

Міністерство освіти і науки України  
Міністерство освіти Азербайджанської Республіки

Національний університет «Полтавська політехніка  
імені Юрія Кондратюка»  
Азербайджанський архітектурно-будівельний університет

# **BUILDING INNOVATIONS – 2021**

Збірник наукових праць  
за матеріалами

IV Міжнародної  
українсько-азербайджанської  
науково-практичної конференції

20 – 21 травня 2021 року

Полтава – Баку 2021

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## **BARRIERS TO THE DEVELOPMENT OF UKRAINE'S ECONOMY ENERGY EFFICIENCY**

***Annotation.** Barriers to the development of Ukraine's economy energy efficiency were identified: market, technical and technological, financial, tax, information, regulatory and institutional. It was analyzed that in countries with developed market economies a new energy civilization has been formed, the main components of which are: energy efficiency; intelligent energy systems based on the Smart Grid concept; decentralization of energy; new alternative energy sources. It was determined that development of the 4th investment cycle energy will be implemented using two main models: "Energy Efficiency +" and "New Paradigm – Power Market". The main directions of energy efficiency management of the Ukraine's economy were formed by authors.*

***Key words:** economy, energy efficiency, country, development, management.*

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## **ПЕРЕШКОДИ НА ШЛЯХУ ДО РОЗВИТКУ ЕНЕРГОЕФЕКТИВНОСТІ ЕКОНОМІКИ УКРАЇНИ**

***Анотація.** Виокремлено перешкоди на шляху до розвитку енергоефективності економіки України: ринкові, техніко-технологічні, фінансові, податкові, інформаційні, регуляторні та інституціональні. Проаналізовано, що в країнах з розвинутою ринковою економікою сформована нова енергетична цивілізація, основні складові якої: енергоефективність; інтелектуальні енергетичні системи на основі концепції Smart Grid; децентралізація енергетики; нові альтернативні джерела енергії. Визначено, що розвиток енергетики 4-го інвестиційного циклу буде реалізовуватися за допомогою двох основних моделей: «Енергоефективність+» і «Нова парадигма – ринок потужності». Сформовано основні напрями управління енергоефективністю економіки України.*

***Ключові слова:** економіка, енергоефективність, країна, розвиток, управління.*

At present, energy efficiency occupies one of the key positions in the economic development of countries with developed economies. After signing of the Association Agreement with the EU, Ukraine, as a member of the Energy Community, is currently fulfilling a number of international commitments to implement energy efficiency reforms.

On this difficult path, Ukraine has already attracted the active support of the German Society for International Cooperation (GIZ). So far, the GIZ energy cluster includes nine projects [1]. As a result of the GIZ project support the “Consulting of enterprises on energy efficiency” and assistance of the State Agency for Energy Efficiency in Ukraine the Network of energy-efficient enterprises in Lviv region and the Network of energy-efficient bakers were created, and also the Network of energy efficiency producers of building materials was introduced. Also with the support of the Germany’s Government, implementation of the EU directive on energy efficiency and implementation of energy management mechanisms and ESCOs is underway [2].

Developed and approved “Energy Strategy of Ukraine” for the period up to 2035 “Security, Energy Efficiency, Competitiveness” which is focused on the integration of Ukraine’s energy system into the European one, in particular through such measures as: first, increasing energy exports; secondly, reducing the level of energy intensity of industrial production; third, increasing the country’s energy security [3].

In countries with developed market economies, a new energy civilization has been formed, the main components of which are: energy efficiency; intelligent energy systems based on the Smart Grid concept; decentralization of energy; new alternative energy sources.

However, there are certain barriers to the development of Ukraine’s economy energy efficiency, namely: market, technical and technological, financial, tax, information, regulatory and institutional (Table 1).

**Table 1**

**Barriersto the development of Ukraine’s economyenergy efficiency**

Barriers	List, essence, content
Market	market organization and price imbalances make it difficult for consumers to fully assess energy efficiency;
	problems related to conflicts of interest that arise when an investor is unable to reap the benefits of efficiency gains;
	costs of the agreement (cost of project development exceeds energy savings);
Financial	costs incurred in advance and benefits spread over time reflect the desires of investors;
	perception of energy efficiency investments as complex and risky, with high transaction costs;
	lack of awareness of financial benefits from financial institutions;
Information	lack of sufficient information and understanding on the part of consumers to decide on the rational use and amount of investment;
Regulatory and institutional	energy tariffs do not stimulate investment in energy saving and energy efficiency;
	incentive structure encourages energy companies to sell electricity rather than invest in cost-effective energy efficiency;
	institutional bias towards supply-side investments;
Technical and technological	lack of available energy efficiency technologies that are acceptable to local requirements;
	insufficient potential for identifying, developing, implementing and supporting energy efficiency investments.

The development of the 4<sup>th</sup> investment cycle energy will be implemented using two main models: “Energy Efficiency +” and “New Paradigm – Power Market” (Table 2) [4].

Table2

Models of energy development of the 4<sup>th</sup> investment cycle

Development models	Execution period	Directions	Components of driver development model activation
1	2	3	4
“Energy efficiency +”	until 2020 inclusive	development of nuclear energy;	dominance of centralized energy; development of three generations, dispersed generation; economically justified innovations; development of intellectual energy models in separate clusters (Smart Grid 1.0);
		development of non-traditional and renewable energy sources (RES);	
		launch of second wave energy efficiency programs (online consumption management);	
		Carbon capture and sequestration (CCS) technologies;	
“New paradigm - power market”	after 2020	strengthening in the fuel and energy balance (FEB) of renewable energy, etc.;	large-scale transition to intelligent energy systems and networks; wide introduction of Smart Grid 2.0 technologies; transcontinental integration of
		market liberalization in the field of generation, dispersed generation; Smart Grid in the “active networks” version;	
		instead of the energy services and fuel market– the market of energy capacities and access to it “buyer – seller” (active houses, electric transport, etc.);	energy systems; introduction of breakthrough technologies (technologies of “clean / green” energy); liberalization of markets.
		reconstruction of cities.	

Source: compiled by the authors based on [4]

Therefore, the main areas of Ukraine’s economy energy efficiency management should be:

- reduction of energy intensity of GDP by 20% by the end of 2020 through the introduction of mandatory commercial accounting of energy consumption (energy and fuel), transition to the use of energy efficient technologies and equipment;
- ensuring the widest possible diversification of routes and sources of primary energy resources supply, including oil, natural gas, coal, nuclear fuel, increasing domestic energy production, introduction of transparent competitive rules for the development and use of energy deposits;
- liberalization of the electric and thermal energy markets, coal and gas, transition to a new model of their functioning;
- integration of Ukraine’s energy system with the continental European energy system ENTSO-E;
- reorganization of the PJSC “National Joint-Stock Company” Naftogaz of Ukraine”;
- complete reform of the pricing system and tariffs for energy and fuel, in particular, revision of the mechanism of energy balance, refusal of cross-subsidization and state subsidies;
- attracting foreign investment in the energy sector of Ukraine, in particular in the modernization of the Ukraine’s Unified Gas Transmission System, power generation facilities and power grids;
- reform of the coal industry and attracting strategic investors, privatization of promising and liquidation (conservation) of unprofitable coal mining enterprises;
- modernization of the fuel and energy complex infrastructure.

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