

Wind Power Potential of the Central Asian Countries

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ABSTRACT

This data article surveys the wind energy potential of the five Central Asian countries; Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. The dataset presents the theoretical wind power supply capacity in the region as well as existing wind power installations.

Keywords: wind power, renewable energy, Central Asia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan

Background

In addition to abundant fossil fuel and hydro-power resources, the Central Asian countries of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan have vast amounts of other renewable energy sources. Among these, wind energy has the greatest potential for exploitation.

Due to its vast territory, almost three-quarters of the theoretical wind power potential in Central Asia belongs to Kazakhstan. Nonetheless, Uzbekistan's wind power potential is ten times greater than its currently installed electricity generation capacity. Kyrgyzstan, Tajikistan and Turkmenistan's theoretical capacity of wind power is higher than their solar power and hydropower potential.

The world is transitioning from fossil fuels to renewable energy.¹ However, the wind power potential of the Central Asian countries has received little attention in academic research literature and the mass media compared to fossil fuels and hydropower. Therefore, the Central Asia

Data Gathering and Analysis Team (CADGAT) is producing a series of data articles on renewable energy in Central Asia. These data are also available in a unified database in excel format from <http://osce-academy.net/en/research/cadgat/>.

Data collection

Data collection was carried out between November 2018 and January 2019, and the figures presented here reflect the data available during that period. They were obtained and prepared based on the National Renewable Energy Laboratory data on gross onshore and offshore wind power potential, local government statistics, mass media and reports by international organizations.

Key findings

Wind power has the highest theoretical potential of all forms of renewable energy in all the Central Asian countries. Over 70% of this potential is concentrated in Kazakhstan.

¹ O'Sullivan et al. (2017) *The Geopolitics of Renewable Energy*. Working Paper. Harvard University, Columbia University and Norwegian Institute of International Affairs (NUPI).

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1. Theoretical wind power potential in Central Asia (in GW)

	Capacity factor	0-0.18	0.18-0.22	0.22-0.26	0.26-0.3	0.3-0.38	Total	Grand total
	<i>Distance from the shore</i>							
Kazakhstan	<i>0-50 miles</i>	216.745	298.633	686.646	823.191	68.936	2094.150	11387.700
	<i>50-100 miles</i>	443.727	681.356	1502.915	1316.112	35.376	3979.486	
	<i>100-5000 miles</i>	128.651	498.109	3974.696	710.938	1.671	5314.064	
Kyrgyzstan	<i>0-50 miles</i>	89.121	33.224	57.050	19.172	0.428	198.995	255.663
	<i>50-100 miles</i>	14.908	13.711	15.379	11.903	0.768	56.669	
	<i>100-5000 miles</i>	0.000	0.000	0.000	0.000	0.000	0.000	
Tajikistan	<i>0-50 miles</i>	104.230	17.210	5.433	0.043	0.000	126.915	146.135
	<i>50-100 miles</i>	0.637	7.197	3.509	2.009	4.988	18.340	
	<i>100-5000 miles</i>	0.000	0.152	0.585	0.145	0.000	0.881	
Turkmenistan	<i>0-50 miles</i>	183.517	400.382	15.864	0.000	0.000	599.762	1991.867
	<i>50-100 miles</i>	311.135	647.288	47.490	0.279	0.000	1006.191	
	<i>100-5000 miles</i>	1.427	331.878	52.610	0.000	0.000	385.914	
Uzbekistan	<i>0-50 miles</i>	139.353	444.335	31.288	0.000	0.000	614.975	1685.278
	<i>50-100 miles</i>	44.734	499.430	52.887	0.662	0.000	597.712	
	<i>100-5000 miles</i>	11.966	298.209	150.339	12.078	0.000	472.591	

Note: This table contains the global onshore wind supply capacity based on a resource assessment performed at the National Renewable Energy Laboratory (NREL) based on the National Center for Atmospheric Research's (NCAR) Climate Four-Dimensional Data Assimilation (CFDDA) mesoscale climate database.

2. Installed wind power projects in Central Asia

Kazakhstan

Name	Location	Capacity	Year	Funding
LLP "VES Nurly"	Enbekshi Kazakh region, Almaty oblast	4.5 MW	2016	Chinese grant
Ereymentskaya LLP "PVES"	Akmola oblast	45.0 MW	2015	Samruk Energo (Quazi-governmental)
Credit Partnership "Zenchenko and Company"	Kyzyljar region, North Kazakhstan oblast	2.0 MW	2014	Settlement and Financial Center for Support of Renewable Energy Sources (Public)
Credit Partnership "Zenchenko and Company"	Kyzyljar region, North Kazakhstan oblast	1.5 MW	2015	Settlement and Financial Center for Support of Renewable Energy Sources (Public)
LLP "Vetro Invest", "Kordayskaya VES-2"	Korday region, Jambyl oblast	53.8 MW	2015	Own funds + loan from private bank
LLP "Annar"	Kapshagay city, Almaty oblast	4.5 MW	2016	Public loan under the governmental program of business support
LLP "VES Sarybulak 1", LLP "VES Sarybulak 2"	Almaty oblast, Sarybulak village	9.0 MW	2017	Private and public investments
Otar LLP "KazEcoBatt"	Jambyl oblast	7.0 MW	2012	Private
"K-1", LLP "Izen-Su"	Jambyl oblast, Korday region	7.0 MW	2014	Loan

Kyrgyzstan

Name	Location	Capacity	Year	Funding
Wind energy unit for two families living at "Koendu" cordon	Sarychat-Ertash State Nature Reserve, Issyk-Kul oblast	2 kW	2014	World Wildlife Fund

Tajikistan

Name	Location	Capacity	Year	Funding
10 small-scale windmills in the Baljuvon, Parkhar and Shuroobod districts	Central Tajikistan (several regions)	10 X 10.0 kW	2009	Ministry of Energy and Industrialization

Turkmenistan

Name	Location	Capacity	Year	Funding
Wind energy unit for local secondary school	Balkan velayat (region), Gyzylsu island in the Caspian Sea	5.0 kW	During the time of the Soviet Union	State budget

Uzbekistan

Name	Location	Capacity	Year	Funding
Pilot windmill in the Bostonlik district. Height: 65 metres; Magnitude of the blades: 50 metres; Diameter of the base of the tower: 3.6 metres; Total weight: 112 tonnes.	Tashkent region	750.0 kW	2010	The general contractor of the construction is the Chinese company "Xian Electric Engineering". The equipment supplier is the Chinese company "Xinjiang Goldwind Science & Technology Co. Ltd."

3. Planned wind power projects in Central Asia

Kazakhstan

Name	Description
LLP "Kaz Wind Energy"	Construction of a wind farm near the town of Arkalyk with a capacity of 48 MW in the Kostanay region
LLP "Tvorchesko-proizvodstvennaya firma NAR"	Construction of the Baidibek-1 wind farm with a capacity of 120 MW in the Zhambyl region
LLP "Vetro Energo Technologii"	Construction of a wind farm with a capacity of 52.8 MW in the Isatai district of the Atyrau oblast
LLP "Energiya Semirechya"	Construction of wind power plants with a capacity of 60 MW in the Shelek corridor of the Almaty region
LLP "Windhan"	Construction of a wind farm with a capacity of 109 MW on the Shokpar site in the Zhambyl region
LLP "Arm Wind"	Construction of a wind farm with a capacity of 48 MW in the area of the Badamsha settlement in the Aktobe region
LLP "Vetropark Juzimdyk"	Construction of a 40 MW wind farm in the Baidibek district of the South Kazakhstan region
LLP "BEST-Group NS"	Construction of a wind farm with a capacity of 5 MW in the Tupkaragan district of the Mangystau region
LLP "Veushar"	Construction of wind farms with a capacity of 37.5 MW in the Zharma region of the East Kazakhstan region
LLP "South Wind Power"	Construction of wind farms in the area of the Fort-Shevchenko Mangistau region with a capacity of 42 MW
LLP "Janatasskaya Vetrovaya Elektrostanciya"	Construction of Zhanatass wind farm with a capacity of 100 MW in the Sarysu District of the Zhambyl Region
LLP "Jeruyik Energo"	Construction of a wind farm with a capacity of 50 MW in Enbekshi, Kazakh district of the Almaty region
LLP "Jel Energo"	Construction of a wind farm with a capacity of 450 kW in the Martuk district of the Aktobe region
LLP "Golden Energy Corp"	Construction of a wind farm with a capacity of 4.95 MW in the town of Ereymentau, Akmola region
LLP "ZETEK Green Energy"	Construction of the wind farm Astana EXPO-2017 with a capacity of 100 MW, for electricity generation

LLP "VES Kerbulak"	Construction of Kerbulak wind farm with a capacity of 9 MW near the village of Sarybulak, Almaty region
LLP "VES NURLY"	Construction of wind farm Nurly 2 with a capacity of 4.5 MW in the Enbekshikazakhsky district of the Almaty region
LLP "VES Shengeldy"	Construction of Shengeldy wind farm 2 with a capacity of 4.5 MW in the area of the village of Shengeldy, Almaty region
LLP-JV "KT Redko metalnaya Kompaniya"	Construction of the Shevchenko wind farm with a capacity of 43.6 MW in the Tupkaragan district of the Mangystau region
LLP "Wind Charsk"	Construction of Charsk wind farm with a capacity of 4.95 MW in the Zharminsky district of East-Kazakhstan oblast
LLP "DES Consulting"	Construction of a wind farm with a capacity of 4.95 MW in the Zharminsky district of the East Kazakhstan region
LLP "Ereymtau Wind Power"	Construction of a wind farm with a capacity of 50 MW in the city of Ereymtau
LLP "Novotechs"	Construction of a 4.5 MW wind farm near the town of Kapshagai in the Almaty region
LLP "Golden Energy Corp"	Construction of a wind farm with a capacity of 25 MW in the city of Ereymtau of the Akmola region
LLP "Wind Electricity"	Construction of Karatau wind farm 2 with a capacity of 4.5 MW near the city of Karatau in the Zhambyl region
LLP "Wind Power City"	Construction of Karatau wind farm 1 with a capacity of 4.5 MW in the area of Karatau in the Zhambyl oblast
LLP "Elektro Set Story"	Construction of the Balkhash wind farm with a capacity of 4.5 MW near the town of Balkhash, Karaganda region
LLP "Vichi"	Construction of a wind farm with a capacity of 7 MW in the Sandyktau district of the Akmola region
LLP "Ventum Energy"	Construction of a wind farm with a capacity of 4.95 MW in the Zharma district of the East Kazakhstan region
LLP "East Wind Energy"	Construction of a wind farm with a capacity of 4.95 MW in the Zharma district of the East Kazakhstan region
LLP "Ivan Zenchenko"	Construction of a wind farm with a capacity of 2 MW in the vicinity of Novonikolskoye, Kyzylzhar district, North Kazakhstan region
LLP "Jel Electric"	Construction of a wind farm with a capacity of 50 MW in the Mendykarinsky district of the Kostanay region
LLP "Ves Service"	Construction of a 10 MW wind farm in the Karakiyansky district of the Mangystau region
LLP "Alcor Energy"	Construction of a wind farm with a capacity of 4.95 MW in the Rayymbek district of the Almaty region
LLP "Vostok Veter"	Construction of a 10 MW wind farm in the Raiymbek district of the Almaty region
LLP "Jel Electric"	Construction of a wind farm with a capacity of 100 MW in the Zerinda district of the Akmola region

LLP "Energo Trust"	Construction of a wind farm with a capacity of 50 MW in the Ayrtau district of the North Kazakhstan region
LLP "Shokparskaya Vetrovaya Electrostanciya"	Construction of a wind farm with a capacity of 50 MW in the Arshalynsky district of the Akmola region
LLP "Investo"	Construction of a wind farm with a capacity of 50 MW in the Glubokoe district of the East Kazakhstan region
LLP "Jel Electric"	Construction of a wind farm with a capacity of 50 MW in Shelek, Almaty region
LLP "Shokparskaya Vetrovaya Electrostanciya"	Construction of a wind farm with a capacity of 100 MW in the Jambyl oblast
LLP "Shokparskaya Vetrovaya Electrostanciya"	Construction of a wind farm with a capacity of 100 MW in the Zhambyl region

Kyrgyzstan

We are not aware of any planned wind farms in Kyrgyzstan at the current time.

Tajikistan

We are not aware of any planned wind farms in Kyrgyzstan at the current time.

Turkmenistan

We are not aware of any planned wind farms in Kyrgyzstan at the current time.

Uzbekistan

Name	Description
100 MW wind farm in the Zarafshan district of the Navoi region	Construction of a wind farm with a capacity of 100 MW, funded by the Navoi Mining and Metallurgy Combinat and contracted by Siemens GmBH, is under construction and is expected to be completed in 2020

Abbreviations and terminology

GW	gigawatt
MW	megawatt
LLP	limited liability partnership

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The Norwegian Institute of International Affairs (NUPI) and the OSCE Academy established the Central Asia Data-Gathering and Analysis Team (CADGAT) in 2009. The purpose of CADGAT is to produce new cross-regional data on Central Asia that can be used free of charge by researchers, journalists, NGOs, government employees and students, both inside and outside the region. The data articles can be found at <http://osce-academy.net/en/research/cadgat/>.

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