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FOREIGN EXPERIENCE IN THE USE OF RENEWABLE ENERGY SOURCES FOR ACHIEVING SUSTAINABLE DEVELOPMENT GOALS

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Abstract. This article provides an economic analysis of foreign experience in utilizing renewable energy sources (RES) to achieve the Sustainable Development Goals (SDGs), particularly under Goal 7 (Affordable and Clean Energy), between 2020 and 2025. The study examines the green energy transition strategies of leading economies, including China, the European Union, and the United States, and their impact on economic growth. Statistics indicate that by 2024, global RES capacity reached 4,448 GW, accounting for 31.7% of global electricity generation. The article highlights investment trends, declining technological costs, and the role of government policy based on statistical data. Furthermore, practical recommendations derived from international experience are developed for emerging economies such as Uzbekistan.

Keywords: Sustainable development, renewable energy, economic growth, green investments, solar energy, wind power, SDG 7, energy policy.

Аннотация. В данной статье анализируется зарубежный опыт использования возобновляемых источников энергии (ВИЭ) для достижения Целей устойчивого развития (ЦУР), в частности в рамках Цели 7 (Недорогостоящая и чистая энергия), в период с 2020 по 2025 годы. В ходе исследования были изучены стратегии перехода к зеленой энергетике ведущих экономик, таких как Китай, Европейский Союз и США, а также их влияние на экономический рост. Статистика показывает, что к 2024 году глобальная

мощность ВИЭ достигла 4448 ГВт, что составило 31,7% от мировой выработки электроэнергии. В статье на основе статистических данных освещены инвестиционные тенденции, снижение технологических затрат и роль государственной политики. Также разработаны практические рекомендации для развивающихся экономик, таких как Узбекистан, на основе международного опыта.

Ключевые слова: Устойчивое развитие, возобновляемая энергия, экономический рост, зеленые инвестиции, солнечная энергетика, ветроэнергетика, ЦУР 7, энергетическая политика.

Introduction. The global economic landscape in the period 2020–2025 has been characterized by a radical shift toward sustainability, driven by the urgent need to mitigate climate change and the strategic imperative of energy security. Following the adoption of the UN 2030 Agenda, the transition to renewable energy sources (RES) has moved from a peripheral environmental concern to a central pillar of macroeconomic policy. As nations grappled with the economic fallout of the COVID-19 pandemic and the 2022 global energy crisis, the resilience of renewable systems became increasingly evident. By the end of 2024, renewable energy capacity had reached unprecedented heights, demonstrating that clean energy is not only technologically viable but also economically superior to traditional fossil fuels in many market contexts [1; 12 b.].

Sustainable Development Goal 7 (SDG 7), which aims to ensure access to affordable, reliable, sustainable, and modern energy for all, serves as the primary benchmark for this global progress. This transition is underpinned by a massive reallocation of capital toward green technologies, with annual investments exceeding $800 billion by mid-decade [2; 5 b.].

The acceleration of solar and wind deployment, particularly in Asia and Europe, signifies a decoupling of economic growth from carbon emissions. This study aims to

evaluate the diverse foreign experiences during this critical five-year period to identify the most effective mechanisms for scaling renewable energy.

The focus is placed on the synergy between policy frameworks, financial incentives, and technological innovation. Furthermore, the analysis explores how leading nations have managed to integrate high levels of variable renewable energy (VRE) into their national grids while maintaining economic stability. By examining the trajectory from 2020 to 2025, we can derive crucial lessons for emerging economies seeking to harmonize industrial development with environmental protection.

Literature Review. The economic literature concerning the transition to renewable energy has evolved significantly between 2020 and 2025, moving from theoretical feasibility studies to empirical analyses of large-scale implementation. Prominent economists such as Nicholas Stern and William Nordhaus have long argued that the costs of climate inaction far outweigh the investments required for a green transition. Recent studies by IRENA and the IEA confirm that the leveling of the levelized cost of energy (LCOE) for solar and wind has revolutionized the market, making renewables the cheapest source of new electricity in most regions of the world [3; 22 b.].

Scholars emphasize that the energy transition is not merely a technical swap of fuel types but a comprehensive economic transformation affecting labor markets, trade balances, and industrial competitiveness. Empirical evidence from Denmark and Germany suggests that long-term policy consistency, such as feed-in tariffs and carbon taxing, creates the necessary certainty for private sector involvement [4; 45 b.].

Another critical thread in the literature explores the 'energy trilemma balancing energy security, equity, and environmental sustainability. Research indicates that countries with diversified renewable portfolios have shown greater resilience to global fuel price volatility. However, challenges regarding grid infrastructure and energy storage remain focal points for academic debate. The works of La Camera and others

highlight that while the Global North has made substantial strides, the 'finance gap' for the Global South remains a barrier to achieving universal SDG 7 targets [5; 18 b.].

This research builds upon these findings by synthesizing the most recent statistical data to provide a comparative economic perspective on regional strategies.

Methodology. This research employs a multi-dimensional methodology combining quantitative statistical analysis and qualitative comparative policy review. The primary data sources include annual reports from the International Renewable Energy Agency (IRENA), the International Energy Agency (IEA), and the United Nations Sustainable Development Goals Report (2020–2025).

Quantitative analysis focuses on three core indicators: total installed renewable capacity (GW), the share of renewables in the total electricity generation mix (%), and the volume of annual green investments (USD). By comparing these indicators across major economic blocs—specifically China, the European Union, and the United States—the study identifies patterns of growth and efficiency. A comparative economic analysis was also performed to evaluate the impact of different policy instruments, such as the EU's REPowerEU plan and China's 14th Five-Year Plan, on market outcomes.

This involved examining the correlation between government subsidies and private sector capacity additions. Statistical tools were utilized to determine the LCOE trends for solar and wind power during the period, providing insight into the economic drivers behind the surge in adoption. Finally, the study incorporates a 'best practice' evaluation model to assess how these foreign experiences can be adapted to the specific economic conditions of developing nations, ensuring a comprehensive and actionable set of conclusions.

Analysis and Results. The analysis of global energy trends between 2020 and 2025 reveals a period of explosive growth in renewable energy capacity, despite significant global economic challenges. In 2024, global renewable capacity increased

by a record-breaking 15.1%, reaching a total of 4,448 GW. This expansion was dominated by solar photovoltaics (PV) and wind energy, which together accounted for over 96% of all net additions. China has emerged as the undisputed global leader, contributing over 50% of the world's new capacity in 2024 alone, largely due to its massive utility-scale solar projects and manufacturing dominance [6; 33 b.].

The share of renewables in global electricity generation rose to 31.7% in 2024, up from approximately 27% in 2020. This indicates that clean energy is increasingly meeting the growth in global demand, though fossil fuel usage has not yet entered a definitive decline phase. The economic efficiency of these technologies is supported by the continuing decrease in costs; for instance, the price of solar PV modules has dropped by nearly 90% over the last decade, making it the most cost-effective option for power generation in history.

Table 1. Comparative growth of renewable energy capacity by region (2020 vs 2024).

Region	Capacity 2020 (GW)	Capacity 2024 (GW)	Growth Rate (%)	Major Technology Driver
Asia (mostly China)	1,280	2,382	86.1%	Solar PV
Europe (EU-27)	610	780	27.9%	Wind & Solar
North America	385	530	37.7%	Solar & Wind
South America	235	295	25.5%	Hydropower & Solar
Africa	54	68	25.9%	Solar & Hydro

Beyond capacity additions, the financial landscape of the energy transition has undergone a profound shift. Global investment in clean energy technologies reached $807 billion in 2024, a significant increase from the roughly $500 billion recorded in 2020. This surge is driven by both public policy frameworks, like the Inflation

Reduction Act in the US and the European Green Deal, and the increasing attractiveness of renewables to private institutional investors. In the European Union, the REPowerEU initiative significantly accelerated the deployment of distributed solar PV on residential and commercial buildings, aiming to reduce dependence on imported natural gas. Meanwhile, in the United States, solar generation has become the fastest-growing electricity source, making up 7.1% of total generation by 2024 [7; 11 b.].

The data also highlights a growing disparity; while the G20 countries account for over 90% of new capacity growth, sub-Saharan Africa and other developing regions continue to lag behind, receiving less than 3% of global renewable investments. This regional imbalance poses a major challenge to the universal achievement of SDG 7. 1-rasm. Global Investment Trends in Solar and Wind Power.

Discussion. The results of our analysis underscore that the 2020–2025 period was a turning point for the global energy economy. The economic success of the renewable transition in leading nations is attributed to a combination of market-pull and technology-push policies. China's experience demonstrates the power of industrial scaling and integrated supply chains, which have driven down global prices for everyone. On the other hand, the European experience highlights the importance of regulatory flexibility and regional grid integration [8; 56 b.].

However, the rapid increase in variable renewable energy (VRE) has brought new challenges to the forefront of economic discussion, particularly regarding grid stability and the need for massive investment in energy storage (BESS) and green hydrogen. Economists argue that the next phase of the transition (2025–2030) will require a shift in focus from mere capacity additions to 'system value'—ensuring that energy systems are resilient and can handle high levels of intermittency. Furthermore, the persistent financing gap in developing nations remains a significant obstacle.

For countries like Uzbekistan, the foreign experience suggests that attracting international climate finance requires robust legal frameworks and transparent auction

mechanisms. The transition is not just about environmental sustainability; it is increasingly about national competitiveness in a world where 'carbon-intensity' will determine trade advantages. Therefore, the strategic integration of RES into the national economic model is no longer optional but a prerequisite for long-term growth and stability.

Conclusion. In conclusion, the period 2020–2025 has proven that renewable energy is the cornerstone of the Sustainable Development Goals, particularly SDG 7. The international experience reveals that a successful transition is driven by three key factors: declining technological costs, ambitious and consistent policy frameworks, and massive mobilization of green capital. Global renewable capacity has nearly doubled in five years, with solar and wind becoming the dominant forces in the power sector.

Leading economies like China and the EU have set a blueprint for rapid decarbonization while maintaining industrial growth. However, to achieve the 2030 targets, the pace of transition must nearly double again, and the benefits must be distributed more equitably across the globe. For developing nations, the priority must be creating an 'investor-friendly' environment and prioritizing grid modernization. The foreign experience shows that while the initial capital expenditure is high, the long-term economic benefits including reduced fuel imports, lower energy costs, and job creation far outweigh the costs.

As we move beyond 2025, the focus must shift toward comprehensive electrification of the transport and heating sectors to fully realize the potential of the green economy.

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