Grid modernization beijing

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If power is the lifeblood of a modern economy, China is getting an arterial upgrade. The world"s second biggest economy has launched a massive campaign to modernise and expand its electricity grid, with planned investments worth 3 trillion renminbi ($415 billion) over the five years from 2020- 2025.

Policymakers in Beijing are determined to supercharge the country"s grid system into one of the fastest and "smartest" in the world. As the country"s economic growth slows in other areas, undertakings like grid modernisation are set to benefit from China"s more targeted approach to infrastructure stimulus and rising demand for greener energy. The implications for investors cut across a swathe of sectors.

A smart grid is a network enabling two-way flows of electricity and usage data, with digital communication and automation technologies. Departing from the traditional mode of one-to-one transmission, smart grids can use artificial intelligence to match dynamic supply and demand across multiple regions. With great flexibility, they can smooth out the transmission of renewable energy whose supply is often highly volatile.

Even as China"s broader economic outlook sees headwinds from softening consumption, a property downturn, Covid-related lockdowns and geopolitical tensions, we expect to see investments in dynamic areas like smart grid tech emerge as powerful drivers of economic growth.

Within China, as wind and solar become more widely adopted, their comparatively more volatile status as sources of power generation poses serious challenges for traditional grids, which are typically designed to transmit steady coal-fired power. The often remote locations of windfarms and solar plants, away from the population centres where energy demand is greatest, also add to China"s need for grid upgrades to ensure more efficient transmission, storage and allocation of electricity.

In response to the challenges, Chinese grid builders have designed artificial intelligence systems for monitoring and routing electricity based on supply fluctuations. These AI-powered grids can also interact with large consumers of electricity to accommodate their changing needs. China"s largest grid operator, the State Grid Corporation, has ranked globally among the top AI patent applicants in recent years, according to the World Intellectual Property Organization, almost rivalling global technology giants like IBM, Microsoft, Toshiba and Samsung.

China has also developed cutting-edge technologies for long-distance transmission at ultra-high voltages (UHV) that are unmatched by grids in Western countries. The newest UHV networks in China can transmit direct currents at as high as 1,300 kilovolts, far above Europe"s top voltage levels. Today, China"s UHV lines have a total installed length of more than 40,000 km, and are expanding fast.

Transmission efficiency has been greatly improved on the UHV networks, which helps reduce China"s

idiosyncratic imbalance between new-energy supply and demand. Unlike Europe, where a large portion of renewable energy can often be locally consumed, China has to match the majority of demand from its eastern provinces with supply concentrated in its western parts. Wind and solar power travels as far as 3,000 km from remote inland areas to the economic powerhouses along the country"s eastern and southern coastlines.

Looking ahead, while the main focus is on opportunities at home, we think some of China"s rising smart grid firms also have the potential to become strong exporters as the country begins selling grid technology and equipment overseas. Already, the State Grid has started building UHV lines in Brazil, while China Southern Grid, the country"s second-biggest grid operator, is in charge of a converter station project in the Philippines. In Europe, Chinese state-owned giants have participated as investors in several grid projects, as they seek to tap developed markets.