CORPORATE ADOPTION OF GREEN ENERGY: TRENDS, IMPACTS AND FUTURE PROSPECTS

Bakhtiyor Nurmetovich Egamov
Ma'mun University Associate Professor, Candidate of Economic Sciences Department of Economics
Dilrabo Kurbondurdi Akhmedova
Acting Associate Professor, PhD
Sherjon Alijan Sherjonov
Acting Associate Professor, PhD

Abstract; *The transition to renewable energy in the corporate sector has intensified globally, driven by environmental regulations, cost competitiveness, and stakeholder pressure. This paper investigates the extent to which corporations are adopting green energy, the methods they employ, and the impact of these initiatives. Using 2023–2024 global datasets and case studies from leading corporations, the study evaluates both the scale of adoption and the environmental and economic benefits realized.*

Keywords: *corporate green energy adoption, sustainability, renewable energy, business trends, environmental impact, corporate social responsibility, future prospects, energy transition*

Аннотация; *Переход на возобновляемые источники энергии в корпоративном секторе активно развивается во всем мире под воздействием экологических норм, конкурентоспособности затрат и давления заинтересованных сторон. В данной статье исследуется, в какой степени корпорации внедряют «зеленую» энергию, какие методы они используют и каковы результаты этих инициатив. Используя глобальные данные за 2023–2024 годы и кейсы ведущих корпораций, исследование оценивает масштаб внедрения, а также экологические и экономические выгоды, которые были достигнуты.*

Ключевые слова: *корпоративное использование зелёной энергии, экологическая устойчивость, возобновляемая энергия, бизнес-тренды, экологическое воздействие, корпоративная социальная ответственность, перспективы, энергетическая трансформация*

1. Introduction

The increasing urgency to address climate change has compelled corporations to rethink their energy consumption strategies. Green energy—derived from renewable sources like solar, wind, hydro, and biomass—offers a sustainable alternative to fossil fuels. Governments, investors, and consumers are increasingly prioritizing Environmental, Social,

and Governance (ESG) criteria, pushing businesses to integrate clean energy into their operations.

In 2023, global renewable energy capacity additions reached 473 GW, a 36% year-on-year increase, marking the largest annual growth to date (REN21, 2024). Corporate Power Purchase Agreements (PPAs) accounted for nearly 46 GW of this total—30% more than in 2022.

The global urgency to mitigate climate change has placed the spotlight on energy consumption patterns, particularly within the corporate sector. As one of the largest consumers of electricity worldwide, businesses play a crucial role in transitioning towards a low-carbon economy. The adoption of green energy—energy derived from renewable sources such as solar, wind, hydro, and biomass—has emerged as a key strategy for corporations to reduce their environmental footprint, enhance energy security, and align with sustainability goals.

In recent years, a convergence of factors has accelerated the corporate shift to renewable energy. These include decreasing costs of clean technologies, mounting pressure from environmentally conscious investors and consumers, and tightening government regulations aimed at reducing greenhouse gas emissions. The cost of solar photovoltaic (PV) power has declined by approximately 80% since 2010, while the cost of onshore wind has dropped by around 70%, making renewable energy increasingly competitive with fossil fuels (IEA, 2023).

Corporations are responding to this landscape not only to fulfill Environmental, Social, and Governance (ESG) commitments but also to gain long-term economic advantages. In 2023, companies signed a record-breaking 46 gigawatts (GW) of renewable energy Power Purchase Agreements (PPAs), accounting for nearly 30% more than in the previous year. Leading firms such as Amazon, Google, and Microsoft have committed to sourcing 100% of their electricity needs from renewables, while regional markets—especially in North America and Europe—have seen a surge in corporate-led clean energy investments.

This study aims to explore the extent and impact of green energy adoption among corporations globally. It examines the strategies employed, evaluates economic and environmental outcomes, and provides insight into regional disparities and future trends. Through statistical analysis and case-based evaluation, the paper sheds light on how corporate engagement with renewable energy is reshaping the global energy landscape.

2. **Methods**

This study uses a mixed-methods approach, combining:

Quantitative data: Sourced from international organizations such as REN21, the International Energy Agency (IEA), and BloombergNEF. Metrics include renewable energy capacity additions, corporate PPA volumes, and job creation figures.

Case studies: Analyses of renewable energy initiatives by Amazon, Microsoft, and AirTrunk to contextualize the corporate shift.

Comparative regional analysis: Data was segmented by region (e.g., North America, Europe, Asia-Pacific) to identify geographic disparities in adoption.

To assess the scale, strategies, and impacts of green energy adoption in corporate settings, a mixed-methods research design was employed. This approach combined quantitative data analysis with qualitative case study evaluation to ensure a comprehensive understanding of current trends and outcomes.

2.1 Data Collection

Quantitative data was gathered from authoritative international sources, including:

REN21 Global Status Reports (2023–2024)

International Energy Agency (IEA) statistics

BloombergNEF and Gitnux sustainability datasets

Corporate sustainability reports (e.g., from Amazon, Microsoft, AirTrunk)

Market research reports on global renewable energy investments (2024–2025)

Key metrics extracted included:

Corporate Power Purchase Agreement (PPA) volumes

Installed renewable capacity by sector and region

Levelized cost of renewable energy (LCOE)

Corporate emissions reductions

Employment figures in the renewable sector

Data was collected for the period 2019 to 2024, with an emphasis on the years 2022–2024 to capture the most recent developments.

2.2 Case Study Analysis

To supplement statistical trends, three multinational corporations were selected for in-depth case studies: Amazon, Microsoft, and AirTrunk. These firms were chosen based on their scale of renewable energy investment, geographic diversity, and availability of public data.

Each case study examined:

Renewable energy sourcing strategy (e.g., on-site generation, virtual PPAs)

Project scale and technology mix (solar, wind, etc.)

Environmental performance indicators (e.g., CO_2 reductions, clean electricity use %)

Economic outcomes (cost savings, ROI, subsidies)

2.3 Data Analysis

Descriptive statistics were used to quantify adoption trends, cost trends, and emissions reductions. Case data was evaluated qualitatively to identify common success factors, challenges, and implementation models.

Regional comparisons were made across North America, Europe, and Asia-Pacific to highlight geographic patterns in corporate green energy integration.

All data was triangulated to ensure reliability and cross-verified where possible with peer-reviewed literature or third-party audits.

3. **Results**

The analysis of quantitative datasets and corporate case studies reveals a significant and accelerating shift toward green energy adoption among corporations globally. Key findings are organized into three primary categories: global corporate renewable energy trends, economic and environmental impacts, and regional disparities in adoption.

3.1 Global Corporate Renewable Energy Trends

Corporate procurement of renewable energy has reached record levels in recent years. According to BloombergNEF (2024), companies signed 46 GW of Power Purchase Agreements (PPAs) in 2023 alone, up from 35 GW in 2022—marking a 30% year-over-year increase.

The technology sector accounted for 47% of all corporate PPAs in 2023, with companies like Amazon and Microsoft leading the charge.

Amazon remained the largest corporate buyer of renewable energy globally, with over 33 GW of renewable capacity in operation or under development, spread across more than 600 projects.

Microsoft committed to becoming carbon negative by 2030 and procured more than 13 GW of clean energy since 2021.

The automotive and retail sectors also showed strong growth in PPA activity, with firms like Volkswagen and Walmart launching solar and wind initiatives to power manufacturing and logistics operations.

3.2 Economic and Environmental Impacts

The cost of solar PV electricity has declined by over 80% since 2010, and onshore wind costs have fallen by 70%, making renewables increasingly cost-competitive.

Corporations report long-term cost savings of 25–40% through renewable procurement strategies, particularly when using virtual PPAs or on-site generation.

In 2022, the global renewable energy sector employed 13.7 million people, up from 12.7 million in 2021—a growth rate of approximately 8% (IRENA, 2023).

Large-scale adoption of renewables contributed to significant emissions reductions. Microsoft reported a 17% drop in operational emissions between 2020 and 2023, largely due to clean energy procurement.

3.3 Regional Trends and Disparities

North America led global corporate renewable procurement in 2023, accounting for 37% of all PPAs. U.S.-based companies alone signed contracts for 17.3 GW of clean power.

Europe recorded a 74% growth in corporate PPA volumes, with Germany, Spain, and the UK leading in capacity added.

In the Asia-Pacific region, Australia saw substantial growth. By late 2024, nearly 4 million small-scale solar PV systems were installed nationwide, providing 19.6% of the country's total electricity.

The UK’s net-zero economy generated £83 billion in value in 2024 and supported close to 1 million jobs, demonstrating strong economic returns from green investment.

4. **Discussion**

Corporations are no longer passive players in the energy transition. The alignment of financial benefits, ESG pressures, and regulatory incentives has catalyzed large-scale renewable adoption. While North America and Europe are leading, Asia-Pacific nations like Australia and China are rapidly catching up.

Challenges persist, particularly in infrastructure, policy inconsistencies, and grid integration. Nonetheless, innovations in energy storage, AI-powered grid management, and green hydrogen point toward a resilient future.

Looking ahead, with the global renewable energy market projected to exceed $4.3 trillion by 2034, corporations will remain central actors in reshaping global energy landscapes.

The findings of this study underscore a pivotal transformation in corporate energy strategies. Businesses across sectors and regions are increasingly adopting green energy not only to meet regulatory requirements and stakeholder expectations but also to secure economic advantages. The record-breaking 46 GW of corporate PPAs signed in 2023, and the leading roles of companies like Amazon and Microsoft, signal that sustainability has shifted from a peripheral concern to a core strategic priority.

4.1 Drivers of Adoption

Several converging factors are accelerating corporate investment in renewable energy:

Cost competitiveness: With dramatic reductions in the cost of solar and wind technologies—by 80% and 70%, respectively—renewable energy has become an economically viable option for businesses, often cheaper than fossil fuel-based alternatives.

Policy and regulatory incentives: Governments worldwide are offering tax credits, subsidies, and renewable energy targets. For instance, the U.S. Inflation Reduction Act (2022) significantly boosted corporate interest in clean energy.

ESG pressures: Investors increasingly demand climate transparency and sustainability performance, prompting companies to commit to net-zero targets and renewable sourcing.

Brand and consumer value: Companies that lead in sustainability attract talent, customers, and investment, creating a competitive advantage.

4.2 Challenges and Barriers

Despite positive trends, barriers remain that could limit the pace or scope of corporate green energy adoption:

Grid infrastructure limitations in many regions hinder the integration of intermittent renewables.

Complex permitting processes and lack of standardized PPA frameworks can delay project implementation.

Geographic inequality: Developing countries often lack access to affordable financing or technical expertise, leading to disparities in adoption.

4.3 Regional Outlook

Regional comparisons reveal stark contrasts in progress:

North America and Europe are leading in PPA volume and policy frameworks, but Asia-Pacific is catching up rapidly, with Australia and China showing strong solar growth.

Emerging economies face higher upfront costs and infrastructural constraints but may leapfrog traditional models through decentralized solutions like microgrids and distributed solar.

4.4 Future Prospects

Looking ahead, corporate engagement will likely deepen through:

Energy storage and smart grid integration, enhancing reliability and efficiency.

Green hydrogen and carbon capture investments, especially in hard-to-abate industries.

Blockchain and AI tools to improve tracking, verification, and trading of renewable credits.

With the global renewable energy market projected to exceed $4.3 trillion by 2034, corporations will continue to be central actors in shaping the future energy landscape. Their ability to scale up clean energy adoption will significantly influence global decarbonization goals and the success of climate action frameworks like the Paris Agreement.

5. **Conclusion**

The corporate adoption of green energy is not merely a trend but a fundamental shift. Supported by declining costs, technological innovation, and stakeholder expectations, businesses are embracing renewables at an unprecedented rate. As more companies integrate sustainability into their core strategy, the momentum toward a decarbonized economy is expected to accelerate further.

REFERENCE

1. Abaku, E.A. and Odimarha, A.C. (2024) 'Sustainable supply chain management in the medical industry: a theoretical and practical examination,' International Medical Science Research Journal, 4(3), pp. 319–340. https://doi.org/10.51594/imsrj.v4i3.931.

2. Abaku, E.A., Edunjobi, T.E. and Odimarha, A.C. (2024) 'Theoretical approaches to AI in supply chain optimization: Pathways to efficiency and resilience,' International Journal of Science and Technology Research Archive, 6(1), pp. 092–107. https://doi.org/10.53771/ijstra.2024.6.1.0033

3. Abukubu, A.E., 2020. Development of a screening tool to assess the feasibility of solar-to-steam application for the purpose of enhanced oil recovery (Master's thesis, Middle East Technical University).

4. Eshpulatovich, E.A. (2023). Development of Green Economy in the Republic of Uzbekistan. International Multidisciplinary Journal for Research & Development, 10(11).

5. Шержонов, Ш. (2023). ИЖТИМОИЙ ҲИМОЯ ТИЗИМИНИ ЯХШИЛАШДА БЮДЖЕТ МАБЛАҒЛАРИ НАТИЖАВИЙЛИГИНИ ТАЪМИНЛАШ ЙЎЛЛАРИ. Iqtisodiy taraqqiyot va tahlil, 1(6), 261-269. 5.Sherjanov, S. (2022). O‘zbekiston aholisini ijtimoiy himoya qilish strategiyasi. Eurasian Journal of Law, Finance and Applied Sciences, 2(13), 132-138.

6. Bakberganovich, S. A. (2022). Foreign experience of increasing local budget income. Web of Scientist: International Scientific Research Journal, 3(10), 436-438.

7. Шержонов, Шержон. "ИЖТИМОИЙ СУҒУРТА ОРҚАЛИ АҲОЛИНИ ИЖТИМОИЙ ҲИМОЯ ҚИЛИШ." Nashrlar (2024): 102-103.

8. Axmedova, D. (2023). BANKLARDA CHAKANA KREDITLASH AMALIYOTINI RAQAMLI TRANSFORMATSIYA QILISHNING HUQUQIY ASOSLARI. Iqtisodiy taraqqiyot va tahlil, 1(7), 32- 42.

9. Yuldashevich, X. S., & Abdullayevich, S. O. (2023). RAQAMLI IQTISODIYOTNING AHOLI TUMUSH FARAVONLIGIGA TA'SIRINI BAHOLASH. ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ, 22(10), 34-36.

10. Masharipova X. (2023) RAQAMLI MUHITDA MIJOZLARNING EHTIYOJLARI VA XATTIHARAKATLARNI O`RGANISH UCHUN TAHLILIY USULLARNI QO`LLASH. Journal of new century innovations 30 (3), 203-207 11. Шержонов, Ш. (2024). ИЖТИМОИЙ СУҒУРТА ОРҚАЛИ АҲОЛИНИ ИЖТИМОИЙ ҲИМОЯ ҚИЛИШ. Nashrlar, 102-103.

12.Jumaniyozov, F. (2024). YASHIL IQTISODIYOT. Молодые ученые, 2(29), 115-117. 11. Jumaniyozov, F. (2024). OPPORTUNITIES TO CREATE NEW JOBS IN THE CONTEXT OF THE TRANSITION TO A" GREEN" ECONOMY. University Research Base, 264-267.

13. O'G'Li, J. F. D. (2024). YASHIL IQTISODIYOTGA O 'TISHDA CHIQINDILARNI BOSHQARISH VA ULARDAN SAMARALI FOYDALANISH MASALALARI. Central Asian Journal of Education and Innovation, 3(10), 115-121.

14. Jumaniyazov, F. D. O. G. L. (2023). Qishloq xo'jaligini raqamlashtirish sharoitida agrar iqtisodiyotni rivojlantirish. Science and Education, 4(5), 702-706