



Institutional and Economic Frameworks for a Green Energy Zone in Azerbaijan

Evidence, challenges, and development prospects for transforming Azerbaijan's energy landscape through renewable energy policy and strategic investment.

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Why Green Energy Now?

Climate change and growing anthropogenic pressure have made energy efficiency and renewable expansion national and international priorities. Azerbaijan pursues a consistent green transition through state programs, development strategies, and regulatory frameworks informed by international best practices in reducing the ecological footprint of its fuel and energy complex.

Policy Foundation

"Azerbaijan-2030: National Priorities for Socio-Economic Development" program, State programs, action plans, and national strategies aligned with international environmental standards

Strategic Objective

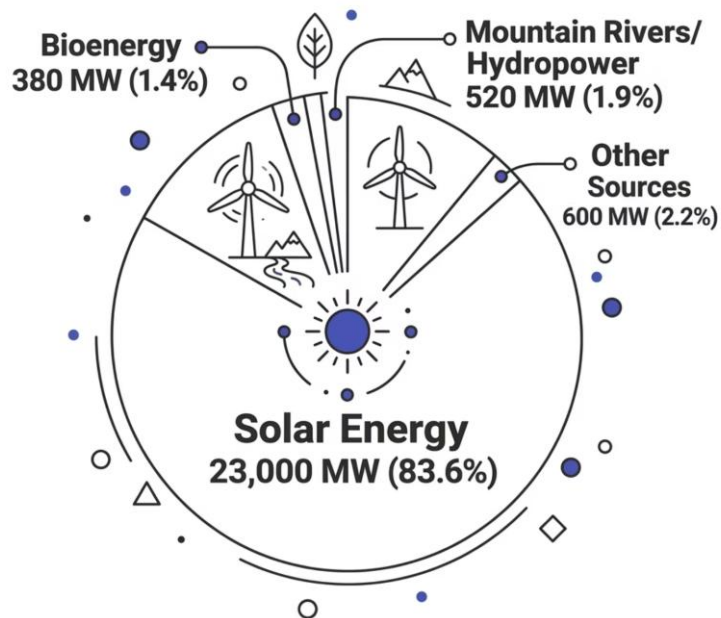
Establishment of a "Green Energy Zone" in liberated territories using high renewable potential

Key Technologies

Solar, wind, hydropower, smart technologies, energy efficiency, and electric transport



Azerbaijan's Renewable Energy Potential



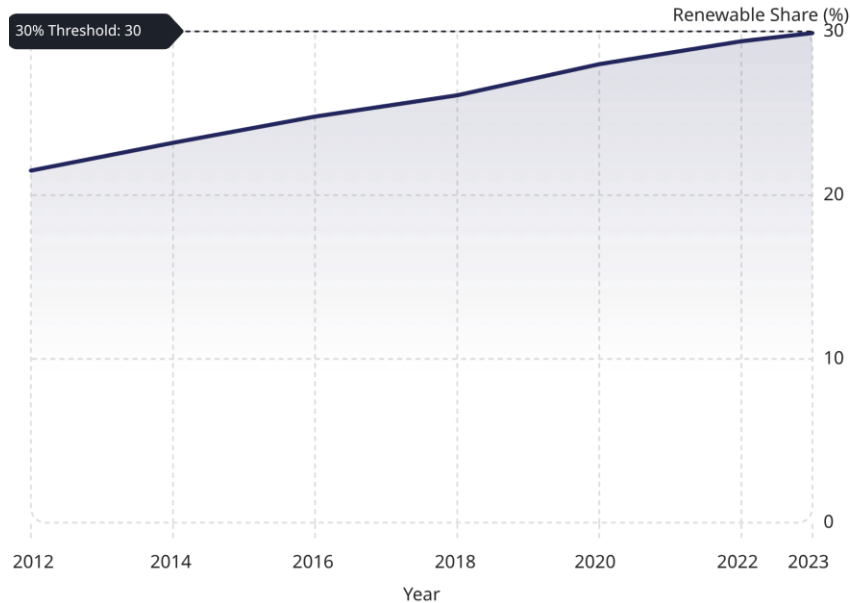
Total Potential: 27,500 MW

Azerbaijan's renewable energy portfolio is overwhelmingly dominated by solar potential, which accounts for **83.6%** of total capacity. Wind energy contributes 3,000 MW, while hydropower from mountain rivers and bioenergy add 520 MW and 380 MW respectively.

i Offshore wind potential alone is estimated at **157 GW** — positioning Azerbaijan as a regional clean energy leader (AREA, 2025).

Source: Compiled by the authors based on data from
<https://area.gov.az/az/page/layiheler/berpa-olunan-enerji-stansiyalari/boem>

Global Renewable Energy Momentum



Renewables Outpace Traditional Energy

Global renewable electricity generation grew at an average annual rate of **5.9%** from 2012–2023 — 4.6 percentage points faster than traditional sources (1.3%). By 2023, renewables accounted for **29.9%** of global electricity generation (IRENA/DoP, 2023).

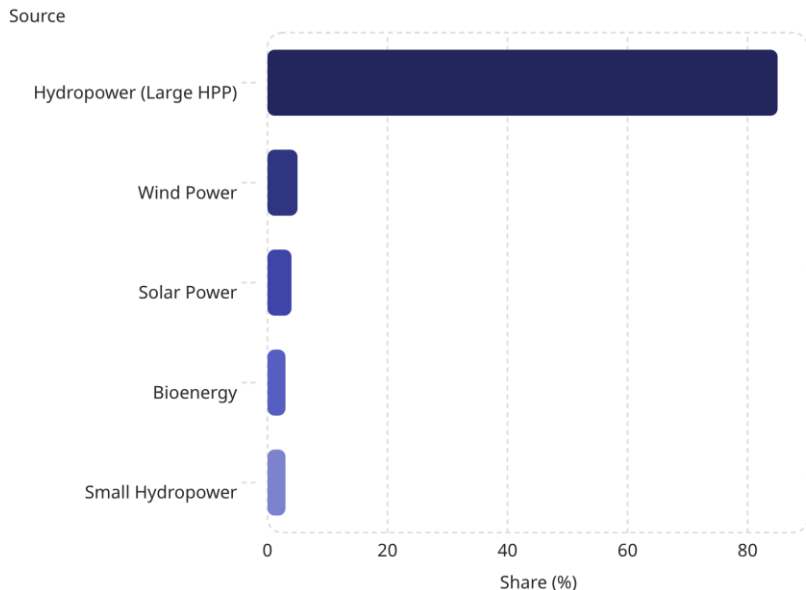
Solar & Wind Surge

13.2% of global electricity in 2023, up 15.7% year-on-year

Hydropower Shift

Once dominant, now declining — down 1.6% in 2023

Azerbaijan's Renewable Energy Mix



Hydropower Dominance — and the Gap Ahead

Hydropower accounts for **85%** of Azerbaijan's renewable generation, with large HPPs totaling 1,110.5 MW led by Mingachevir (424 MW) and Shamkir (380 MW). Solar (45.9 MW) and wind (66.1 MW) remain underdeveloped relative to their vast technical potential.

Overall, renewable energy represents **17.3%** of Azerbaijan's total energy production (MoE, 2026).

Installed Capacity by Technology

1,110 MW

Large Hydropower

10 major HPPs including Mingachevir, Shamkir, and Yenikend

66 MW

Wind Energy

7 wind facilities; Yeni Yashma WPP leads at 50 MW

46 MW

Solar Energy

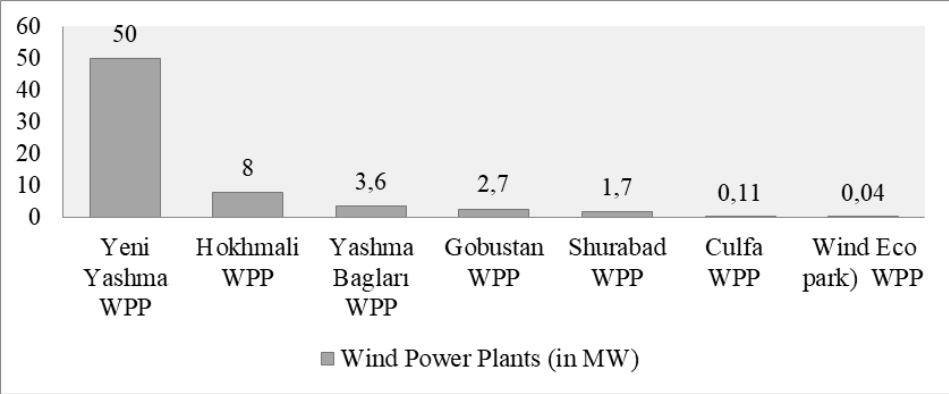
12 solar installations; Babek SPP is the largest at 22 MW

38 MW

Bioenergy

"Clean City" JSC dominates with 37 MW of capacity

Solar energy recorded the fastest growth in 2023, rising **25.2%** year-on-year — the highest output since 2018. Wind energy grew by **9.8%**, signaling accelerating diversification beyond hydropower.



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Policy Evolution: From Kyoto to COP26

2004–2006

State Program on Renewable Energy (SPRES)
and Comprehensive Environmental Action
Plan launched; Absheron Peninsula
remediation prioritized

2011–2020

State Strategy on Renewable Energy; short,
medium, and long-term action plans; public-
private partnership mechanisms established

1

2

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Kyoto Protocol

CO₂ emissions at 60 million tons; post-2010
reductions brought this down to 37 million
tons through program implementation

COP26, Glasgow 2021

Azerbaijan commits to **40% GHG reduction
by 2050** and announces "net-zero
emissions" zone in liberated territories



The Green Energy Zone: Liberated Territories

Following the 44-day Patriotic War, establishing a Green Energy Zone in liberated territories became a top state priority. A presidential decree initiated collaboration with Japan's TEPCO to develop a Concept Document leveraging the region's exceptional renewable potential.

☀ Solar

Qubadli, Zangilan, Jabrayil & Fuzuli: **7,200+ MW** technical potential

🌀 Wind

Lachin & Kalbajar mountainous areas: **~2,000 MW** technical potential

💧 Hydropower

Tartar & Hakari rivers and tributaries offer significant untapped potential

🏢 Active Projects

BP solar (240 MW, Zangilan-Jabrayil); Khudaferin & Giz Galasi HPPs (140 MW); Lachin/Kalbajar WPP (100 MW)



Institutional Challenges & Research Gaps

Key Institutional Barriers

- **Regulatory consistency:** Policy instruments exist but implementation efficiency remains uneven across sectors
- **Governance coordination:** Inter-institutional alignment requires strengthening to accelerate project deployment
- **Path dependency:** Hydrocarbon-based institutional structures create transition risks (Landoni & Muradzada, 2026)
- **Investment frameworks:** Public-private partnerships need more robust legal and financial scaffolding

Where Research Falls Short

Existing literature focuses predominantly on either macroeconomic impacts, policy descriptions, or sector-specific analyses. **Integrated research** systematically examining both institutional and economic frameworks for green energy zone formation remains limited.

- 📄 This study addresses that gap by combining institutional, economic, and spatial perspectives in a unified analytical framework.

Conclusions & Policy Implications

Institutional Foundation Is Strong

Azerbaijan has developed a comprehensive strategic and regulatory base but effective coordination and regulatory consistency must improve to accelerate implementation.

Enormous Untapped Potential

With 27,500 MW of renewable potential and offshore wind at 157 GW, Azerbaijan can reposition itself from oil exporter to green energy hub supporting diversification and long-term sustainability.

Liberated Territories as a Catalyst

The Green Energy Zone represents a transformative opportunity: 7,200+ MW solar, 2,000 MW wind, and active hydropower projects can anchor a net-zero regional model aligned with global sustainability trends.

*Thank
you!*