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CURRENT THREATS TO ENERGY AND RESOURCE EFFICIENT  
DEVELOPMENT OF UKRAINIAN ECONOMY\*

*The paper studies the main internal and external threats to economic development of Ukraine, also identifying and analyzing such internal threats as high level of energy intensity of GDP, insufficient level of social responsibility of enterprises, low innovative activity of economic entities and also such external threats as problems of foreign trade balance and external debt growth. The priority of energy and resource efficiency increase within the national economy is grounded.*

*Keywords: energy saving; resource efficiency; economic development.*

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СУЧАСНІ ЗАГРОЗИ ЕНЕРГО- ТА РЕСУРСОЕФЕКТИВНОМУ  
РОЗВИТКУ ЕКОНОМІКИ УКРАЇНИ

*У статті досліджено ключові внутрішні та зовнішні загрози розвитку економіки України на сучасному етапі. Серед внутрішніх загроз виділено і проаналізовано динаміку енергоємності валового внутрішнього продукту, незадовільний рівень соціальної відповідальності підприємств, низьку інноваційну активність суб'єктів господарювання, серед зовнішніх – проблеми зовнішньої торгівлі та зростання зовнішнього боргу. Обґрунтовано пріоритетність та напрями зростання енерго- й ресурсоефективності вітчизняної економіки.*

*Ключові слова: енергозбереження; ресурсоефективність; економічний розвиток.*

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СОВРЕМЕННЫЕ УГРОЗЫ ЭНЕРГО- И  
РЕСУРСОЭФФЕКТИВНОМУ РАЗВИТИЮ  
ЭКОНОМИКИ УКРАИНЫ

*В статье исследованы ключевые внутренние и внешние угрозы развитию экономики Украины на современном этапе. Среди внутренних угроз выделены и проанализированы динамика энергоёмкости валового внутреннего продукта, неудовлетворительный уровень социальной ответственности предприятий, низкая инновационная активность субъектов хозяйствования, среди внешних – проблемы внешней торговли и роста внешнего долга. Обоснованы приоритетность и направления повышения энерго- и ресурсоэффективности отечественной экономики.*

*Ключевые слова: энергосбережение; ресурсоэффективность; экономическое развитие.*

**Problem setting.** Ongoing military operation on Ukrainian territory makes the national economy extremely vulnerable to changes in the internal and external environments. The situation is extremely complicated because the national economic system is highly dependent on Russian Federation, especially in terms of energy supply and foreign trade, which now has an extremely negative impact on economic processes inside the country.

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Major external and internal threats force Ukraine correct the vector of its strategic development considering challenges and potential opportunities for state development. The major economic problems of the country include: outdated irrational structure of national economy, high energy intensity of national production and energy deficit. As soon as the military threat to territorial integrity of Ukraine is removed the primary goal would be to provide energy and resource efficient development.

**Recent research and publications analysis.** The theoretical and practical frameworks for energy and resource saving within socioeconomic systems are investigated in the works of many foreign (Abdalla et al., 1994; Daly et al., 1996; Dias et al., 2006; Kuhndt et al., 2006) and Ukrainian scientists (Kovalko and Denysuyk, 1998; Paton et al., 2012; Anderson et al., 2011). In recent decades the concept of sustainable development is widely used in developed countries. Its switching to energy and resource efficient development through more efficient resource use helps effectively solve the resource security problem (Agenda 21, 1993; Sustainable development..., 2013; World Commission, 1987). In addition, its use creates necessary and sufficient conditions for the solution of social, economic, political and environmental problems of territories.

Ukraine adopted the concept of sustainable development and seeks to implement it. However, the current economic situation in the country, including political, energy and economic security, creates significant threats and new opportunities for further development. Effective use of these opportunities requires a detailed scientific research for studying the causes and consequences of such threats.

Intensification of energy and resource saving processes will allow balancing external relations, reducing foreign debt, and creating a strong financial basis for economic growth. For realization of these tasks the **research objective** is system analysis of the current situation in the country and finding, on this basis, innovative approaches to national economy transformation towards energy and resource saving and sustainable development.

**Key research findings.** Today the state of economy of Ukraine is critical. Deep social and economic crisis is combined with military-political crisis. Every day the government has to spend millions of dollars to support its army (Poroshenko, 13.01.2015). At the same time the efficiency of resource use by the national economy is extremely low. In this regard, the economic system of the country is suffering from external negative influences and it also has serious unresolved deepening problems in domestic social and economic development. Along with the main internal threats, which now prevent the national economy from stabilization, along with military operations, it is necessary to underline high energy intensity of Gross Domestic Product (GDP), insufficient level of social responsibility of enterprises and also their low innovation activity. External threats cause problems with foreign trade balance and external debt growth. They are closely linked and are interdependent, and therefore, their solution requires an integrated approach. In order to identify the perspective areas of solving these problem let's have a closer look at them.

**High energy intensity of GDP.** Significant energy intensity of GDP of Ukraine is the former Soviet Union legacy due to specific structure of national economy. It was reduced to some extent during the 2000s, but it is still rather high compared with the world leading countries and some other post-Soviet states (Figure 1). Thus, in 2013

energy intensity of Ukrainian GDP was 339 koe/USD (PPP, 2005) or 2.12 times higher than in the world average and 2.95 times higher than in the European Union (www.worldenergy.org, 2014). Although in the last decade there was a gradual decline in energy intensity of GDP (over 2000–2013 to -4.5% annually), the growth rate of energy efficiency is unsatisfactory in general. Thus, if over 1990–2013 Slovakia had reduced the energy intensity of its economy by 2.1 times, Poland – 2.43 times, Ukraine – only 1.81 times (www.worldenergy.org, 2014).

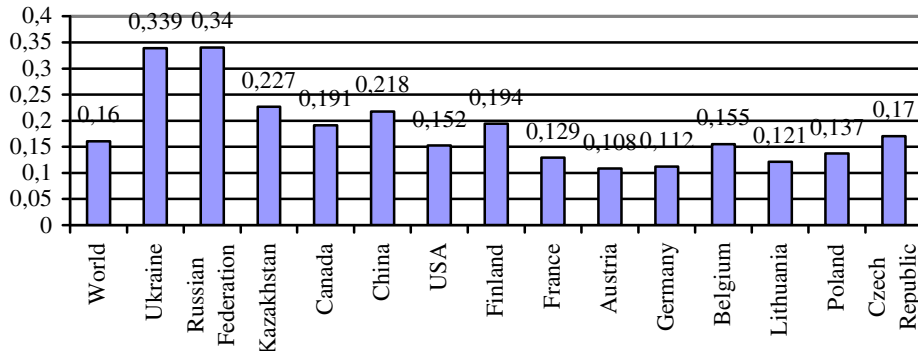


Figure. 1. Energy intensity of GDP in some countries in 2013, koe/USD (PPP, 2005), authors' construction based on the data (www.worldenergy.org, 2014)

High energy intensity determines a huge potential of energy efficiency growth for production and consumption processes in Ukraine, only a small part of which is now implemented. Thus, basing on the data from (www.worldenergy.org, 2014) and the average EU indicators, in 2013 the possibility for reducing energy consumption through energy efficiency improvements was up to 234% of the current level in the domestic industry, 94% – in the service sector and 24% – for transport. The year 2014 has not significantly changed the situation for better; therefore, energy efficiency in Ukraine is extremely relevant concerning the scarcity of domestic energy resources and the need to import them at world prices from other countries.

**Insufficient level of social responsibility of enterprises.** An important role in resource efficiency improvement of national economy belongs to the development of business social responsibility, in particular, its such component as environmental responsibility. Strong interrelation between economic and environmental components of development at the national and global levels were discussed back in 1972 at the United Nations Conference in Stockholm, and the program document on Environment and Development was adopted in 1992 at the UN Conference in Rio de Janeiro (Declaration, 1992). The goal, declared by the UN Conference, is the development of fair partnership based on cooperation, mutual respect of interests and environmental protection provision. This goal has become the basis for economic development policy formation at the national level as well as at the level of separate business units all over the world. Unfortunately, environmental initiatives in the area of corporate social responsibility (CSR), such as participation in the United Nations Global Compact, certification according to environmental ISO standards, implementation of "Green Office" and other successful world practices of social responsibility are not widely spread among domestic enterprises. According to research data,

slightly more than 50% of enterprises in Ukraine care about the issues of social responsibility. 48% of the abovementioned enterprises rationally use natural resources and are concerned about the state of the environment (Zinchenko and Saprykina, 2008: 9).

The experience of leading Ukrainian and world companies proves that the use of energy efficient equipment in production processes and improvement of energy consumption monitoring mechanisms in the framework of general development policy of CSR serve as the basis for energy efficiency increase (Saprykina et al., 2014: 60). Lack of official statistics on the effectiveness of implementation of corporate environmental responsibility measures in Ukraine increases the role of nonfinancial reports and annual reports on best CSR practices in spreading this idea among companies and population. Thus, reporting analysis shows that separate companies in Ukraine have achieved significant results in improving resource efficiency. For example, in 2012–2013 rational resources use measures allows JSC "Lvivoblenergo" receiving annual water savings of about 16 ths m<sup>3</sup>, electricity – about 325 ths kW·h, fuel – 210 ths liters (Saprykina and Yankovska, 2014: 46). Media Holding Company "1+1" and DTEK corporation also got significant savings by means of rational and repeated resources use (Saprykina et al., 2014: 62). The majority of measures, implemented by the abovementioned companies, do not require significant financial expenses. Such measures are based on progressive and socially responsible thinking of managers and owners of companies and employees' initiatives. Support and development of such initiatives at all levels management contribute to progressive changes and improvement of resource and energy efficiency of domestic business.

**Problems with foreign trade.** Ukraine's orientation on the export of raw materials and primary processing products negatively affects the parity of foreign economic relations between Ukraine and other countries, leading to trade imbalance, considerable dependence of income of national export oriented enterprises from world markets fluctuations. Thus, negative trade balance increased from 1.7% (in 2009) to 8.5% (2013) (index.minfin.com.ua, 2015). The ongoing trade deficit was partly covered by investments and transfers from abroad. It allowed maintaining stable national currency rate. At the same time, before 2012 the growth of imports and exports was stable on average; in 2013 there was a slowdown tendency in imports and exports, imports were dropping at faster rate. In 2014 the trade deficit fell to 5.2 bln USD, or 4.0% of GDP, while the rate of imports decline were twice higher than exports. Experts explained the current dynamics in Ukraine's foreign trade by the trade war and military intervention of Russia, the rapid fall of UAH at the beginning of 2014 and the third wave of the economic crisis in developing countries, including Ukraine and its main importer – Russia (Mozhyrovskiy, 2013; index.minfin.com.ua, 2015).

In 2014 major commodities exported by the state, as in previous years, were from metallurgy and agriculture sector (mainly grains). In 2014 there was a significant reduction in exports by 14.4% – to 55.6 bln USD due to suspension of production facilities and the destruction of transport infrastructure on the East of the country, lower prices at world markets and deterioration of trade relations with Russia. Thus, exports of goods to Russia fell by 34.7% (its share fell to 17.7% from 23.2% in 2013), while deliveries to the EU increased by 2.1% and its share increased from 25.8% to 30.8%. Exports declined in all product groups, primarily, in engineering (by 29.2%),

chemicals (by 26.1%) and agricultural products (by 2.0%). On the one hand, exports of food industry primarily to Russia decreased by 12.9% (almost half) introduced sanctions due to against Ukrainian producers. On the other hand, due to the liberalization of access of Ukrainian goods to the EU market and the record harvest, grain exports rose by 2.8% (in physical volumes – by 23.7%), oils and fats – by 9.2% (Balance of payments, 2015).

Imports of goods decreased by 27.4% – to 61.7 bln USD, due to the weakening of UAH (by 19.5%) and reduction in domestic demand: retail trade turnover decreased by 8.6% and industrial production declined by 10.7%. Supply of goods from Russia reduced most of all (by 45.5%), primarily due to lower gas imports (by 63.1%). The share of imports from Russia decreased to 20.6% (from 27.4% in 2013), while the share of imports from the EU increased to 32.4% (from 30.2% in 2013). Due to lower natural gas supplies from all external sources and reduction of oil imports as a result of stopping power refineries Ukraine imports decreased by 28.8% in 2014. Concerning exports of non-energy goods most significant decline occurred in the group of machine-building (by 38.0%), chemical products (by 20.2%) and food products (by 26.1%) (Balance of payments, 2015).

The analysis of foreign trade in Ukraine shows serious distortions in its structure. They need to be corrected in the nearest future. It is noteworthy, that even UAH devaluation in 2014, which made domestic goods cheaper for foreign markets, could not prevent the fall of exports as a whole to provide a positive balance of trade. In particular, stoppage of production in the East of the country impeded it.

At foreign markets Ukraine is primarily known as a supplier of raw materials, which estimate more than half of all Ukrainian exports. Such position of the country at international markets makes it very sensitive to price fluctuations and political decisions of other countries. Ukraine's high dependence on energy imports and low energy efficiency of the national economy provides the basis for the emergence of political, social, economic and even military conflicts.

Despite domestic developments and achievements in space, missile, aircraft, shipbuilding and other industries Ukrainian producers cannot seriously compete with Western firms in the high-tech field. This is due to irrational structure of Ukraine's economy, in which the production of goods of higher technological modes (5th and 6th) is about 4%; production of goods of the 6th technological way is almost absent (less than 0.1%). 70% of R&D financing goes to the 4th technological mode and only 23% – to the 5th; 60% of innovation spending is allocated in the 4th technological mode, 30% – in the 3rd and only 8.6% of innovation spending belongs to the 5th technological mode (Buzni and Karlova, 2012). Consequently, many domestic firms export to Eastern markets, especially to Russia. A large share of consumers in Russian Federation, Asian countries and the EU in the structure of domestic exports increase the dependence of national large and medium-sized firms from the demand for Ukrainian products at these markets. National corporations experience huge losses and sometimes bankruptcy because of market failures. As a result thousands of workers in different regions of Ukraine are dismissed and social tension increases.

Solving the problems of Ukraine's foreign trade balance can largely be achieved by increasing energy and resource efficiency of national production. On the one hand, it will allow reducing government spending on energy imports and other raw materials;

on the other, it will form the basis for the transformation of the sectoral structure of the national economy towards growing share of high-tech industries, transformation of Ukraine from a raw material supplier to supplier of high-tech products. However, this transformation will require radical changes in innovative activity of firms.

Low level of innovative activity. Most domestic companies are unable to meet the current challenges because they are using outdated technologies. Lack of financing prevents companies from installing innovative, energy saving, energy efficient technologies. This trend reveals through the new technological processes installing index in Ukraine's industries for the period from 1991 to 2014 (Figure 2), which for more than 20 years of independence could not reach the level of 1991. The share of low-waste, resource saving and waste-free processes in the total volume of new technological processes during this period did not exceed 20–40%, indicating low energy and resource savings of industrial enterprises.

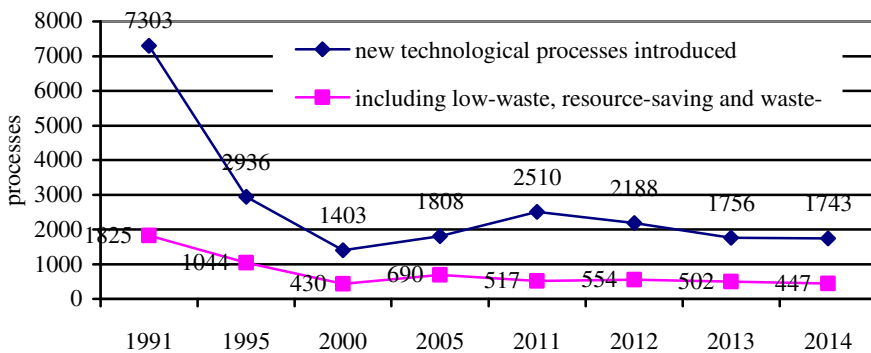


Figure 2. Installing new technological processes in Ukraine's industry during 1991–2014, authors' analysis based on the data from (Innovative activity, 2015; Scientific and innovation activity, 2015; Sotnyk, 2010)

In recent years, the absence of state financial support, contradictory legislation, the lack of innovative infrastructure and innovative products' market, problems with intellectual property rights protection etc. impede the innovative activities of local firms. Consequently, the share of firms engaged in innovations in Ukraine does not exceed 18% of their total number during 2000 to 2014, and the share of innovative products ranged from 7% (in 2002) to 2.5% (in 2014), which is extremely low. In 2014 the share of innovative products sales in Zakarpatsky, Sumy, Poltava, Kirovohrad, Zhytomyr, Kharkiv, Ivano-Frankivsk, Kherson, Odessa regions and in Kyiv was above the country's average. During 2000–2012 the total expenditures on innovative activities increased annually (except the 2009 crisis year), and began to decrease in 2013–2014 due to the crisis aftermath. Today, like 10–14 years ago, the lion's share of the cost is firms' funds (53–90% depending on a year). Companies are not always able to finance the implementation of innovative projects in production, introduce capital-intensive energy efficient, resource saving technologies (Innovative activity, 2015; Scientific and innovation activity, 2015).

As known from business practices, every time the Government wants to spend budget money on reconstruction and modernization of the national economy they are opposed by a powerful industrial lobby in the Parliament, corruption schemes,



kickbacks that reduce to zero the efforts to update national production and consumption patterns. In particular, during 2000–2014 the budget's share in financing of innovative activities did not exceed 0.3–5%, what can hardly be called "active state support" (Innovative activity, 2015; Scientific and innovation activity, 2015). Despite the adoption of basic laws in Ukraine, which orient the national economy to innovative, sustainable, socially and environmentally efficient development, the overall situation is still very difficult. Thus, urgent is the search and implementation of new approaches to innovation management, which would allow implementing the existing laws, provide reliable state support for innovative processes, especially energy and resource saving.

**External debt.** The country is constantly experiencing a significant funds' deficit for solving urgent economic, social and environmental problems. Traditionally Ukraine solves these problems by attracting loans from international organizations and other countries, constantly increasing its external debt. It has grown rapidly in the last 20 years. If as of January 1, 2007 gross external public debt was 54.5 bln USD, 1.01.2010 – 103.4 bln USD, 1.01.2015 – 126.3 bln USD. 01.01.2014 it grew to 142.1 bln USD, i.e. by 37.4% as compared to the beginning of 2010 and by 2.6 times higher, if compared to the beginning of 2007. However, due to national currency devaluation and worsening of the general economic situation in the country in 2014 the external debt increased nearly twice in UAH, if compared to USD – almost did not change. 01.01.2015 the ratio of external debt to GDP in Ukraine reached its maximum – 96.5%. If we estimate the gross external debt per capita, we can say that it increased from 1168.6 USD to 2942.2 USD during the period of 2007 to 2014, or by more than 2.5 times (Gross external debt, 2015). The rapid growth of external debt necessitates Ukraine to pay billions of USD as interest and fees for this debt annually. So, not always successful governmental attempts to reform the national economy make every Ukrainian taxpayer pay more than 200 USD each year to other countries and international organizations.

Further growth of the external debt without radical reforms, especially in the area of energy and resource saving, is leading Ukraine to the debt trap. Following the current practice of ineffective governance and "patching holes" in the state budget by creating new debt, unreasonable prices for key energy resources (high for industries and low for households), unauthorized use of funds on the restructuring of the national economic system, human resources decline, pensions problems, unemployment, decrease of real income of population etc. can easily lead the country to economic collapse.

People's dissatisfaction with the previous government policies, especially on Eurointegration, severe social and economic problems generate political ones. Recent military activities in Ukraine somewhat shadowed social and economic problems; however, they still require urgent solutions. The fact is that the solution of these problems may somehow contribute to the stabilization of political situation, but any delay will lead to even more political and social unrest. Understanding the negative impact of Russian foreign policy on the situation in Ukraine, we stress that in case of solving the military conflict and stabilizing political situation, it is the economic stabilization based on energy and resource efficiency that will allow quick regeneration of lost time and resources.

**Conclusions.** At the current stage of its development Ukraine is facing serious challenges in political, economic and social spheres. Most of them are associated with external threats, such as the policy of Russian Federation as the main political and economic partner and slow globalization of Ukraine's economy. There are also internal threats to efficient development. The main are: high energy intensity of GDP, insufficient level of social responsibility of domestic enterprises, their low innovative activity, high corruption level, irrational economic structure and poor governmental regulation mechanisms for economic development, lack of financial resources for innovative restructuring of national production, pensions problems, reduction in labour forces, and social insecurity etc.

External and internal threats are interrelated, and the country's readiness to respond to them is the key aspect that would form a state strategic development vector. Along with the solution of political problems, decrease of Ukraine's energy dependence, the restructuring of the national economy based on energy and resource efficiency, development of renewable energy sector, environmental entrepreneurship, the use of innovations, and the solution of social problems must be of high priority for the new Government. Implementation of these priorities is possible only due to an integrated approach to the management of transformation changes in the national socioeconomic system in which the problematic aspects of management are considered as potential drivers of growth and development of economic, social and political processes. If the new Government uses rationally the current opportunities of Ukraine, and adequately responds to the existing challenges, taking advantage of the patriotic attitude of the Ukrainians, we hope that at last Ukraine will become a truly European country, not only geographically, but also as a country with high quality of life that its residents expect.

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