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FOREIGN DIRECT INVESTMENT AND THE EXPANSION OF RENEWABLE ENERGY CAPACITY IN UZBEKISTAN: TRENDS, PUBLIC–PRIVATE PARTNERSHIPS, AND STRUCTURAL BOTTLENECKS

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ABSTRACT

This paper examines the relationship between foreign direct investment (FDI) and the expansion of renewable energy generating capacity in Uzbekistan between ***2026 and 2026. Drawing on OECD investment policy analysis, official government*** statements, and reporting from multilateral development institutions, the study documents that Uzbekistan's total installed electricity capacity grew from 24,063 ***MW to 28,570 MW within 2026 alone, with solar and wind capacity reaching***

approximately 4.7 GW by the end of the year, raising the share of green energy in the national grid to 30%. Since 2022, tenders equivalent to roughly 55% of total installed generation capacity have been awarded to foreign investors through public–private partnerships, and in 2025 alone the country attracted USD 35 billion in energy-related foreign investment. However, the analysis also identifies a structural bottleneck: according to OECD data, only about half of the 2,567 MW of solar and 900 MW of wind capacity under foreign development is legally counted as installed capacity, because grid connection has outpaced formal commissioning, and independent industry analysis indicates that roughly a third of renewable electricity generated is currently curtailed due to insufficient transmission and system-management capacity. The paper also documents substantial inconsistency in Uzbekistan's own stated 2030 renewable targets across different official sources. Practical recommendations are offered for aligning transmission investment with generation capacity growth.

KEYWORDS

foreign direct investment; renewable energy; Uzbekistan; public–private partnerships; green economy; grid infrastructure; curtailment.

1. INTRODUCTION

Uzbekistan has, over the past several years, pursued one of the most rapid renewable energy expansion programs in Central Asia, financed predominantly through foreign direct investment channeled via public–private partnerships (PPPs) with international financial institutions and private developers. By the end of 2025, the country's total installed electricity generating capacity had reached 28,570 MW, up from 24,063 MW at the start of the year — an increase of nearly 19% within a single year (Kursiv Media, 2025). Solar and wind facilities alone accounted for approximately 4.7 GW of this capacity by October 2025, and President Shavkat

Mirziyoyev stated that the country attracted USD 35 billion in energy-sector foreign investment in 2025 (Kursiv Media, 2025).

This scale of investment reflects a deliberate policy choice: since 2019, the Asian Development Bank has advised Uzbekistan's Ministry of Energy on structuring solar tenders for independent power producers, and since 2022 tenders equivalent to approximately 55% of the country's total installed generation capacity have been awarded to foreign investors in the form of PPPs (OECD, 2025). At the same time, independent energy-sector analysis suggests that generation capacity has expanded faster than the transmission and distribution infrastructure required to deliver this electricity to consumers, resulting in significant curtailment of renewable output (Energy Prof, 2025).

The research problem addressed here is the apparent gap between the scale of FDI-driven renewable generation capacity added in Uzbekistan and the country's capacity to fully utilize this investment — evidenced by both a formal "counting" gap (grid-connected capacity not yet legally recognized as installed) and a physical curtailment problem. The purpose of this paper is to document the scale and structure of FDI-driven renewable capacity growth in Uzbekistan for 2022–2025, and to assess the extent to which transmission and system-management constraints limit the economic realization of this investment.

2. LITERATURE REVIEW

The OECD's Roadmap for Sustainable Investment Policy Reforms in Uzbekistan (OECD, 2025) provides the most comprehensive assessment to date of the country's foreign investment climate in the energy sector, documenting both the scale of PPP-based renewable tenders and the specific gap between grid-connected and formally counted installed capacity. The report notes that approximately 50% of the solar and wind capacity currently under foreign development is already connected to the grid

and generating electricity, but is not yet legally classified as fully operational and therefore is not counted in official installed capacity statistics.

Industry-focused analysis, such as the Energy Prof newsletter's assessment of Uzbekistan's renewable sector (Energy Prof, 2025), highlights a pattern common to several emerging renewable energy markets: government policy succeeds in attracting generation investment, but slower progress on transmission, distribution, and system management results in substantial curtailment — estimated at roughly one-third of total useful renewable electricity generated over the period examined. This perspective is corroborated by project-level reporting from multilateral institutions such as the World Bank and the Asian Development Bank, which increasingly combine renewable generation financing with parallel investments in transmission infrastructure (World Bank, 2024).

A further point emerging from the literature is the lack of a single, stable long-term target for Uzbekistan's renewable energy sector: different official and institutional sources, published in different years, cite renewable capacity targets for 2030 ranging from 18 GW to 27 GW and renewable electricity shares ranging from 40% to 54% (World-Energy, 2024; World Bank, 2024; OECD, 2025; Energy Prof, 2025). This inconsistency has not previously been documented as a distinct methodological issue in the literature on Uzbekistan's energy transition, and this paper treats it as a limitation relevant to any quantitative assessment of progress toward stated targets.

3. METHODOLOGY

This study employs secondary data analysis (desk research) drawing on the OECD's 2025 investment policy report on Uzbekistan, official statements reported by Uzbek and international media (Kursiv Media, World-Energy, Energy Prof/Substack), and project-level press releases from the World Bank and Asian Development Bank. The

period of analysis is 2022–2025, corresponding to the period during which PPP-based renewable tenders have been actively awarded to foreign investors.

Because different sources report renewable capacity and FDI figures using different units, reference years, and definitions (e.g., "installed" versus "grid-connected" capacity), all figures are reported alongside their original source and date, and are not combined into a single derived statistic. Growth rates are calculated only where two comparable data points from the same source and definition were available. No regression or correlation analysis was conducted, since the number of independent, comparably defined annual observations is too small to support such methods — this is an explicit methodological limitation.

4. RESULTS

Table 1 summarizes the growth of Uzbekistan's total installed electricity generating capacity and the share attributable to renewables over the course of 2025.

Table 1. Installed electricity generating capacity and renewable share, Uzbekistan, 2025

Indicator	Start of 2025	End of 2025
Total installed capacity, MW	24,063	28,570
Solar and wind capacity, GW	not available	≈4.7
Share of green energy in national grid, %	not available	30
New energy facilities opened during the year	—	42 (21 more under construction)

Source: Kursiv Media (2025), citing official statements.

The 18.7% growth in total installed capacity within a single calendar year (from 24,063 MW to 28,570 MW) is a substantial expansion by regional standards. According to the same source, this was accompanied by the modernization of 69,000 kilometers of power lines and 14,000 transformers and substations, financed in part by the USD 35 billion in energy-sector foreign investment attracted in 2025 (Kursiv Media, 2025).

Table 2 presents OECD data on the structure of foreign-investor-financed renewable capacity under development and the gap between grid-connected and officially counted capacity.

Table 2. Foreign-investor renewable capacity under development and the installed-capacity counting gap

Indicator	Value
Share of total installed generation capacity tendered to foreign investors via PPPs since 2022	≈55%
Solar capacity under foreign development	2,567 MW
Wind capacity under foreign development	900 MW
Combined share of 2024 total installed capacity	16%
Share of this capacity already grid-connected but not legally counted as installed	≈50%

Source: OECD (2025), Roadmap for Sustainable Investment Policy Reforms in Uzbekistan.

The data in Table 2 point to a specific structural feature of Uzbekistan's renewable energy expansion: roughly half of the 3,467 MW of solar and wind capacity currently being developed by foreign investors is physically connected to the grid

and producing electricity, yet is not classified as "installed capacity" for regulatory purposes. This is not merely a statistical technicality — it implies that official installed-capacity figures likely understate the renewable generation already contributing to Uzbekistan's electricity supply, while at the same time signaling unresolved administrative or commissioning procedures that may be slowing the full economic integration of this investment.

Several individual FDI-backed projects illustrate the scale and international composition of this investment, summarized in Table 3.

Table 3. Selected foreign-investor-financed renewable energy projects in Uzbekistan

Project	Location	Capacity / Investment	Investor(s)
Zarafshan wind farm	Navoi region	Extended to 1.5 GW; USD 600 million	Masdar (UAE)
Khorezm solar plant	Khorezm region	100 MW; USD 3.5 million WB payment guarantee	Voltalia (France); World Bank
Karakalpakstan wind project	Karakalpakstan	200 MW, with battery storage (first in the region)	ADB, ACWA Power

Source: Gulf News (n.d.); World Bank (2024).

The Khorezm solar plant, for example, is expected to generate more than 240 GWh annually upon commissioning, reduce CO2 emissions by over 230,000 metric tons per year, and supply approximately 60,000 households, illustrating the typical scale of individual FDI-backed projects in this sector (World Bank, 2024).

Finally, Table 4 documents the inconsistency in Uzbekistan's officially and institutionally stated 2030 renewable energy targets, which varies depending on the source and year of publication.

Table 4. Stated 2030 renewable energy targets for Uzbekistan across different sources

Source and year	Capacity target by 2030	Renewable electricity share target
World-Energy (2024)	>18,000 MW (solar and wind)	40%
World Bank (2024)	25 GW	40%
OECD (2025)	21 GW	54%
Energy Prof (2025)	27 GW (including hydro)	40%

Source: World-Energy (2024); World Bank (2024); OECD (2025); Energy Prof (2025).

The spread across these four sources — from 18 GW to 27 GW in capacity terms, and from 40% to 54% in renewable-share terms — is too large to be attributed to rounding or minor definitional differences alone. It most likely reflects a combination of evolving official targets over time, different scopes (e.g., solar and wind only versus all renewables including hydro), and secondary reporting of announcements that were not always precisely sourced. This finding is treated in the paper as a data-quality limitation rather than as evidence of any single "correct" target.

5. DISCUSSION

The results confirm that foreign direct investment, channeled primarily through PPP tenders since 2022, has been the principal driver of Uzbekistan's renewable capacity expansion, consistent with the OECD's assessment that the country is "on track" to meet its renewable targets (OECD, 2025). The scale of investment — USD 35 billion in the energy sector in 2025 alone, and roughly 55% of total installed generation capacity tendered to foreign investors since 2022 — is substantial by regional standards and reflects a deliberate, internationally supported policy strategy involving the ADB, World Bank, and private developers such as Masdar, ACWA Power, and Voltalia.

However, the identified gap between grid-connected and officially counted capacity, together with independent estimates of curtailment affecting roughly a third of renewable output, suggests that the economic value of this FDI is not yet being fully realized. This pattern — successful attraction of generation investment outpacing transmission and system-management capacity — is consistent with experiences documented in other rapidly expanding renewable energy markets, where grid bottlenecks, rather than generation capacity itself, become the binding constraint on further progress (Energy Prof, 2025).

The inconsistency in stated 2030 targets across sources also has practical implications: it complicates any external assessment of whether Uzbekistan is genuinely "on track," since the answer depends heavily on which target is used as the benchmark. From an academic standpoint, this points to a need for Uzbekistan's government to publish and consistently maintain a single, dated, and clearly scoped renewable energy target, rather than allowing multiple figures to circulate across different reports and years.

6. RECOMMENDATIONS

- The Ministry of Energy should synchronize transmission and distribution infrastructure investment schedules with renewable generation tenders, so that new solar and wind capacity can be fully utilized upon connection rather than curtailed.
- Regulatory procedures for formally classifying grid-connected renewable capacity as "installed" should be streamlined, so that official statistics more accurately reflect the electricity already being supplied to the grid.
- The government should publish a single, consistently maintained 2030 renewable energy target (capacity and share of generation), explicitly dated and scoped, to reduce the ambiguity currently observed across different official and institutional sources.
- Given the scale of FDI already committed to generation (2,567 MW of solar and 900 MW of wind under foreign development), transmission-focused PPPs — modeled on the generation PPP framework already in use — should be prioritized to close the current infrastructure gap.
- Independent, regularly updated public reporting on curtailment levels should be introduced, enabling both investors and policymakers to monitor the extent to which generation capacity is being economically utilized.

7. CONCLUSION

This analysis shows that foreign direct investment has driven a substantial and rapid expansion of Uzbekistan's renewable energy generating capacity between 2022 and 2025, with total installed capacity growing by nearly 19% within 2025 alone and renewables reaching a 30% share of the national grid. At the same time, the study identifies a structural bottleneck: roughly half of the solar and wind capacity currently under foreign development is grid-connected but not yet formally counted

as installed, and independent estimates suggest that around a third of renewable electricity generated is currently curtailed due to transmission and system-management constraints. Uzbekistan's own stated 2030 renewable targets also vary considerably across official and institutional sources, complicating external assessment of progress.

The scientific contribution of this paper lies in bringing together FDI, capacity, and grid-infrastructure data that are typically reported separately, and in explicitly documenting the inconsistency in Uzbekistan's stated renewable targets as a distinct data-quality issue. Its practical significance lies in recommendations for aligning transmission investment with generation capacity growth and for standardizing target reporting. Future research should track curtailment levels and the installed-capacity counting gap over time as more FDI-backed projects reach commissioning.

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