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Central Asia Data Gathering and Analysis Team

CADGAT



Wind Power Potential of the Central Asian Countries

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A B S T R A C T

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]](#footnote-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.

## 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** |
| *Distance from the shore* |
| **Kazakhstan** | *0-50 miles* | 216.745 | 298.633 | 686.646 | 823.191 | 68.936 | 2094.150 | **11387.700** |
| *50-100 miles* | 443.727 | 681.356 | 1502.915 | 1316.112 | 35.376 | 3979.486 |
| *100-5000 miles* | 128.651 | 498.109 | 3974.696 | 710.938 | 1.671 | 5314.064 |
| **Kyrgyzstan** | *0-50 miles* | 89.121 | 33.224 | 57.050 | 19.172 | 0.428 | 198.995 | **255.663** |
| *50-100 miles* | 14.908 | 13.711 | 15.379 | 11.903 | 0.768 | 56.669 |
| *100-5000 miles* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **Tajikistan** | *0-50 miles* | 104.230 | 17.210 | 5.433 | 0.043 | 0.000 | 126.915 | **146.135** |
| *50-100 miles* | 0.637 | 7.197 | 3.509 | 2.009 | 4.988 | 18.340 |
| *100-5000 miles* | 0.000 | 0.152 | 0.585 | 0.145 | 0.000 | 0.881 |
| **Turkmenistan** | *0-50 miles* | 183.517 | 400.382 | 15.864 | 0.000 | 0.000 | 599.762 | **1991.867** |
| *50-100 miles* | 311.135 | 647.288 | 47.490 | 0.279 | 0.000 | 1006.191 |
| *100-5000 miles* | 1.427 | 331.878 | 52.610 | 0.000 | 0.000 | 385.914 |
| **Uzbekistan** | *0-50 miles* | 139.353 | 444.335 | 31.288 | 0.000 | 0.000 | 614.975 | **1685.278** |
| *50-100 miles* | 44.734 | 499.430 | 52.887 | 0.662 | 0.000 | 597.712 |
| *100-5000 miles* | 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.

## 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 |
| Ereymentauskaya 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.”  |

## 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 ЕХРО-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 "Ereymentau Wind Power" | Construction of a wind farm with a capacity of 50 MW in the city of Ereymentau |
| 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 Ereymentau 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 Aiyrtau 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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**About CADGAT and Central Asia Regional Data Review**

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/>.

The following CADGAT data articles have been published:

1. Hydroelectric dams and conflict in Central Asia

2. The narcotics trade and related issues in Central Asia

3. Language use and language policy in Central Asia

4. The transportation sector in Central Asia

5. Road transportation in Central Asia

6. Gender and politics in Central Asia

7. Political relations in Central Asia

8. Trade policies and major export items in Central Asia

9. Intra-regional trade in Central Asia

10. Trade barriers and tariffs in Central Asia

11. Holidays in Central Asia. Part I: Laws and official holidays

12. Holidays in Central Asia. Part II: Professional and working holidays

13. Media in Central Asia: Print media

14. Media in Central Asia: TV

15. Media in Central Asia: Radio

16. Renewable energy policies of the Central Asian countries

17. Wind power potential of the Central Asian countries

CADGAT has also produced a database on Elites in Central Asia, which can be found at <http://osce-academy.net/_dbelite/>.

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1. O’Sullivan et al. (2017) *The Geopolitics of Renewable Energy.* Working Paper. Harvard University, Columbia University and Norwegian Institute of International Affairs (NUPI). <https://www.researchgate.net/publication/317954274_The_Geopolitics_of_Renewable_Energy> [↑](#footnote-ref-1)