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ADIPEC

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ENERGY IN CONTEXT SERIES

# FINANCING A JUST, ORDERLY AND EQUITABLE TRANSITION



CASE STUDY

Closing the energy gap:  
Equitable electrification  
partnership

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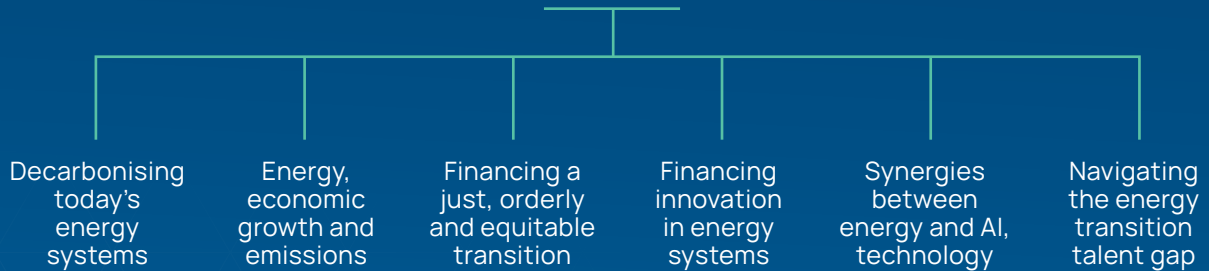
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# Closing the energy gap: Equitable electrification partnership

## CONTEXT

Kazakhstan's power industry has gone through dramatic changes in the last three decades. Its vertically integrated system has been unbundled into generation, transmission, and distribution. Now, it is time for its ageing electricity grids to modernise.

Creating an electric grid for the 21st century has enormous benefits. It can help improve system efficiency, reduce costs for both electric consumers and companies, allow for the integration of renewable energy generation and distribution, and help lower carbon and other emissions.

The country's recent collaboration with the Asian Development Bank (ADB) will enable it to upgrade select substations and facilitate the integration of large-scale electricity generation into a unified network.

## PARTNERSHIPS THAT MAKE ENERGY TRANSITION MORE INCLUSIVE

In 2017, the Kazakhstan Electricity Grid Operating Company (KECOG) signed an agreement with ADB, through which the bank would invest US\$122.2 million to strengthen the power grid in southern Kazakhstan. The agreement is in line with the country's efforts to lower emissions from its energy sector and make it more reliable, affordable, and efficient.

The funding will expand the high-voltage transmission network by constructing 500 kV overhead transmission lines stretching for 475km.

### 222

Number of power plants in Kazakhstan as of Jan 2024<sup>5</sup>

### US\$24.1tn

Global investment needed in power grids by 2050 to support net-zero scenario<sup>2</sup>

### 58bt

Amount of additional carbon emissions between 2030 and 2050, if grid expansion is delayed globally<sup>3</sup>

### 111Gm

Projected length of powerlines needed by 2050 to meet climate goals<sup>6</sup>

### Organisations involved

- Asian Development Bank
- Kazakhstan Electricity Grid Operating Company

### Investment

US\$122 mn

### Location

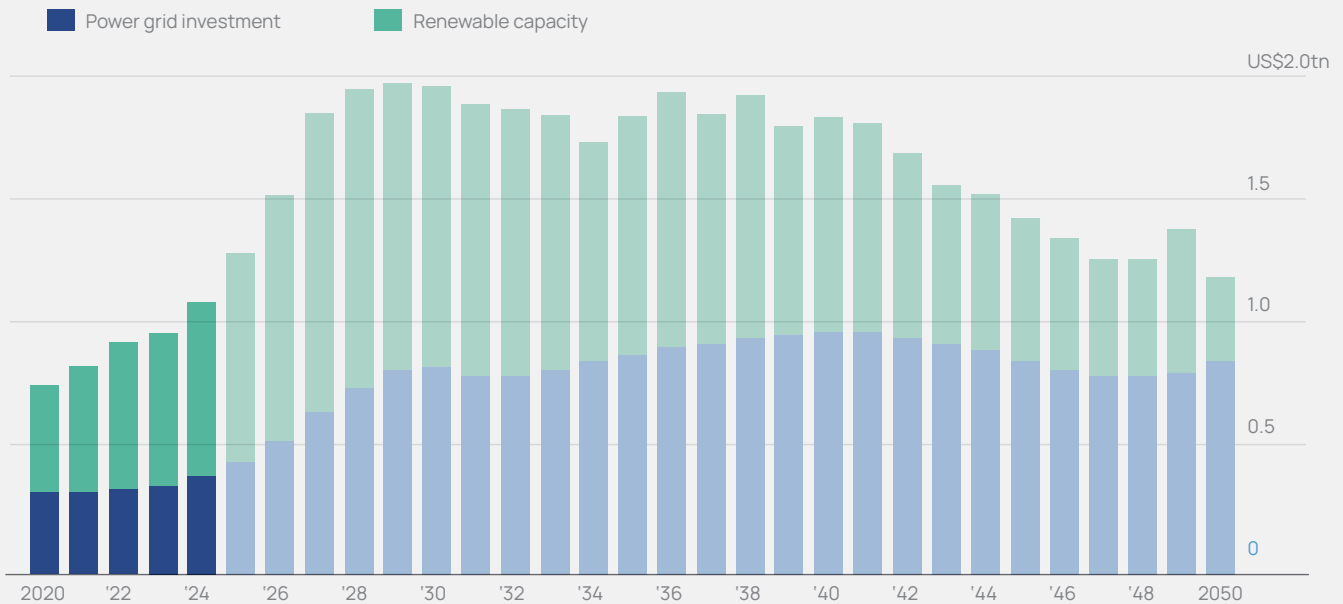
Kazakhstan

### Industry

Energy

## Global annual spending versus renewables for net zero

As clean energy transitions advance, the role of electricity will be prominent, making grids even more important for society and economies



Source: BloombergNEF

Additionally, the Shu, Jambyl, and Shymkent substations will be modernised to boost the capacity of the power grid by 75%<sup>1</sup>.

Increasing the transmission capacity of these substations is crucial for enhancing the country's renewable energy capacity, improving the reliability of electricity supply, and reducing energy losses. The reliability of the electricity supply network will also improve the quality of life for people and facilitate electricity exchange with the Central Asian Energy System, allowing Kazakhstan to export energy.

Nabi Aitzhanov, CEO of KEGOC, said: "The new architecture of the national power grid will enable us to integrate the significant potential of renewable and traditional energy sources in southern Kazakhstan into the national power balance. Our export and transit potential will increase significantly, and the energy security of the entire region will be enhanced."

Power generation in Kazakhstan increased by 124% between 2000 to 2022. During the same time period, energy consumption per capita increased by 74%<sup>7</sup>. However, the Southern Zone has been facing a peak

demand deficit, prompting the need for increased production to meet rising demand.

The expansion will integrate large-scale renewable energy into the grid, enhance power transmission stability in southern Kazakhstan, and strengthen the country's energy security. Once completed, this power grid will contribute to the country's ability to meet its nationally determined contributions (NDCs) under the Paris Agreement, which include reducing GHG emissions by 15% from 1990 levels by 2030 and achieving carbon neutrality by 2060.

Power grids in Kazakhstan need expansion and modernisation, much like in many countries, to meet growing energy needs. The current infrastructure in Kazakhstan is ageing, with approximately 65% of equipment in power generating facilities having been in use for more than 20 years, and about 31% for more than 30 years. Not to mention, electricity transmission networks are inefficient, with estimated losses of 15%.

Modernising grids is essential for supporting the energy transition. Despite the potential of renewable

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sources like solar and wind, significant infrastructure is needed to transmit energy from remote areas and ensure supply when sunlight is unavailable.

Globally, grid networks must extend by 111 gigametres (Gm) over the next two and a half decades to meet demands<sup>2</sup>.

The next two decades are crucial: countries must expand their grids at a pace and scale that matches the achievements of the past 140 years if we are to meet climate goals. In fact, global investment in power grids will need to outpace spending on renewable energy to achieve net-zero emissions by 2050. To put things in perspective, building net-zero grids could cost nearly US\$24.1 trillion by 2050, representing two-thirds of anticipated renewable energy expenditure<sup>2</sup>.

Delays in grid expansion could lead to an additional 58 billion tonnes of carbon dioxide emissions between 2030 and 2050, equivalent to the emissions from all the world's power plants over the past four years<sup>3</sup>.

In 2023, the International Energy Agency (IEA) highlighted that most countries are falling behind in constructing the necessary power lines and grids to support clean energy technologies. Countries will need to double their investment in transmission lines and infrastructure to US\$600 billion per year by 2030<sup>4</sup>.

Kazakhstan has achieved several energy transition milestones in the region. This latest project to modernise its grids could set a valuable precedent and inspire other countries in the region to invest in their own grid infrastructure. Financing grid modernisation is crucial not only for meeting global carbon emissions targets but also for enhancing energy security.



“The new architecture of the national power grid will enable us to integrate the significant potential of renewable and traditional energy sources in southern Kazakhstan into the national power balance. Our export and transit potential will increase significantly, and the energy security of the entire region will be enhanced.”

**Nabi Aitzhanov**  
CEO of KEGOC

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