China's Renewable Ambition: Provincial Pathways Toward a Renewable Powerhouse

This is a report summary of iGDP's Provincial 15th Five-Year Plan Renewable Energy Target & Potential Evaluation, which integrates Energy Policy Simulator (EPS) modeling results, provincial progress tracking, and a policy review to identify the key regional drivers behind China's path to 3.6 TW by 2035.

China's new commitment to reach **3.6 TW of installed solar and wind capacity by 2035** marks a major acceleration of its energy transition and a new phase of renewable expansion.

At the subnational level, iGDP analysis reveals that most provinces have **huge potential for further increasing their renewable installed capacity target** for the years 2030 and 2035, given several major dynamics:

- Power demand will continue to rise noticeably.
- All provinces will need to peak electricity sector emissions before or around 2030, meaning renewable must take up most of the incremental electricity generation.
- Most provinces have already reached their 2025 and even 2030 solar and wind capacity targets ahead of schedule.

Regional capacity-addition patterns

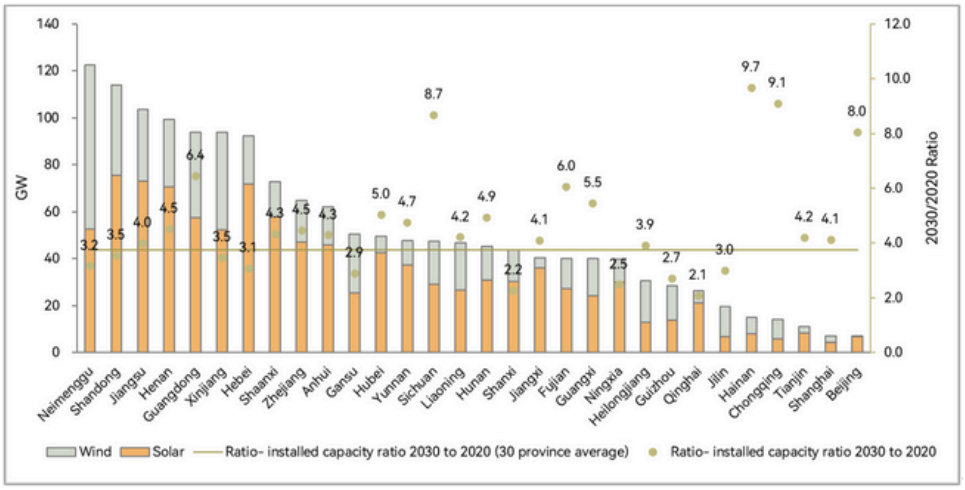
Our analysis finds clear regional differences in future capacity additions.

Northwest and northern provinces—notably Inner Mongolia, Gansu, Ningxia, and Xinjiang—will remain the backbone of large-scale renewable deployment. Abundant land, rich solar and wind resources, and rapidly declining costs continue to enable faster renewable expansion. Many of these provinces are projected to see cumulative wind-solar capacity several times higher than in 2020.

Eastern and coastal regions will focus on distributed solar and offshore wind. With limited land availability and high electricity demand, provinces such as Shandong, Jiangsu, and Guangdong will prioritize distributed PV and offshore wind projects to increase local renewable supply.

Central provinces like Henan and Anhui show strong growth potential as industrial relocation and demand expansion shift part of the country's load center inland.

Figure 1. Forecast of solar and wind capacity additions (2020-2030) under Dual Carbon Scenario



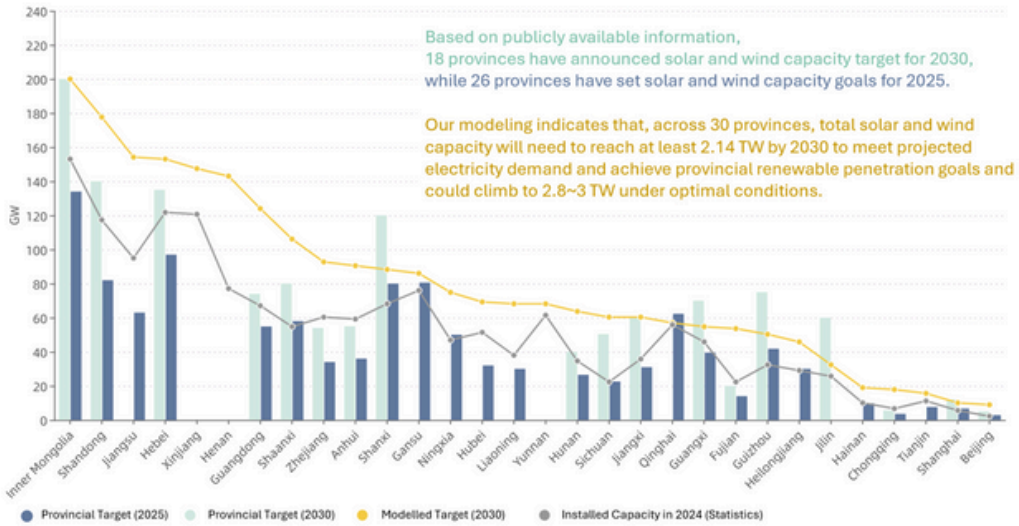
iGDP modeling shows that more than half of China's total solar and wind capacity additions between 2020 and 2030 will come from ten provinces, led by Inner Mongolia, Shandong, Jiangsu, Henan, and Guangdong. Solar PV will be the primary source of this growth, followed by wind. This **geographic concentration**, closely matching areas of rising power demand, requires a more **flexible system and enhanced transmission** to ensure energy security and high utilization rate.

Targets reached early

China's renewable expansion has consistently outpaced policy expectations. **The 2030 target of 1.2 TW** for solar and wind was achieved by 2024, six years in advance. At the subnational level, the trend repeats. Many provinces had already met or exceeded their 2025 targets by 2024. Four provinces—Zhejiang, Anhui, Fujian, Chongqing—have reached or surpassed their 2030 goals years ahead of schedule.

This rapid progress is driven by falling technology costs, continuous investment in utility-scale and distributed projects, and the momentum generated by national carbon-neutrality and energy-security objectives. The pattern also suggests that the provincial targets set in the "14th Five-Year Plan" may have been conservative and will likely need to be revised upward to attract more investment and stay aligned with China's 2035 vision, as well as the global "tripling target."

Figure 2. Solar and wind capacity target vs. 2024 progress and model projection

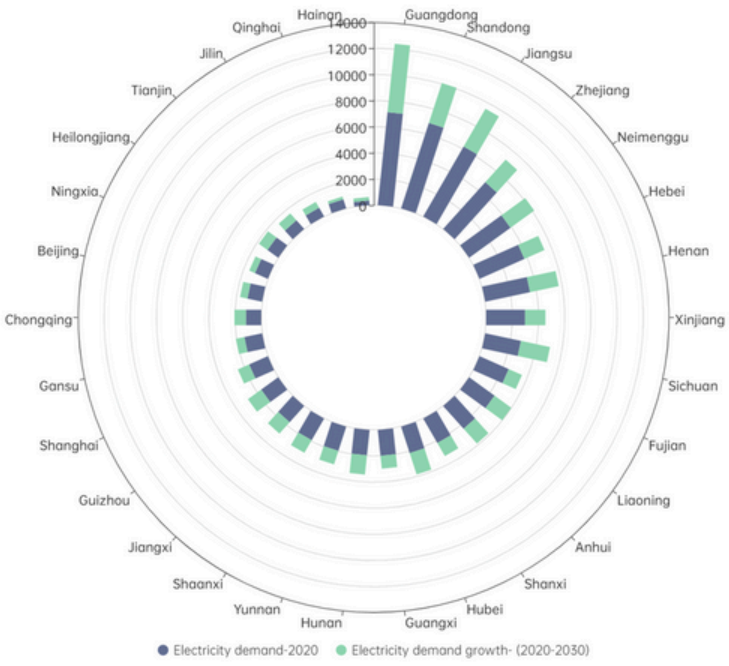


Eastern provinces driving demand growth

While the northwest leads on supply, the **east and south are driving demand growth**. Coastal provinces — Guangdong, Jiangsu, and Shandong — are experiencing surging electricity demand driven by new manufacturing and rapid electrification. Moreover, these provinces are leading the **green power and certificate markets**, with Guangdong, Zhejiang, and Jiangsu ranking among the top in **Green Electricity Certificate (GECs) and green electricity trading volumes**, signaling strong corporate demand for renewable procurement.

To stay competitive against the low-cost power available in the northwest, these provinces will need to expand renewable generation fast enough to meet growing demand and keep energy prices attractive for industry sector. Because land is scarce, renewable expansion will rely on **distributed PV and offshore wind**, with importing more renewable generation from other provinces as an alternative.

Figure 3. Electricity demand in 2020 and growth from 2020 to 2030 (Unit: 100 GWh)



Transmission and market reform: the critical enabler

Sustaining rapid renewable growth depends on **system integration**—not just capacity build-out. The two enabling conditions are transmission and electricity market reform.

Cross-regional transmission capacity needs to expand quickly. Curtailment risks could rise if renewable additions outpace the development of inter-provincial transmission capacity. Coordinated planning between generation and transmission is crucial to ensure that surplus renewable electricity can reach high-demand areas.

Power market reform should be accelerated to align with higher renewable penetration. China's electricity-market reform is advancing quickly: policy requires all provinces to establish continuously operating **spot markets** by end of 2025. This was completed in November. In 2025, China also issued "Document 136", which requires renewable power to be fully integrated into market trading with protective mechanisms. To ensure a cost-effective and reliable transition, spot and ancillary markets must send clear, consistent price signals that encourage flexibility from renewables, storage, demand-side users, and coal fired power plants alike.

Looking ahead: from expansion to coordination

China's march toward **3.6 TW of solar and wind by 2035** marks a shift from quantity to quality — from expansion to integration. China's achievement of the previous NDC targets and rapid cost reductions demonstrate that the **transition is already underway**. iGDP's provincial analysis shows that the **northwest** will remain the engine of large-scale renewable supply additions, while the **east and south** will lead demand-side market integration in near to mid-term.

To align local actions with national ambition, iGDP's analysis calls for three priorities:

- **Raise renewable targets** in high-demand, early-achiever provinces.
- **Build flexibility** through storage, demand response, and market-based ancillary services.
- **Advance grid infrastructure and market integration** to ensure efficient transmission and consumption of renewable generation.

China's next energy transition chapter will be written province by province — and powered by a grid that's as clean and flexible as it is vast.

Methodology and modeling approach

The projections in this analysis build on ***iGDP's EPS China 30-Provinces Base Model***, which quantifies energy demand, capacity expansion, and GHG emissions trajectories across **30 provinces**. The EPS model integrates economic, demographic, and energy-technology parameters to simulate how policy interventions —such as renewable generation share, carbon market reforms, and electrification rates—affect regional energy system and power-sector emission. The model is built using public data (official statistics and planning documents) and calibrated against 2024 statistics to ensure internal consistency between national and provincial totals.

Two scenarios were analyzed: a **2020 Frozen Policy Scenario (BAU)** and a **Dual Carbon Scenario** aligned with China's 2060 goals. The **dual carbon scenario** assumes accelerated electrification, a higher renewable consumption target, stronger energy saving, etc. The model assumes steady GDP and population growth consistent with provincial medium- and long-term development plans, as well as progressive grid expansion and efficiency improvement.

Note: 30 provincial regions were modeled and analyzed in this report due to data availability.

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