

Press release

Case study: Inner Mongolia ripe to play pivotal role in decarbonisation of China's power sector

HELSINKI/BEIJING, 30 September 2024 – For nearly the past two decades, Inner Mongolia has been building up to become a power house of renewable energy production and exports. Today, the region's large-scale clean energy bases are now more cost competitive than exports from neighbouring provinces or local resources.

According to a new case study from the [Centre for Research on Energy and Clean Air](#) (CREA) and [WaterRock Energy Economics](#), following up from last year's report, '[Resolving near-term power shortages in China from an economic perspective](#)' (CREA, WaterRock, 2023), Inner Mongolia, as China's biggest renewables producer and exporter, is now positioned to play a key role in accelerating the decarbonisation of the country's power sector, with the crucial support of government policies.

As of the end of June 2024, Inner Mongolia had 27 gigawatts (GW) of installed solar power and 76 GW of installed wind capacity, with over 50 GW of solar and more than 100 GW of wind in the pipeline. Currently, Inner Mongolia plans to build four clean energy bases in 'unused' land such as its arid, desert, and barren areas. Each base is to comprise 8 GW solar, 4 GW wind, 4 GW supporting coal, and one dedicated ultra-high voltage (UHV) line.

Yet, whilst the region has been operating five UHV lines since 2018, their utilisation rates have been less than 40%, and the annual renewable share for the exports via those UHV lines has been lower than 40%.

The low utilisation rates of UHV lines are mainly driven by two factors:

- poor alignment between different segments such as UHV line construction, associated large-scale clean energy projects, local grid enhancement projects, and potential demand from importing provinces; and
- overly rigid inter-provincial trading agreements whose negotiation is mainly driven by provincial governments and provincial grid companies.

Accelerating the approval and building of dedicated UHV lines and adopting the latest transmission technologies are necessary to avoid renewable curtailment issues and enable a high renewable share in the export market.

China's focus should now be to incentivise investment in a portfolio of highly flexible capacity and solutions, including battery energy storage solutions (BESS), pumped hydro storage, open cycle gas units, and concentrated solar plants and demand response solutions, in both sending and receiving provinces.

Developers will also need to consider that a higher share of the inter-provincial power flow from the large clean energy bases will be intermittent wind and solar sources, which will result in increasing short-term operational complexities. This will necessitate enhanced trading arrangements, including the provision of regular annual, monthly, and multi-day trading in the power exchanges as well as inter-provincial or regional day-ahead and real-time wholesale spot electricity markets.

In addition, multi-year direct long-term power purchase agreements (PPAs) between RE developers and large corporations in receiving provinces should be allowed and facilitated. This could help increase the bankability of the large energy bases, reduce price volatility, and fully reflect the market value of green attributes of new solar and wind projects.

Careful coordination of project development for different segments is also essential to avoid any potential bottlenecks when developing these ambitious projects.

'As Inner Mongolia develops its large clean energy bases with associated UHV lines, China's power system will become increasingly complicated. We strongly encourage the Chinese regulators to continue to reform inter-provincial power trading and pricing so as to provide the right incentives for short-term power operation and long-term power investment across different provinces in China. The grid companies can also continue to innovate and adopt the latest transmission and distribution technologies so as to increase grid flexibility and truly move to smart grids in which renewables make up the bulk of power generation. All the key stakeholders in the power sector could capitalise on these trends to peak China's carbon emissions before 2030 and achieve carbon net zero before 2060,' said WaterRock Energy Economics Director, Liutong Zhang.

'Inner Mongolia has the opportunity to better assess the role that existing coal power plants can play in supporting the future large-scale clean energy bases. By fully utilising current resources and avoiding excessive new coal power construction, the region can prevent stranded assets and reduce challenges to the green transition. With improved planning and coordination, Inner Mongolia can also serve as a model for other provinces in their green transition effort,' said Qi Qin, China Analyst at CREA.

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About CREA

The Centre for Research on Energy and Clean Air (CREA) is an independent research organisation focused on revealing the trends, causes, and health impacts, as well as the solutions, to air pollution. CREA was founded in December 2019 in Helsinki and has staff in several Asian and European countries. The organisation's work is funded through philanthropic grants and revenue from commissioned research.

www.energyandcleanair.org

About WaterRock Energy Economics

[WaterRock Energy Economics](#) provides economic and commercial consulting services on the electricity and gas sector to governments and businesses in Asia. In the past six years, our clients have engaged us on a wide range of matters ranging from assessing opportunities and risks of investing in renewable, battery energy storage solutions and gas/LNG projects in Asia, to economic analysis and quantitative forecasting for renewable and flexible capacity in Asia and regulatory support on electricity market design in Singapore, the Philippines, Malaysia and China.

About the data

WaterRock Energy Economics analysis in the report is based on an array of different publicly available data sources including: China Statistical Bureau, China Electric Council, National Energy Administration, State Grid, Inner Mongolia Electric Power Group, New Energy Consumption Monitoring and Warning Centre, Inner Mongolia Engineering Consulting Association, Inner Mongolia government and publicly available news clips.