

# Renewable Energy Data and Decision Support for Kazakhstan – RE Data Explorer in Action

## Background

In 2012, the Government of Kazakhstan announced Strategy 2050, an ambitious national plan for widespread economic and social development with the goal of positioning Kazakhstan among the top 30 global economies by 2050. A key component is a commitment to transition Kazakhstan's fossil-fuel heavy power sector to 50% renewable energy by 2050, with an interim goal of 10% by 2030.

In 2016, with support from the United States Agency for International Development (USAID) Central Asia Mission and the U.S. Department of State Leadership Compact, and in collaboration with the Government of Kazakhstan and other Central Asian governments NREL launched the RE Data Explorer for Central Asia, including world-class wind and solar resource data for Kazakhstan and surrounding countries. The RE Data Explorer paved the way for additional collaboration with USAID on Kazakhstan's first ever renewable energy auctions and grid integration modeling.

## Key Decisions and Impacts

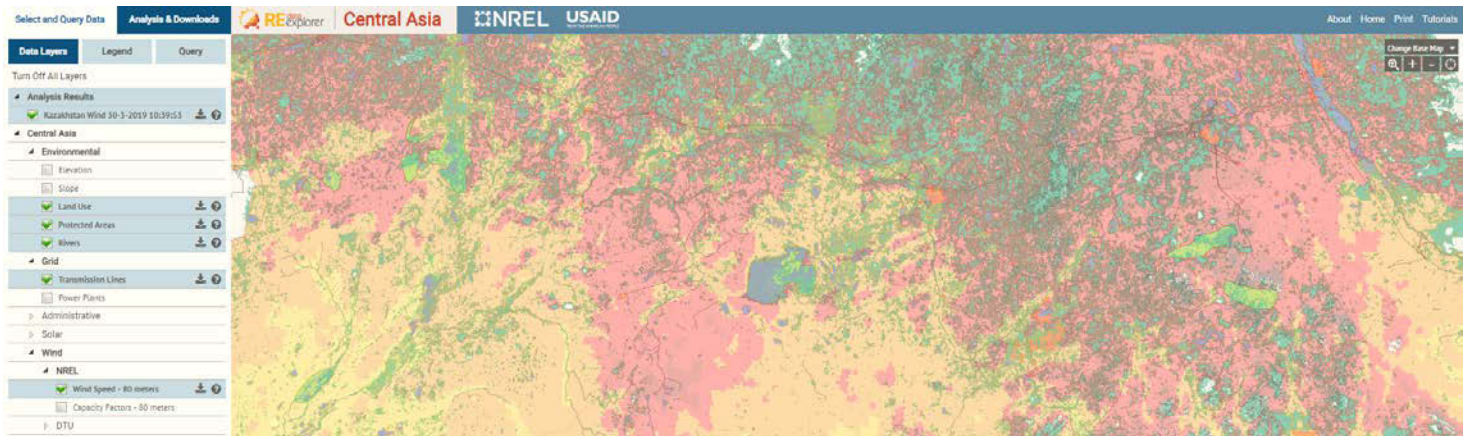
**Power System Planning and Grid Integration.** Datasets and tools provided by the RE Data Explorer are being used to inform power sector planning and grid integration analysis at the Kazakhstan Electricity Grid Operating Company (KEGOC). In collaboration with USAID and NREL, KEGOC is developing a state-of-the-art simulation model of Kazakhstan's power system. This effort helps power system operators and planners understand how planned solar and wind power integration will impact power system operations, conventional thermal power plants, and transmission networks. An important component of this analysis is the wind and solar

### What is the RE Data Explorer?

The RE Data Explorer is a user-friendly geospatial analysis tool for analyzing renewable energy potential and informing decisions. Developed by the National Renewable Energy Laboratory (NREL) and supported by the U.S. Agency for International Development (USAID), RE Data Explorer performs visualization and analysis of renewable energy potential that can be customized for different scenarios.



Photo credit: First Wind Power Plant LLP with permission of the Financial Settlements Center of Renewable Energy LLP.



The Central Asia RE Data Explorer is being used by policymakers and power-sector stakeholders to inform the development of a local renewable energy industry. In Kazakhstan, the RE Data Explorer is informing the selection and verification of sites that will host wind and solar energy projects. Tools and data from the RE Data Explorer are being used to assess the energy potential of specific wind and solar projects and are identifying additional sites that may be suitable for future auction rounds.

resource data used in KEGOC’s planning models. These data are drawn from the RE Data Explorer for Central Asia, which serves as a key source and repository for high-resolution wind and solar resource data that meets international standards for data quality.

**Informing Renewable Energy Auctions.** The first renewable energy auctions in Kazakhstan were held in spring 2018. This landmark event represented the first time local and international renewable energy developers were able to compete for rights to build large-scale clean energy projects in a transparent and competitive online bidding platform in the region. The RE Data Explorer provided and continues to provide important insights for local organizations involved in developing, launching, and running Kazakhstan’s renewable energy auctions. The Technical Potential Tool is used to assess potential locations for future solar and wind energy auction rounds, helping to narrow down areas with good solar and/or wind resources, suitable land area, and proximity to centers of demand and transmission infrastructure. The Data Download Tool provides access to high-quality modeled wind resource data (15-minute resolution) for all points in Kazakhstan including wind speed, wind direction, air pressure, and temperature at heights from 80 to 120 meters. Solar irradiance data is also available. Local project developers, government planning agencies,

### What is NREL’s System Advisor Model?

NREL’s System Advisor Model (SAM) is a performance and financial model designed to estimate the cost of energy for grid-connected power projects based on installation and operating costs and system design in order to facilitate decision making for people involved in the renewable energy industry. For more information, visit <https://sam.nrel.gov/>.

and other power system stakeholders use the tool to download these data free-of-charge, then use NREL’s System Advisor Model to estimate the energy generation potential and financial performance of wind and solar energy projects in specific locations.

RE Data Explorer was developed by NREL and is supported by USAID and the U.S. Department of State. The following partners provide data to support diverse applications of RE Data Explorer: the Consultative Group for International Agricultural Research (CGIAR), Carbon Monitoring for Action (CARMA), Danish Technical University (DTU), De Conto Piscinas, Entec ESCO Vietnam, Environment Operations Center (Greater Mekong Subregion), Environmental Systems Research Institute (ESRI), European Space Agency (ESA), Global Administrative Areas Database, International Food Policy Research Institute, Japan External Trade Organization, Open Development Cambodia, OpenStreetMap, Protected Planet, Socioeconomic Data and Applications Center (SEDAC), The World Bank, and the World Resources Institute (WRI).

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[www.re-explorer.org](http://www.re-explorer.org) | [www.nrel.gov/usa-id-partnership](http://www.nrel.gov/usa-id-partnership)

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Renewable Energy (RE) Explorer provides renewable energy data, geospatial analysis tools, and technical assistance to support data-driven renewable energy decision making. The RE Explorer was developed by the National Renewable Energy Laboratory and are supported by the U.S. Agency for International Development.

The USAID-NREL Partnership addresses critical challenges to scaling up advanced energy systems through global tools and technical assistance, including the Renewable Energy Data Explorer, Greening the Grid, the International Jobs and Economic Development Impacts tool, and the Resilient Energy Platform. More information can be found at: [www.nrel.gov/usa-id-partnership](http://www.nrel.gov/usa-id-partnership).

This work was authored, in part, by the National Renewable Energy Laboratory (NREL), operated by Alliance for Sustainable Energy, LLC, for the U.S. Department of Energy (DOE) under Contract No. DE-AC36-08GO28308. Funding provided by the United States Agency for International Development (USAID) under Contract No. IAG-17-2050. The views expressed in this report do not necessarily represent the views of the DOE or the U.S. Government, or any agency thereof, including USAID.

NREL/FS-6A20-74216 | August 2019  
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