

## **MARKERS OF FINANCIAL FLOWS IN RENEWABLE ENERGY IN THE EU AND UKRAINE**

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The conclusions of experts, indicating that the harm from obtaining energy from fossil fuels is greater than the economic benefit, have formed the basis for national programs for the development of renewable energy in European Union (EU) countries. According to the European Commission, a circular economy, «green economy», eco-design, eco-innovations, waste prevention and raw material reuse will help European region companies achieve a clean economy of up to 600 billion euros. Additional measures to increase the productivity of utilized resources by 30% by 2030 could increase the GDP of the EU by almost 1%, creating an additional 2 million jobs [1].

The establishment of the EU's regulatory framework for transitioning to renewable energy has been carried out systematically since the signing of the Maastricht Treaty in 1992 [2] and involves the creation of a system for active support of the sector.

The price of renewable energy is a significant indicator in decision-making, shaped by market and industrial factors. It depends on supply, demand, generation costs, market conditions, and institutional regulatory tools.

Financial flows for supporting the renewable energy sector have two types of sources – institutional and private. Investment approaches of stakeholders vary depending on the investor's purpose and category.

An institutional investor supports the development of the market and enhances the government's efforts to expand this market for households that cannot afford energy resources to meet their basic living needs.

Institutional initiatives have stimulated private investor interest in entering the renewable energy generation market, resulting in the establishment of industrial-scale generation capacities.

Investment flow management at the EU level involves extensive consultations with stakeholders and the public. For instance, to discuss the 2020 roadmap for renewable energy development, public consultations and meetings with interested parties were promptly organized.

Directive 2018/2001/EU [3] encouraged individual investment in renewable energy. However, the realization of the socio-economic impact from such investment is only at the location level of the investing resident. By 2022, direct private investments in local renewable energy sources in the EU accounted for 37.5% of their total amount in solar energy and 35% in wind energy.

One of the current sources of financing for renewable energy in the European Union (EU) is the implementation of research and demonstration programs [4]. The key drivers of their development include the formation of energy storage systems with flexible depreciation, the establishment of innovation development funds for generation with favorable tax treatment, and the development of financial and investment flow management systems. Targeted grant funds have become the source of financing for such programs.

As a result of these efforts, as of 2020, several EU countries shifted away from incentivizing «green energy» through special tariffs and introduced a system for determining energy prices from renewable sources through auctions.

In 2021, renewable energy became the exclusive primary energy source in Malta, accounting for over 95% of energy production in Latvia, Portugal, and Cyprus [5]. Finland, Sweden, and Latvia became leaders in domestic energy consumption from renewable sources.

Since the European community recognizes that climate change knows no borders, and investments in renewable energy development projects can only be effective when supported by all stakeholders at all levels, the EU is willing to provide support and share its expertise with neighbors and partners [6].

In 2018, Ukraine became a member of the International Renewable Energy Agency (IRENA) [7]. In 2020, a series of legislative acts were adopted in Ukraine to standardize calculations in the renewable energy market and to change the model of Ukraine's energy market.

In Ukraine, investments in renewable energy [8] have evolved as socially responsible investments, with institutional structures as the primary actors. The state has emerged as a key actor and source of financing for the development of renewable energy. Its influence on the energy sector is channeled through pricing, taxation, financing, and state subsidies. The state not only sets requirements for market participants and monitors compliance with these requirements [4], but also actively participates in this market.

In Ukraine, there is a 'green tariff' in place for both electricity from renewable sources. There is an incentive tariff for heat energy from renewable sources [9]. This tariff is higher than the market price for energy produced from fossil sources and covers the expenses of renewable energy producers through state compensation from the Ukrainian state budget.

In 2021, Ukraine approved a series of legislative acts that established the principles of the country's energy efficiency policy and outlined the action plan for renewable energy until 2030 [10].

The model of state regulation in the renewable energy market through the «green tariff» and the introduction of the Guaranteed Buyer institution contributed to the expansion of this market to households. The number of solar and wind installations and combined systems has significantly increased. However, the «green tariff» model for private households is more of an entrepreneurial initiative. It offers an opportunity to earn additional income by selling energy to the general grid at high rates. In practice, private industrial energy generation facilities were created without personal consumption, often owned individually or by families. The development of the electricity market allowed long-term contracts for the purchase of renewable energy at «green» tariffs until 2030, solidifying the position of individual energy production in Ukraine.

Separately, Ukraine's investment policy [11] aimed to support large industrial investors through the Investment Law, investment via industrial parks, and state support for projects with significant investments.

In Ukrainian circumstances, the main source of investment income was determined by the state, which proposed substantial profits to large industrial investors through cost savings. For the systematization and implementation of the best national and international practices in investment management at the local and regional levels, Recommendations on standards for attracting and supporting investors in local and regional markets were developed with the support of the PLEDDG (Partnership for Local Economic Development and Democratic Governance Project) and Ukraine. Invest by the Ministry of Economic Development, Trade, and Agriculture of Ukraine [12]. Following the World Bank's recommendations, Ukraine started exploring the potential for offshore wind energy development in the Black Sea. Ukraine lacks experience in operating offshore zones on its territory, but it does have experience in managing special economic zones and areas of priority development at the beginning of the 21st century.

However, in the context of active military aggression from Russia, all of Ukraine's plans and strategies in the renewable energy market are subject to change. The potential for small-scale renewable energy generation for local consumption remains, and the distribution and fragmentation of generation capacities also become a means of protection from the destruction of the energy sector due to constant artillery and air strikes from an aggressive neighbour. Organizing auctions in the conditions of war and a significantly damaged energy system presents challenging issues and is likely not cost-effective. The main source of funding for energy regeneration becomes donations from partner countries. In 2022, the European Commission approved the REPowerEU plan, aimed at developing renewable energy

generation as a source of primary social interest. Ukraine, as part of Europe's energy system, has no other choice but to develop in line with these trends.

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