management towards safety. In particular, energy security of an enterprise reflects the level of security of its energy supply from external and internal threats in the context of the normal functioning with the perspective of development, and the degree of power supply the minimum required energy needs in emergencies [15; 24]. According to this definition, energy security of the enterprise can be achieved through the implementation of measures to improve its energy efficiency. Thus, the choice of enterprise strategy aimed at ensuring energy security involves the formation of a number of alternatives of a choice in strategies.

In turn, O. V. Kirilenko [11] distinguishes between the concepts of "energy strategy" as a process of formation of the general perspective directions of development of the enterprise in the field of energy conservation based on the definition of a qualitatively new goals, matching internal capabilities of the enterprise environment and the development of complex energy saving measures to ensure its implementation. The energy strategy should be the basis and strategy of the highest level for the formation of energy security strategy of the enterprise. Such a hierarchy will promote the principles of the International standard ISO 50001:2011 "Energy management systems – Requirements with guidance for use", which establishes requirements for the energy management system, based on which the company can develop and implement energy policy, to setting goals and objectives, and develop action plans taking into account legislative requirements and data on significant energy use [22]. According to the economic essence of energy saving, the Law of Ukraine "About energy saving" [7], formed its own interpretation of the term: energy security strategy of the enterprise, which is a long-term vector of innovative development of enterprise in the field of energy security, aimed at rational and efficient use of energy and natural energy resources for the production of products, performance of works, rendering of services and achievement of strategic innovation aimed objectives of energy policy.

After reviewing the researches [10; 14; 17], as well as drawing on our own work [23], we believe that the energy security strategy of the enterprise is formed under the influence of a number of factors that can be divided into the following groups: external (macro - and microenvironment of the enterprise) and internal.

Macro environment of the enterprise defines the general conditions which must form its energy strategy and characterized by political, legal, economic, social and technological, nature, scientific-technical factors.

However, assessment of the macro environment can be augmented by analyzing the energy component, which determines the state policy in the field of formation of energy security strategy of enterprises and regions. Factors in the microenvironment include the requirements of consumers for products, the energy saving policy of the competitors, conditions of energy supply and energy-saving equipment.

The internal factors of formation of strategy of energy security of the enterprise should include the concept of development of the enterprise, its strategic goals defined the overall corporate strategy and the strategic potential of an enterprise (resource, production, labor, investment, innovation, organizational, managerial, financial) as a combination of existing resources and competencies to achieve the strategic objectives of energy saving.

Of course, the energy security strategy of enterprises must comply with the basic directions of implementation of energy strategy at the state level that is due primarily to the monopolistic nature of the whole energy and the lack of competition in the electricity market.

Therefore, the choice of energy security strategy of the enterprise is influenced both by internal factors of the enterprise (its internal environment, including available resources and competencies) and by external environment (macro and micro). Based on the methodology of the continuous improvement cycle "Plan – Do – Check – Act" (PDCA) as stipulated in the International standard ISO 50001:2011 "Energy management systems – Requirements with guidance for use", the algorithm of development energy security strategy of the enterprise should include the following steps (Fig. 1).

The choice of energy security strategy of the enterprise is preceded the holding of strategic energy analysis which aims to study external and internal factors affecting energy consumption and energy efficiency of the enterprise.

According to the International standard ISO 5001:2011 "Energy management systems – Requirements with guidance for use" for the development of energy analysis in the enterprise need to carry out a series of sequential steps:

a) analyze energy use based on measurement and evaluation sources; evaluation of the utilization and energy consumption for previous periods;

b) identify areas of excessive energy consumption, which involves the identification of buildings, equipment, systems, processes that significantly affect the use and consumption of energy; the current definition of energy
efficiency indicators associated with the significant use of energy; evaluate the future use and energy consumption; 

c) identifying opportunities to improve energy efficiency.

Fig. 1. Stages of formation of energy security strategy of the enterprise in the conditions of innovative development (formed by the authors based on [17])

Therefore, Dzhedzhula V. V. declares the necessity of conducting an energy audit, which is in the feasibility survey systems generation, transportation and consumption of energy resources, water for the purpose of identification and economic justification technical, organizational, economic, operational ways of reducing primary energy consumption and maximum transfer to the secondary and alternative sources of energy. Such steps will enable the company to achieve real and substantial savings and reduce the ecological load on the environment [5].

I agree that an energy audit is a tool for the study of energy and energy-financial flows of enterprises. As a result of which the proposed economically justified energy conservation measures. The basis of energy efficiency policies in the enterprise can be formed the energy management service, whose main objective is to ensure energy security. Accordingly, the energy audit should be attributed to the priority methods of strategic energy analysis.

Completed strategic analysis by conducting SWОT analysis with which to develop strategic alternatives of innovative development, build development scenarios impact on energy security of the enterprise. In the next step justify the energy security strategy, which will allow wider use of opportunities and strengths of the enterprise and also to neutralize threats, reduce the impact of weaknesses. Implementing the strategy into concrete actions is possible through the quality system of programs, projects, plans of conservation. The implementation of the programme of energy saving requires the use of technical, economic, organizational, legal and other methods.

The company should provide monitoring, measurement and analysis of energy efficiency indicators, based on which conclusions on the effectiveness of the chosen strategy. If necessary, possible remedial effect and review the overall development strategy and energy policy of the enterprise. Achieve system objectives within the framework of the chosen energy security strategy of the enterprise will promote energy efficiency and prevent internal and external threats, as well as the stable functioning of the enterprise. The proposed sequence of development energy security strategy of the enterprise demonstrates the need for a versatile energy analysis, the need to find a “pair combinations” in the SWOT analysis and provide alternative rationale for the strategy. At the research works [12; 14; 18] a group of scientists explores the specific socio-economic situation on the optimization of the composition and choice of variants of the enterprise strategy. Based on this list each company must be formed, discussed and adopted its own, specific to this enterprise, a comprehensive strategy, taking into account the peculiarities of the macroeconomic situation, the status of sectoral and regional surroundings of the enterprise, its internal capacity, as well as management energy security strategy. Control energy security strategy of enterprises in the unstable conditions of existence must contain the following components (Fig. 2).

Fig. 2. Main components of a management energy security strategy of the enterprises in conditions of innovative development
The strategy of anticipatory counteraction is in the anticipation and prevention of negative phenomena, preparing for their emergence and prevention at the initial stage. The effectiveness of the strategy could be achieved with energy-stability of the enterprise and helps organization within a certain time to perform its functions even in the case of environmental parameters for certain restrictions.

Thus, the strategy of anticipatory counteraction is based on activities that contribute to counter crises and slow down the process of their development in the company. In addition, the organization is able to function using properties such as flexibility and adaptability that allow it to change the goals, processes and pace of achieving the objectives or goals depending on the conditions of the internal environment.

Strategy for adequate response lies in the adoption of management decisions aimed at neutralizing external and internal threats that constantly arise on the basis of the analysis of the external environment of the enterprise. In its actions the strategy for adequate response relies on the reserves and additional resources, stabilize the situation, but also on the competence of the leadership in energy security issues. During the implementation of this strategy determines the success of solving problems, enables companies to perform their production tasks within a certain time, despite being in a state of crisis and to move towards innovative development. Irrational organized system of control has a negative impact not only on the work of the enterprise, but also on the relations with the external environment, which on its turn affects energy economic indicators.

With the aim of resolving crisis situations and out of them in the functioning of enterprises used a range of strategies as “Bankruptcy”, “Sanation”, “Peace agreement”, “Elimination” and others, which are based on financial relationships, and the ways out of crisis situations based on the solution of economic and energy.

Consequently, the development of a strategy for adequate response and decision-guidance solutions aimed at neutralizing threats in the external environment involves the following steps:
- analysis of the current crisis;
- definition and division of objective and subjective negative actions;
- define the list of measures to prevent threats to energy security;
- assessment of the effectiveness of the proposed measures from the point of view of neutralization of negative actions;
- valuation of the proposed measures to address the threats to energy security.

In turn, the protection strategy seeks to ensure the protection of information and property business, as well as security personnel. In our view, to ensure energy security in the enterprise needs to operate special organs.

The organizational activity of the enterprise involves the creation of structures involved in the analysis of the state’s energy security and developing measures to ensure the economic security of the enterprise as a whole, depending on the nature of the business and can be as own department, and also as attracted on a contractual basis. The main objectives of division of energy security is shown in figure 3.

**Fig. 3. Main tasks of the division of energy security implementation (built by the author using [14])**

Thus, the main objectives of the division of energy security of the enterprise are:

1) definition of criteria and parameters (qualitative and quantitative thresholds) energy system enterprises that meet the requirements of energy security;

2) development of mechanisms and measures identification of threats to energy security and their carriers;

3) the rationale for the areas of localization of threats;

4) establishment of the main subjects of the threats, the mechanism of their functioning and impact on the energy system of the enterprise;

5) development of methodology for predicting, identifying and preventing the factors that determine the occurrence of threats to energy security, conduct research...
to identify trends and opportunities for the development of such threats;

6) creation of mechanisms and measures of energy and economic policy, neutralizing or mitigating the impact of negative factors;

7) the definition of objects, subjects of control parameters for the energy security of the enterprise.

To reduce internal risks and threats to energy security are needed in the enterprise, first of all, the control structure of energy security of the enterprise, which is presented in figure 4.

![Control structure of energy security of the enterprise](image)

Control service to ensure energy security of the enterprise should in operatively mode monitor energy security, to react on changing situations, regularly prepare documents to guide the enterprise to make decisions regarding problems related to the supply and consumption of energy resources, and to monitor their implementation.

Thus, for the organization of effective system of energy security of the enterprise is necessary to develop appropriate documentation, the company, which shall be determined by internal and external threats, as well as the criteria based on which the energy security of the enterprise can be recognized as impaired.

Under such conditions, monitoring of risks and threats to energy security is conducted to analyze and organize incoming information for further relevant decisions of the higher management of the companies. The complexity of the practical implementation of the process of monitoring risks and threats, first of all, depends on the source of occurrence and risk profile. To identify risks and analyze them for the level of quality necessary, but not sufficient. The risk of economic decisions estimated expected losses, which is a consequence of the threat, so the risk assessment framework that formalize the process of measurement and calculation, must determine three basic components: magnitude (the amount of possible losses); likelihood of adverse events; duration of exposure to risk.

According to many specialists and scientists to measure and assess risks is the most important and difficult step in the entire procedure of monitoring and control energy risk. The quality of such estimates depends on the appropriateness of implementation of a particular business transaction, determining the level of necessary energy resources, the formation of an adequate cost of insurance.

Since the activities of enterprises connected with the action of external and internal risk factors and threats to energy security, there should be monitoring internal and external risk factors, determine the level of risk and, if necessary, making appropriate management decisions for its reduction or prevention. To internal and external risk factors of functioning of the enterprise identified in the innovation development process and are subject to monitoring include: the lack or insufficiency of external and internal investments, difficulties in obtaining long-term loans from banks, which do not allow to replenish the company's circulating assets and to direct them to update power equipment. This leads to the use of technically and morally obsolete equipment and technologies, which entails a threat to energy security. Inefficient organization of the production process, insufficient skilled workers, a high degree of wear of fixed assets at the enterprises of Ukraine is 60-70% and in some industries reaches 80-85% etc., leads to decrease in the level of energy security.

Thus, the energy security strategy of the enterprise should include the following components:

- diagnostics of situations;
- separation of objective and subjective negative actions;
- define the list of measures to prevent threats to energy security;
- assessment of the effectiveness of the proposed measures from the point of view of neutralization of negative actions;
- valuation of the proposed measures to address the threats to energy security.

**Conclusions**

One of the main reasons constraining innovative development of Ukraine is the lack of domestic enterprises the explicit directions of the reflected in the appropriate strategy. In an unstable market trends, threats to energy, political and social trends, energy security is becoming increasingly important not only at country level but also at the enterprise level. Energy security is one of the highest priorities of the functional areas of security. Energy security plays a defining role in ensuring the sustainability and competitiveness of the enterprise. At the same time reducing the level of energy security of Ukraine due to a number of external and internal factors, and risks with respect to ensuring energy sustainability and independence. Definition of priority directions of ensuring energy security of the enterprise should be preceded by an assessment of the current state and diagnosis of the existing risk factors, involve formation of strategy of
energy security of the enterprise. The basis of such a strategy should be based on an assessment of actual volume of consumption of energy resources, technical, information and technological support of the enterprise. Development of energy security strategy of the enterprise involves conducting versatile power analysis to find the "pair combinations" in the SWOT analysis and the alternative rationale. The creation of a special control structure over the energy security of the enterprise, whose main task is to analyze the status of energy security and development of measures for its maintenance, creates additional opportunities for monitoring, timely response on changing situations related to the delivery and consumption of energy resources.

Further researches

The subject of further studies are issues of innovative development of the enterprises through a strategy of ensuring their energy security, the method of building a hierarchy of strategy choice of energy security, take into account the numerous factors that influence the external environment and the existing level of energy security.

References

УПРАВЛІННЯ ІННОВАЦІЙНИМ РОЗВИТКОМ ПІДПРИЄМСТВ У КОНТЕКСТІ ВИБОРУ СТРАТЕГІЇ ЗАБЕЗПЕЧЕННЯ ЕНЕРГЕТИЧНОЇ БЕЗПЕКИ

Предметом дослідження в статті є стратегія забезпечення енергетичної безпеки підприємства, вибір якої для підприємства є основою повноцінного функціонування та подальшого економічного та інноваційного розвитку. Мета статті полягає у виявленні умов та критеріїв вибору стратегії забезпечення енергетичної безпеки підприємств із врахуванням чинників та загроз внутрішнього та зовнішнього середовища. У статті було використано такі методи і прийоми наукового пізнання: методи аналізу та синтезу – для розгляду сутності стратегії забезпечення енергетичної безпеки, теоретичного узагальнення – для виявлення етапів формування стратегії забезпечення енергетичної безпеки підприємства за умов інноваційного розвитку, класифікаційно-аналітичний – для класифікації основних складових стратегії управління енергетичною безпекою підприємств, логічного узагальнення – для обґрунтування актуальності теми, мети і завдань дослідження, метод переходу від абстрактного до конкретного – при розробці та обґрунтуванні пропозицій щодо вибору стратегії забезпечення енергетичної безпеки за умов інноваційного розвитку підприємства. Завдання: визначити альтернативи вибору стратегічних перспектив енергетичної безпеки; проаналізувати основні підходи до формування стратегії забезпечення енергетичної безпеки за умов управління інноваційним розвитком; розробити науково-методичні рекомендації щодо нейтралізації загроз внутрішнього та зовнішнього середовища підприємства. Станом на дату дослідження, в основі коштовності використання енергетичних ресурсів за умов управління підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можна відмітити, що в багатьох випадках використання енергетичних ресурсів за умов управління підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущення, що виконання підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущення, що виконання підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущення, що виконання підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущення, що виконання підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущення, що виконання підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущення, що виконання підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущення, що виконання підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущення, що виконання підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущення, що виконання підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущення, що виконання підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущення, що виконання підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущення, що виконання підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущення, що виконання підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущення, що виконання підприємством, також існує загроза внутрішнього та зовнішнього середовища підприємства. Отже, можемо висловити припущ
стратегии обеспечения энергетической безопасности предприятия в условиях инновационного развития, классификационно-аналитический – для классификации основных составляющих стратегии управления энергетической безопасностью предприятий, логического обобщения – для обоснование актуальности темы, цели и задач исследования, метод перехода от абстрактного к конкретному - при разработке и обосновании предложений по выбору стратегии обеспечения энергетической безопасности в условиях инновационного развития предприятия. **Задачи:** определить альтернативы выбора стратегических перспектив энергетической безопасности; проанализировать основные подходы к формированию стратегии обеспечения энергетической безопасности в условиях управления инновационным развитием; разработать научно-методические рекомендации по нейтрализации угроз внутренней и внешней среды энергетической стратегии предприятия, которые выявляются в процессе инновационного развития. Получены следующие **результаты:** определены основные условия выбора обеспечения энергетической безопасности предприятия; предложено авторское толкование понятия "стратегия обеспечения энергетической безопасности предприятия", в основе которого лежит вектор инновационного развития предприятия в сфере энергетической безопасности, направленный на рациональное и энергоэффективное использование энергии и природных энергетических ресурсов, достижение стратегических инновационно-направленных целей энергетической политики; сформирована структура контроля за обеспечением энергетической безопасности предприятия и определены основные задачи подразделения обеспечения энергетической безопасности предприятия. **Выводы:** Управление инновационным развитием предприятия предполагает разработку и реализацию концепции, которая является основой для формирования предприятием экономически обоснованной политики повышения конкурентоспособности предприятия. Динамичность и неопределенность рыночной экономики требует от менеджмента предприятия быстрой адаптации к меняющимся условиям внешней среды. Достижения эффективности функционирования социально-экономических систем возможно на основе энергоэффективности и ориентации на снижение энергозатрат предприятия. Следовательно, управление инновационным развитием предприятия в основе которого возложено обеспечение энергетической безопасности, могут стать единственным приемлемым выходом для отечественных предприятий, который позволит обеспечить значительное повышение конкурентоспособности и сформирует новую парадигму управления на долгосрочную перспективу. **Ключевые слова:** инновационное развитие; управление; энергетическая безопасность; угрозы; структура; стратегия; энергоэффективность; стратегический анализ; энергетический аудит.