Energy in Kazakhstan

Power Generation and Distribution Industry

U.S. Commercial Service

Summary

• The forecast for 2012 power generation output is 90.3 billion kilowatts per hour (kWh)

• Kazakhstan's 2011 power generation output is expected to reach 86.6 billion kWh

• In 2010, power generation amounted 82.7 billion kWh

• Kazakhstan's power generation sector is projected to boost total capacity to 124.5 billion kWh by 2015.

• Kazakhstan plans to attract approximately $21 billion of investment in electric power development by 2015.

Industry Overview

Kazakhstan’s electrifying growth:

• Power generation amounted to 82.7 billion kWh in 2010, and the Government of Kazakhstan estimates that this will increase to 97.9 billion KWh by 2014, with consumption totaling 96.8 billion KWh and exports amounting to 1.2 billion KWh. The average annual growth rate of power generation is thus projected to be 4.4%.

• About 75% of power is consumed by industry, 11% by households, and 2% by transportation.

• 11 power plants, generating 50% of electricity, are owned by large industrial companies and generate electric power for them. Large industrial enterprises consume about 40% of Kazakhstan’s electricity.

• The government program for “Accelerated Industrialization and Innovation” foresees investments in the electric power industry to total $6.8 billion between 2011-2014. This is approximately 11% of all investments under the program or 1.1% of GDP annually.

• Kazakhstan is looking for ways of using renewable energy sources. Wind power and hydropower are considered to be the most promising options. Currently, 0.5% of power is generated from renewable energy sources in Kazakhstan. The “Electric Power Industry Development Program” demands that 1% or 1 billion KWh of power per year are generated from clean energy sources by 2014.
The electric power industry remains a key factor in Kazakhstan’s industrial development and economic growth. Electric power generation accounts for approximately one tenth of Kazakhstan’s industrial output, while thermal power stations in Karagandy Province and Pavlodar supply almost half of the total power generation. Kazakhstan ranks third among CIS countries in terms of electric power generation.

Kazakhstan's power generation industry has undergone a challenging and painful post-Soviet transformation. The production and consumption of electricity in Kazakhstan fell significantly following independence in 1991. This was followed by an aggressive privatization program, followed by state involvement in a few generation companies. Robust economic growth since 2000 has helped boost generation to 78.9 billion kilowatt-hours (kWh) in 2007 and consumption to 76.9 billion kWh. In 2008, consumption reached 80 billion kWh.

Due to the financial and economic crisis, generation of electricity in 2009 decreased to 78.4 billion kWh and consumption to 77.9 billion kWh, as production stagnated in metallurgical plants and the construction industry. Power generation amounted 82.7 billion kWh in 2010. This is 4.8% more than in 2009, when both power generation and consumption decreased slightly due to decreased industrial production. In the first quarter of 2011, power generation grew 6.7% year-on-year. In 2011, Kazakhstan's power generation output is expected to reach 86.6 billion kWh. The forecast for 2012 power generation output is 90.3 billion kWh.

The Government of Kazakhstan has developed an action plan for electric power development through the year 2015 which includes a list of power plants for reconstruction and modernization as well as the construction of new ones.

Kazakhstan's power generation sector is projected to boost total capacity to 124.5 billion kWh by 2015. However, the technology in existing electric power plants can only accommodate energy production up to 80 billion kWh. The country’s plans to modernize existing facilities and construct new power plants would not only provide electric power to Kazakh consumers but also increase reserve capacity and export potential.

Kazakhstan's economic development plan for 2010-2015 calls for the upgrade of power facilities, the launch of a North-South power transmission line, and the construction of small hydropower plants. For the program's implementation, new production facilities are needed and existing electricity producers have to be refurbished. The program envisions the installation of a gas turbine electricity station capable of producing 56 megawatts in Western Kazakhstan, an electricity station in Karachaganak (120 megawatts), a gas turbine plant at the company SIPS-Aktobemunaigaz (48 megawatts), and another in the country's south (60 megawatts). Small hydroelectric stations along the rivers in the Almaty region will be refurbished, and a pilot project for the building of wind-powered generators in the region is also planned. For all these projects, Kazakhstan plans to attract approximately $21 billion to electric power development by 2015, according to the president of the Kazakhstan Electric Grid Operating Company (KEGOC).

At the same time, the construction of new power plants and the expansion of power distribution networks are being discussed and will likely be implemented in the medium term. Some observers project steady growth in the market for a wide range of power generation and distribution equipment.
The slow pace of development of Kazakhstan's electricity generation and distribution network is of increasing concern, given the rapid growth in the economy and the subsequent increase in energy demand. Electricity generation is expanding by around 5% annually, with consumption growing at a slightly faster rate, but the country's generating stations are working at only 65% capacity, owing to a lack of investment. The development of nuclear energy, which would make use of Kazakhstan's uranium resources, is one proposal favored by the government. Both Russia and Japan have expressed interest in working with Kazakhstan to construct a nuclear power station, possibly in Aktau on the Caspian coast. In the meantime, Kazakhstan is likely to become increasingly reliant on imports of electricity from its neighbors, the Kyrgyz Republic in particular, where Kazakh companies are seeking to invest in the construction of new hydropower plants.

Currently, the electric power sector has three levels of transmission networks including interregional, regional, and local networks. Interregional networks include high voltage lines (1150, 500 and 220 kW) transmitting energy from producers to the largest regional networks and users. Regional level networks include 220 kW lines transmitting energy from interregional substations to smaller end-users and redistribution (wholesaler) enterprises. Local networks have lines supplying energy to individual end-users and households.

Kazakhstan has 71 power plants including five hydroelectric power stations, giving the country an overall installed generating capacity of 17 gigawatts (GW), 80% of which are coal fired and 12% of which are hydroelectric. Almost 75% of the country's power generation comes from coal-fired plants located in the northern coal producing regions. Kazakhstan's hydroelectric facilities are located primarily along the Irtysh River which flows from China across northeast Kazakhstan.

The decade-long decline in Kazakh electricity consumption has come primarily at the expense of thermal power, while consumption of hydroelectric power has remained constant. As a result, hydropower now accounts for almost 10% of Kazakhstan's electricity consumption, more than twice its percentage in 1992. This makes the Irtysh River, which starts upstream in China's Altai Mountains, increasingly important as a source of hydropower. Kazakhstan and China have held joint negotiations on management of the Irtysh River since 1999 when there was a dispute over water rights and management.

Overall, 94% of Kazakhstan's gas turbines, 57% of its steam turbines, and 33% of its steam boilers have been in use for more than twenty years. Electricity transmission networks are inefficient with losses during transmission and distribution estimated at approximately 15% of energy produced, although the actual number may be higher.

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