

employers can make this hard. But open, honest dialogue and a will to understand each other are the keys. Organizations that succeed in this will gain a strong advantage in the job market.

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EVALUATING THE EFFICIENCY OF ALTERNATIVE ENERGY ENTERPRISES WITHIN EMERGING ECONOMIC MODELS

The global energy landscape is undergoing a radical transformation due to the growing urgency of climate change, geopolitical volatility, and the depletion of conventional energy sources. In this context, alternative energy enterprises (AEEs) have emerged as key drivers of sustainable development, energy diversification, and economic modernization. The evaluation of their efficiency is essential for determining their competitiveness, long-term viability, and integration into emerging economic models that prioritize decarbonization, innovation, and resilience. The relevance of this study lies in the need to assess how AEEs perform under the conditions of transitioning economies and evolving policy environments.

Recent academic discourse has emphasized the multifaceted role of AEEs in modern economies. According to the International Renewable Energy Agency (IRENA), renewable energy sources accounted for over 40% of newly installed global power capacity in 2023, with total global renewable generation capacity reaching 3,870 GW, of which 1,395 GW comes from solar energy and 1,017 GW from wind [1]. Porter and Kramer's framework of shared value underscores the strategic importance of embedding sustainability into corporate operations, which is particularly pertinent for AEEs operating in competitive and policy-sensitive markets [2]. Sovacool et al. (2021) highlight the institutional, technological, and behavioral barriers to energy transition, suggesting that systemic reforms and innovation ecosystems are prerequisites for enhancing the efficiency of AEEs [3]. Ukrainian scholars, such as Zgurovsky and Pasko, have contributed to the development of theoretical approaches to evaluating green economic activity, emphasizing the role of system analysis and strategic planning in energy enterprises [4].

The performance of AEEs must be analyzed within the broader framework of emerging economic models that integrate environmental imperatives with market-based mechanisms. The European Green Deal, the Inflation Reduction Act in the United States, and China's Renewable Energy Law exemplify policy initiatives that redefine the role of the energy sector in national economies [5]. These policies foster the growth of green enterprises by providing financial incentives, establishing regulatory frameworks, and promoting research and development. In 2023 alone, the European Union allocated €250 billion to energy transition projects, with €86 billion specifically targeted at renewable energy enterprises and energy efficiency improvements.

An in-depth comparative analysis of Germany, Denmark, and Ukraine reveals diverse trajectories of AEE efficiency. Germany's *Energiewende* has demonstrated the feasibility of large-scale renewable integration through stable subsidies, long-term energy planning, and public support mechanisms [6]. As of 2023, Germany sourced 52% of its electricity from renewables. Denmark, where wind power accounts for over 55% of national electricity production, has capitalized on its technological specialization and export-oriented green technologies. Ukraine, despite institutional and infrastructural challenges exacerbated by war, has shown considerable progress: in 2023, renewable energy provided approximately 10.3% of electricity generation, with over 9 GW of installed renewable capacity—5.9 GW from solar, 1.7 GW from wind, and the remainder from biomass and small hydro [7].

Key performance indicators (KPIs) used in assessing the efficiency of AEEs include Energy Return on Investment (EROI), carbon intensity per unit of output, payback periods, technological adaptability, and capital utilization rates. For instance, the EROI of solar PV has improved significantly, ranging from 10:1 to 20:1 depending on location and technology. The global Levelized Cost of Electricity (LCOE) for solar PV dropped to \$0.045 per kWh in 2023, and for onshore wind to \$0.033 per kWh, making both technologies fully competitive with fossil fuels [8]. In Ukraine, decentralized solar energy systems deployed in rural

areas show a payback period of 5–7 years and enable households to save up to €30,000 annually on electricity bills, which is significant given the average monthly household income of approximately €15,000.

The integration of AEEs into circular economy models, the expansion of smart grid infrastructure, and the use of digital technologies such as digital twins for real-time monitoring contribute to improving operational efficiency and enterprise agility. For example, in the Netherlands, the deployment of digital energy monitoring systems increased average operational efficiency by 15%, while reducing maintenance costs by 20%. These developments signal a paradigm shift in the organization and assessment of energy enterprises, moving away from centralized fossil-fuel-based structures toward decentralized, data-driven, and environmentally integrated systems. The potential for scaling such models is contingent on continuous evaluation, dynamic adaptation, and the alignment of enterprise goals with global and regional sustainability objectives.

In conclusion, the efficiency of alternative energy enterprises plays a central role in shaping the trajectory of emerging economic models. Their development is driven by a combination of technological innovation, supportive regulation, and alignment with global environmental priorities. Countries such as Ukraine possess significant untapped potential in solar, wind, and biomass energy, which can be realized through strategic policy alignment, public-private partnerships, and international cooperation. The continuous application of multidimensional efficiency metrics is essential for guiding investment, informing policy decisions, and ensuring that AEEs contribute effectively to economic resilience and environmental sustainability in a changing world.

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