



Раздел 1
МАШИНОСТРОЕНЕ

Section 1
MECHANICAL ENGINEERING

DIRECTIONS OF EFFICIENCY INCREASING FOR ENERGY POLICY OF UKRAINE

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Abstract

The problems of energy efficiency and energy saving in the Ukrainian energy sector, and the nature of technical and technological, structural, financial, infrastructural obstacles are defined. Instruments of regulatory, financial and economic, technical and infrastructural nature that would to be implemented in Ukraine are proposed. Priority directions of activities in energy saving sphere for households sector are determined. The measures for reducing of energy dependence of Ukraine and the EU from external sources are proposed. The necessity of reforming the energy markets are proved.

Keywords: energy efficiency, energy prices, energy resources, competitiveness, international economy, energy saving, innovations, investments.

FORMULATION OF THE PROBLEM.

At the present stage of the development of world economy state (supranational) energy policy acts as one of the determinants of socio-economic growth. Task of energy security ensuring acquire of particular importance for countries and integration groups that do not have a sufficient natural supply by energy resources and are energy dependent.

ANALYSIS OF RECENT RESEARCH AND PUBLICATIONS.

The problem of formation and implementation of EU energy policy is in the focus of such researchers as M. Berger, O. Bely, O. Volodin, J. Hillingem, I. Gudkov, T. Daynits, H. Dukas, S. Langsdorf, F. Parra, D. Houdon and more. The works of A. Degtyareva, V. Karetka, O. Kyrylenko, V. Lysyuk, S. Petrenko, A. Smenkovsky, A. Shevtsov are dedicated to use of EU experience in the implementation of energy policy of Ukraine.

But are not just investigated the mechanisms of formation and implementation of energy policy. The conducting of research for improving the efficiency of energy policy in Ukraine and improving the mechanism for economic cooperation in the energy sphere of Ukraine and the EU are necessary.

The purpose of the paper is to develop the recommendations for improving the effectiveness of energy

policy of Ukraine and improve the mechanism for economic cooperation in the energy sphere of Ukraine and the EU.

Presenting of main material. The problems of energy efficiency and energy conservation are among the most pressing in the Ukrainian energy sector.

Discovered two groups of problems, one of which is actual, but still unresolved for Ukraine, and the solution is on the way to the EU, and the second group is common for Ukraine and the EU and requires of finding common ways for its solving.

The first group of problems include:

- Inefficient energy efficiency of the national economy;

- Slow transition to greater use of energy from renewable sources that are friendly for environment (the development of so-called "green" energetics).

The second group of problems includes:

- Inefficient liberalized and regulatory inconsistency of functioning of energy markets of the countries that are participating in the Energy Community (EnC);

- High import dependence and inefficient diversification of supply by sources of traditional energy resources (oil and gas).

- Lack of formation of joint energy networks within EnC.

For solving of the problems of the first of the found

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groups advisable to use the experience of EU countries that are successfully overcome or overcome similar problems. Of course, with such borrowing is advisable to take into account the specifics of Ukrainian energy sector, national economy and domestic social and political processes and so on. As for the second group of problems, then we consider it necessary actively to use the opportunities received by Ukraine as the result of the accession to EnC.

One of the directions for solving this problem is the reducing of energy intensity of GDP. Amid the constant increasing of prices on energy that take place both on the world and on the national markets a high portion of energy expenses in the cost of Ukrainian industrial production makes last less competitive, *ceteris paribus*, compared to similar products of European enterprises. So necessary is, above all, the increasing of energy efficiency of domestic industry, which get in the way technical and technological, structural, financial, infrastructural obstacles.

The essence of technical-technological barriers is in insufficient active implementation of energy efficient technologies and equipment in industrial plants; significant deterioration of existing equipment, that resulting in increased of energy costs in their consumption.

Structural barriers are in significant relative weight of energy intensive industries in the Ukrainian industrial production – metallurgy, machinery construction, chemical industry, construction and so on.

Financial barriers on the way of increasing of energy efficiency of the Ukrainian economy, particularly its manufacturing sector, are in poor financial condition of the domestic industrial enterprises; lack of specialized financial and credit institutions, whose activities would be aimed on solving of the problems of energy efficiency; unfavorable investment climate in the field of energy efficiency and energy saving.

Infrastructure barriers are based on the imperfections of financial, marketing, information, research infrastructure in the field of energy efficiency and energy saving. Such infrastructure is in its infancy in Ukraine, and the existing institutions – Institute for Energy Saving and Energy Management of the National Technical University "Kyiv Polytechnic Institute"; Association "Energy Efficient Cities of Ukraine", etc. – do not meet the needs of the national economy in their respective services. Overcoming of these obstacles impact requires of a combination of efforts from the government and private sector.

Based on the experience of the EU for improving of energy efficiency in the economy of Ukraine and the specific features of the domestic energy industry and energy policy, it is appropriate to offer such tools to be introduced in Ukraine in this direction:

1. Regulatory instruments:

-The introduction of a strategic approach to the development and implementation of state policy in the field of energy efficiently with aim of formation of public policy in the field of energy efficiency in the long- and short-term perspective.

-The introduction of energy monitoring in all industries with aim for obtaining of data about the current state and dynamics parameters of the energy efficiency for further adjusting of strategic priorities, measures and targets.

-Establishing of the operational control in the area of energy efficiency with aim for improving the efficient means of state regulation on energy efficiency in the national industry.

2. The financial and economic tools:

-Initialization of state programs for promoting energy efficiency increasing in specific sectors of the national economy through preferential loans, tax incentives, government guarantees for commercial targeted loans and others with the aim for encourage of economic entities. Especially those that operate in the energy-intensive industries, on the proceedings of the modernization and upgrading of production for improving of its energy efficiency and energy conservation.

-Providing of easy access of undertakings for long-term financing of energy efficiency measures to overcome the financial risks (inflation, high interest rates, etc.) that threaten to economic entities in the implementation of energy efficiency increasing projects.

-Implementation of joint investment programs in the area of energy conservation, especially in energy-intensive industries with aim for establishing a public-private partnership in this area, and ensuring of energy efficiency increasing projects to financial resources from different sources.

3. Technical tools:

-Introducing of mandatory labeling of technological equipment by the classes of energy efficiency and requirements for installation of equipment of certain classes in energy efficiency depending on the specific of production processes in terms of energy consumption.

4. Infrastructure tools:

-Creation of financial institutions that provide financial assistance, or concessional loans for implementation of projects for improving of energy efficiency and use of energy with renewable sources.

-The creation of research institutions that should work closely with companies-innovators in the field of energy saving, as well as with local authorities that implement the relevant projects at the level of municipalities.

-The creation of institutions in the field of state technical control, whose activities are aimed at monitoring of compliance labeling process equipment by class of energy efficiency, especially of techniques, as well as installation and compliance of requirements for energy class of imported technological equipment.

As for energy saving measures in the household sector, then it is advisable to intensify work in appropriate direction at the local and regional levels; actively involve into the implementation of thematic projects municipalities, companies operating in the field of energy supply, enterprises of housing and public utility, NGOs and others.

In the context of the energy efficiency of households advisable make to focus on the problems of energy saving – use reducing of energy consumption, especially traditional, in the heating and cooling of residential buildings, the use of household electrical appliances, heating of water for household needs and more.

One of the most important directions of activities in the field of energy saving in the household sector is activation of promotion public awareness on the possibilities of improving private energy consumption and on the results of the implementation of appropriate measures, especially in the form of its economic benefit for end users, i.e. for the public.

Also in this direction should take measures for involvement in joint projects on energy saving in the household sector of all stakeholders – local and central authorities, enterprises of power supply and housing-public

utility, construction companies and organizations, the general public and others.

Special interest for Ukraine represented research programs in energy conservation that implemented within the framework programs of the EU. These projects are aimed primarily on accelerating the movement of energy saving innovations from research institutes to direct consumers through their commercialization and popularization.

Basis for gradual transition of the Ukrainian energetic to renewable sources should be enhancing of innovation activities in the energy sector. For speed up the innovation introduction in this area makes sense use relevant experience of the EU, given the peculiarities of Ukrainian regions, as by their nature these energy sources are local and have primarily to meet local demand for energy resources. For example, for Ukraine, especially its southern, steppe part where there are frequent squally winds, it is advisable to use the experience of the EU for the establishment of wind turbines AeroGreen, which are twice more effective than traditional wind generators that based on turbine technologies.

Formation of cooperation with the EU's countries on borrowing experience of widespread use of solar power generators in private buildings also is necessary.

Reducing the energy dependency of Ukraine and the EU from external sources (energy imports) requires joint actions in the following areas:

- Intensification of exploration activities and intensification the use of own sources of fossil energy, because both Ukraine and the EU have certain natural potential for oil and natural gas mining. There should be a useful implementation of joint projects on exploration and future use of oil, for example, in Dnieper and Carpathian regions, where experts suggest that there are significant oil deposits; on the shelf of the Azov and Black Seas, where has proved the presence of oil reserves and more. In turn, Ukraine may be involved in the implementation of joint European projects of exploration and production of oil in the North Sea [1]. As for gas production, then it is advisable to pay attention to his unconventional natural sources – shale gas in North Donbass, the possibilities of using coal gas and so on. However, here we must consider the potential environmental hazards, and therefore requires introduction of balanced approach to the gas production from such sources, including the involvement of EU countries specialists who have to evaluate the ratio of positive results and possible threats from such gas production activities.

- Diversification of sources of oil and natural gas supply for overcoming the dependence of Ukraine and the EU on energy imports from Russia. As alternative transit routes included already built but underutilized pipeline "Odessa-Brody", which should ensure the transit of oil through Ukraine from the Caspian region (Azerbaijan, Kazakhstan) to the EU countries and pipeline project AGRI (Azerbaijan-Georgia-Romania-Italy), which provides transportation of liquefied gas by tankers across the Black Sea, in which the possible inclusion of maritime transport routes with stops in the Ukrainian Black Sea ports [4, p. 134].

- Reconstruction and modernization of the existing gas transportation and oil transportation system of Ukraine in order to use it effectively, introducing of transparent management of such system with aim to

improve the image of Ukraine as a reliable transitory of energy resources to the EU countries. Appropriate measures are possible with the active participation of foreign investors, and the implementation of relevant projects allow to Ukraine will participate actively in other projects of energy transportation and finding of new sources of its imports, initiated by the EU, including within the framework of EnC.

- Increasing of use of energy from renewable sources that will allow to reach not only reducing of environmental threats level associated with the use of carbon energy sources, but also reducing of the dependence of national economy on imports of traditional energy resources.

Ukraine raises before the challenge of not only catching movement towards liberalization, but the implementation of parallel with EU reforms of its own energy market. For solving of this problem there are necessary systemic transformation of the national institutional system, aimed at accelerating implementation of the relevant regulations. For this urgent is need to increase the transparency and efficiency of public institutions functioning. Mandatory is implementation of personnel policy aimed at increasing of professionalism of specialists in the area of public administration by energy market; strengthening of controls aimed on preventing of antitrust actions of state energy companies; reforming of the system of partition competence of public administration in the energy markets.

Reforming properly of energy markets is also necessary for:

- Bringing of pricing system in domestic energy markets in line with pricing systems in the EU markets.

- Reforming of the structure of domestic energy markets, particularly the electricity market as one of the most regulated markets. Such models of the functioning of this market that using by EU countries should be useful. Today Ukrainian electricity market operates on the model of single buyer, which serves the state monopoly wholesale buyer. Instead, in many EU countries operating model of bilateral contracts with the balancing market, which provides for the buyers (consumers, energy suppliers of different levels, etc.) possibility of choice between conclusion of contracts, programs that standing for a specified period of varying duration, and buying of electricity on the balancing market, which operates through the system of relations between producers and consumers of electricity in the mode close to real time that allowing participants of that market to adjust according to the current needs the volume of supply and demand for electricity [5, p. 37]. For building of market model of this type in Ukraine is required fundamental restructuring of the current power market, including its organizational structure, pricing system, system of state regulation, regulatory support, etc.

- Further privatization of energy markets subjects with obligatory increasing of transparency of privatization procedures, equality of privatization participants and the eradication of corruption in this area that can be realized only under conditions of system transformation of state power in Ukraine.

The main problem of Ukrainian energy networks is their deterioration, technical and technological obsolescence and therefore the key point here should be bringing of the national energy networks in accordance with the requirements that apply to these networks in EU countries. Proposed for decision of problems in the first group (energy

efficiency increasing) ways for improving the energy networks by building "smart" networks that able to adjust volume, ways and directions of energy supply in the context of decision of common energy challenges of Ukraine and the EU should be supplemented as follows:

– Improving of the technical level of combined energy networks by attracting of additional investment just to this segment of the energy systems of Ukraine and the EU. It should pay particular attention to the possibility of implementing of joint projects Ukraine-EU in this area. In particular, it is appropriate Ukrainian accession to the common grid of EU energy networks not only because so-called "Burshtyn energy island" (that consisting electricity generation capacities of Carpathian and Transcarpathia), but also through further synchronization with other electricity generation capacities of Ukraine through appropriate electricity grids. This integration of electric power and sync of their use requires harmonization and further improvement of Ukrainian and European operational documentation and technical re-equipping of joining networks with aim to improve their reliability, improving of dynamic properties for preventing of accidental switching off when overloaded individual sections etc.

– Common with the Eastern European EU countries forming of strategic reserves of oil and natural gas that have distributed through joint networks.

CONCLUSIONS

Two groups of problems in the Ukrainian energy sector are revealed. The first group of problems is urgent but unresolved in Ukraine, while these problems are solved successfully in the EU, and therefore is reasonable borrowing European experience in such areas as increasing of energy efficiency of the national economy and the transition to renewable energy sources that friendly for environment. The second group of problems is presented by challenges shared for Ukraine and the EU, and therefore those that require finding of common solutions such as:

insufficient liberalizing and regulatory inconsistency of energy markets functioning for countries that participating in EnC; high import dependency and lack of diversification of supply of traditional sources of energy resources (oil and natural gas); non-formation of joint energy networks within EnC. The ways of solving the identified problems, based on the use of a wide range of instruments of regulatory, technical and technological, financial and economic and infrastructural character are proposed.

REFERENCES

- [1] Kyrylenko, O. V., Blinov, I. V., & Parus, Y. V. (2011). Balansuyuchyy rynek elektroenerhiyi Ukrayiny ta yoho matematychna model [Balancing power market of Ukraine and its mathematical model]. *Technical. Electrodynamics*, 2, 36-43.
- [2] Maksak, H. A. (2013). Dyversyfikatsiyna polityka Yevropeyskoho Soyuzu u formuvanni enerhetychnoyi bezpeky Ukrayiny [Diversity policy of the European Union in forming the energy security of Ukraine]. In *Naukovi pratsi Chornomors'koho derzhavnoho universytetu imeni Petra Mohyly kompleksu "Kyryvevo-Mohylyanska akademiya". Seriya: Derzhavne upravlinnya [Scientific papers of Petro Mohyla Black Sea State University of the complex "Kyiv-Mohyla Academy". Series: Public administration]*: Vol. 22, Iss. 214 (pp. 131-134). Mykolayiv.
- [3] Official website of Ministry of Energy and Coal Industry of Ukraine (2015). Retrieved from <http://mpe.kmu.gov.ua/>
- [4] Cabinet of Ministers of Ukraine (2013). Pro skhvalennya Enerhetychnoyi stratehiyi Ukrayiny na period do 2030 roku [On approval of the Energy Strategy of Ukraine till 2030]. Prescript on 2013, July 24, 1071-r. Retrieved from <http://zakon4.rada.gov.ua/laws/show/1071-2013-p>
- [5] European Parliament and Council of the EEC (2009). Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC. Retrieved from <http://eur-lex.europa.eu/legalcontent/EN/TXT/PDF/?uri=CELEX:32009L0028&from=EN>