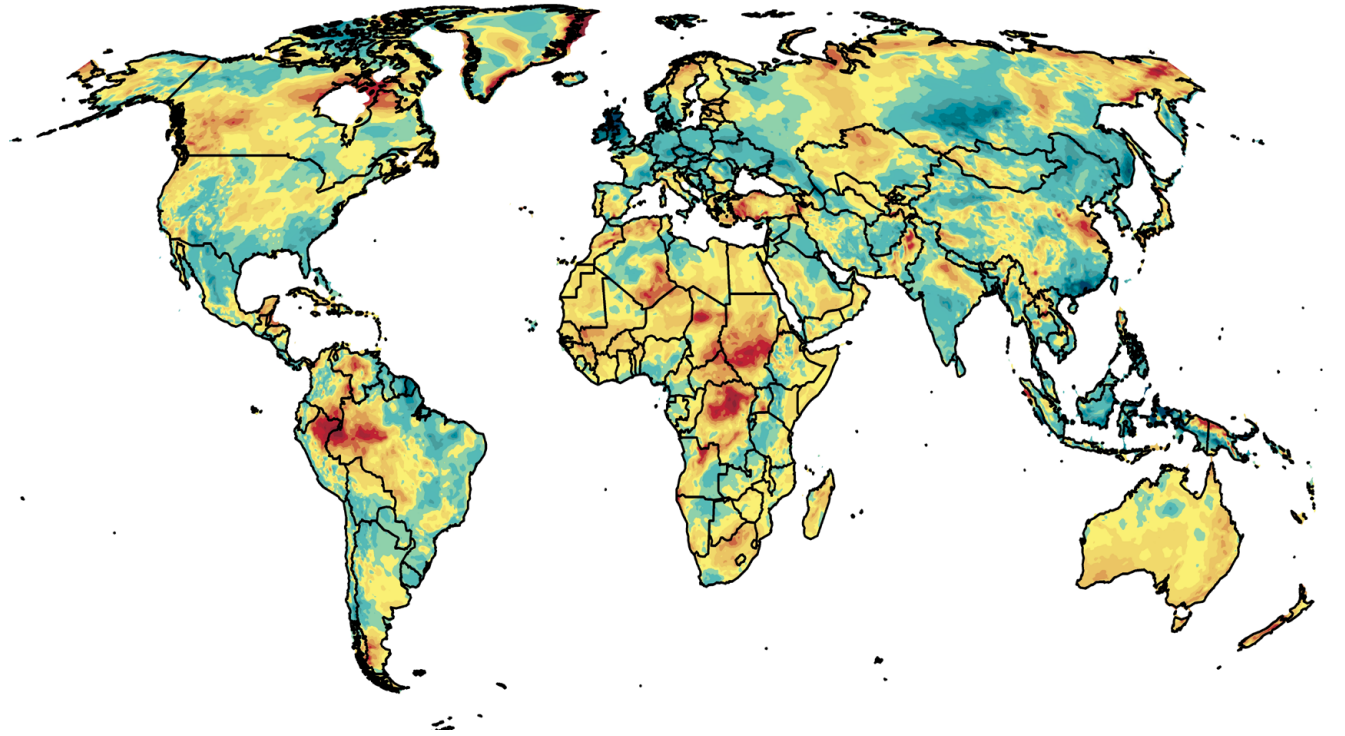




2021 | Q3 Global

Wind Trends

Global wind speed performance



The Wind Trends Bulletin depicts anomalies of the global wind resource from the historical norm on a monthly, quarterly, and annual basis. The anomalies are calculated as a percent deviation from the 1995 – 2019 mean speed at 100 m above ground level for the calendar period. The latest Wind Trends dataset is derived using the ERA5, a contemporary global reanalysis dataset. For more information about customized analyses for your project portfolio, data or subscription options, please contact us at renewableenergyservices@ul.com.



The global wind speeds continued below the long-term (1995-2019) norm in the third quarter of 2021. Wind speeds rose above the regional, quarterly norm across North America, and continued above the norm across Africa and the Middle East, and Oceania. A wind speed deficit continued across Europe, Asia, and South America.

North America

Quarterly wind speeds were above normal for western Canada, the Pacific Northwest (U.S.), the interior U.S., Hawaii, and the Caribbean. Below-normal winds extended from the southern Rockies, through Texas, and into northern Mexico. Much of the contiguous U.S., Canada, and northern Mexico started off the period with relatively quiescent conditions in July. This coincided with moderately to strongly above-normal wind speeds across Hawaii (up to 10%) and western Alaska (12 to 16%). Elsewhere, there were above-normal wind speeds across the Caribbean, including the Yucatan Peninsula and much of Central America. Significant changes

occurred across North America in August. Above-normal conditions overspread Canada as well as the U.S. west of the Mississippi River, while the wind speed surplus across southern Mexico and the Caribbean intensified (up to 21%). Wind speeds across northern Mexico and the eastern U.S. continued below the norm during this time. By September, wind speeds dipped below the norm across the southern Rockies and northern Great Plains (U.S.) — while moderately strong wind speeds overspread the Midwest and Northeast U.S. Above-normal wind speeds continued across much of Canada in September, while Hawaii rose above the norm again (3 to 21%). To the south, wind speeds dropped well below the long-term norm across many of the Caribbean Islands (-3 to -21%), while still remaining above the norm across the Yucatan and nearby parts of Central America (up to 21%).

South America

South America rounded out another quarter with a wind speed deficit. In fact, four of the five countries in the region with the highest capacity

(representing over 99% of the MW installed) finished the quarter with wind speeds below the norm. The third quarter wind speeds reflected the general pattern of wind speed anomalies for Q2 2021 with a few following notable exceptions. Wind speeds across southern Argentina rose above the norm, bringing the country's Wind Index from slightly below normal in Q2 to slightly above normal in Q3. Wind speeds dropped below their long-term, quarterly norm across all of Uruguay. Conditions remained relatively stable compared to the long-term norm across Brazil and Chile, as both experienced another quarter with below-normal wind speeds.

Europe

Regional wind speeds continued their decline below the long-term, quarterly norm across Europe — mainly Central Europe and the United Kingdom. The wind speed deficit across the United Kingdom intensified from about -9% in Q2 to about -18% in Q3. Above-normal wind speeds (3 to 9%) across Central Europe in Q2 dropped below the norm in Q3 (-3 to -15%). However,

other areas fared better. Quarterly wind speeds rebounded above the norm across many key areas of the Iberian Peninsula and Scandinavia, while wind speeds across much of Central France, Northern Italy, Greece, Turkey, and the Baltic states remained above the norm for another quarter.

Africa and the Middle East

Wind speeds rose above the long-term, quarterly norm across key wind-power producing areas of Africa, and the Middle East, most notably South Africa, Egypt and East Africa. Wind speeds remained above the norm across much of North Africa and West Africa. In terms of variability within the quarter, most wind-power producing areas of the region experienced wind speeds well above the monthly norm in July and September, with a dip below the norm in August.



Asia

Wind speeds were below the long-term, third quarter norm across much of Asia. Key wind power producing areas of India rounded out the quarter with wind speeds below the quarterly norm, despite favorable conditions in some months. A speed deficit in July and August throughout much of the country gave way to strongly above-normal conditions across eastern India (9 to 21%) and more significantly, the western and southwest coast in September (6 to more than 21%) where much of the country's capacity is installed. Wind speeds declined across China for another quarter. However, two areas in China with substantial wind power development ended the quarter with a surplus of winds: the North China Plain (near Beijing) and the southwest (the Yunnan and Sichuan provinces). Notably, the North China Plain saw wind speeds exceeding 21% above the norm in July and September — a strong contrast to concurrent wind speeds in the southeast (-9 to -21% or lower). Japan finished the third quarter with a modest wind speed surplus due to strongly

above-normal conditions in August (18% or more). Much of southern and southeast Asia began the quarter with winds well above the monthly norm in July, only to fall into a deficit for August and September.

Oceania

Strongly above-normal wind speeds enveloped much of Oceania for at least some of the third quarter, allowing for much of the region to round out the period well above the norm. In July, strong wind speeds concentrated across mainland Australia's southern coast. By August and into September, wind speeds moderated across the southern coast, but picked up across Tasmania and points east (e.g., New Caledonia and New Zealand).

[Download](#) index values for even more wind power producing countries!



2021 | Q3

North America

Below normal:

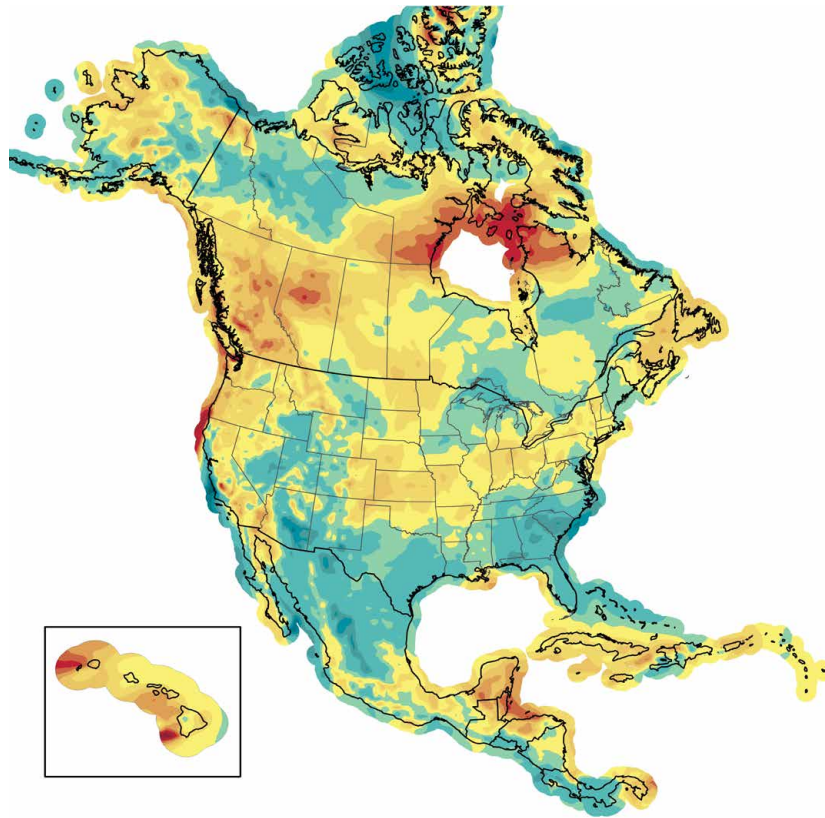
- Texas
- Northern Mexico
- Southern Rockies, U.S.
- Southeast, U.S.
- Maine

Above normal:

- Hawaii
- Pacific Northwest
- Western Canada
- Central Great Plains
- Northern Ohio River Valley
- Canadian Maritimes
- Yucatan Peninsula



Wind plant locations source:
www.thewindpower.net



Wind Trends

Global wind speed performance

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South America

Below normal:

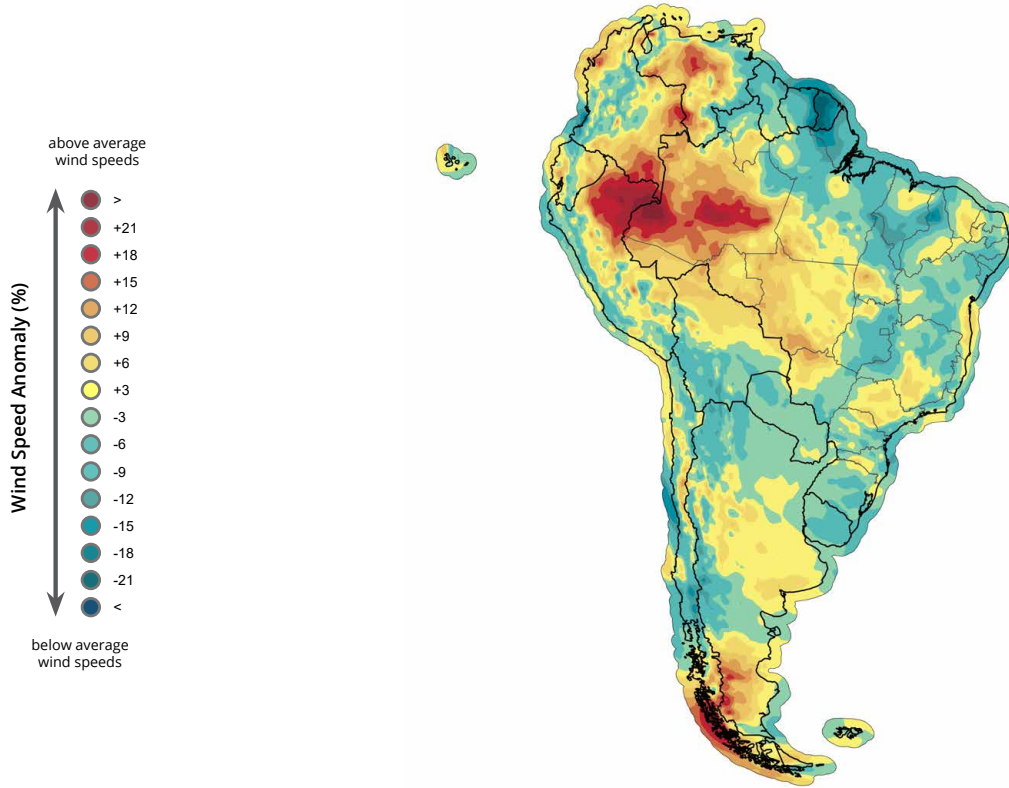
- Northeast Brazil
- Uruguay
- Chile
- Southern Bolivia
- Coastal Peru

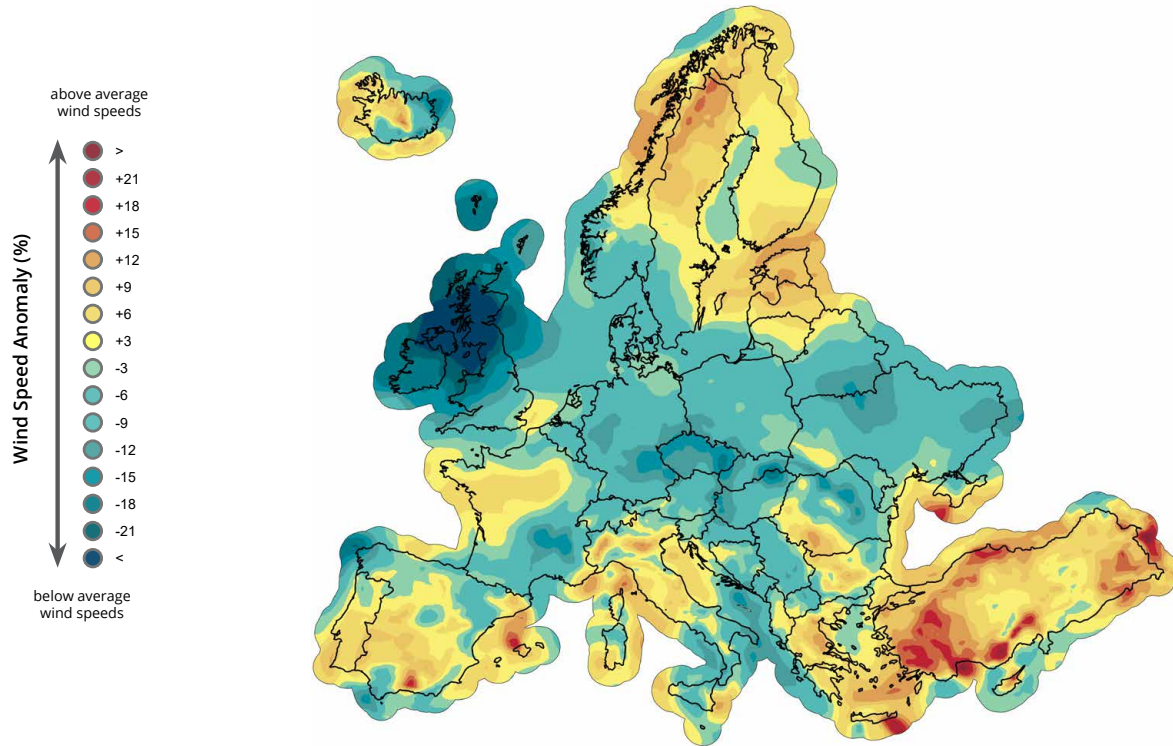
Above normal:

- Southern Argentina
- The ABC Islands



Wind plant locations source:
www.thewindpower.net

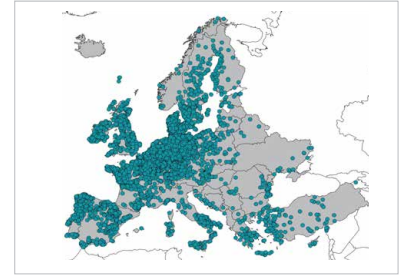


**Below normal:**

- Southern Norway and Sweden
- The United Kingdom
- Central Europe
- Ukraine
- Southern France
- Northern Spain
- Southern Italy

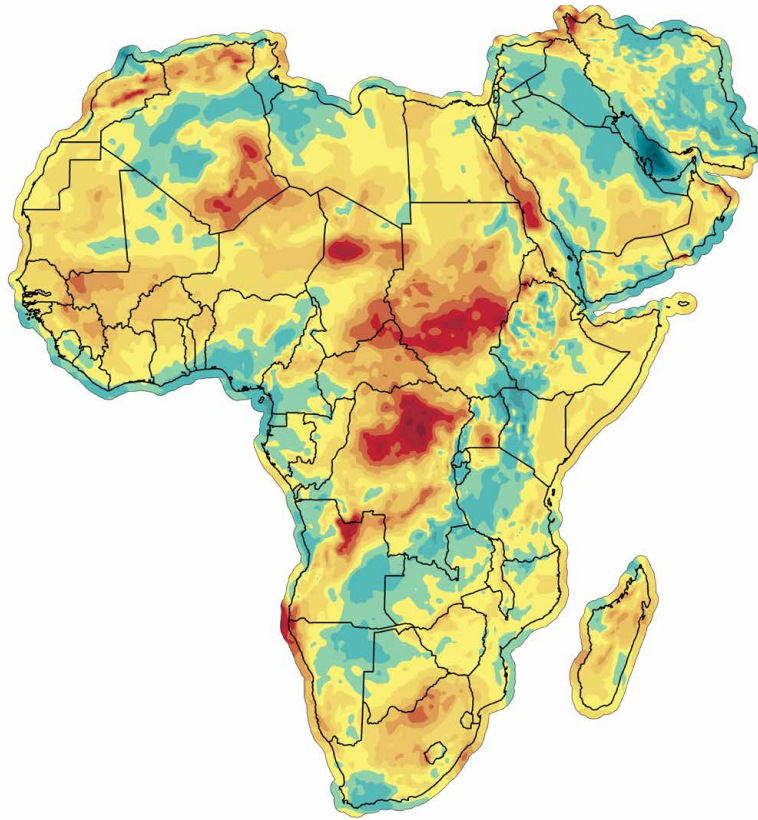
Above normal:

- Northern Scandinavia
- Turkey
- Greece
- Northern France
- Southern Portugal



Wind plant locations source:
www.thewindpower.net





Below normal:

- Western Kenya
- Cape Verde Islands
- Western Cape, South Africa

Above normal:

- East African Islands
- Egypt
- Northern and Eastern South Africa
- Morocco
- Western Sahara
- Canary Islands



Wind plant locations source:
www.thewindpower.net



Below normal:

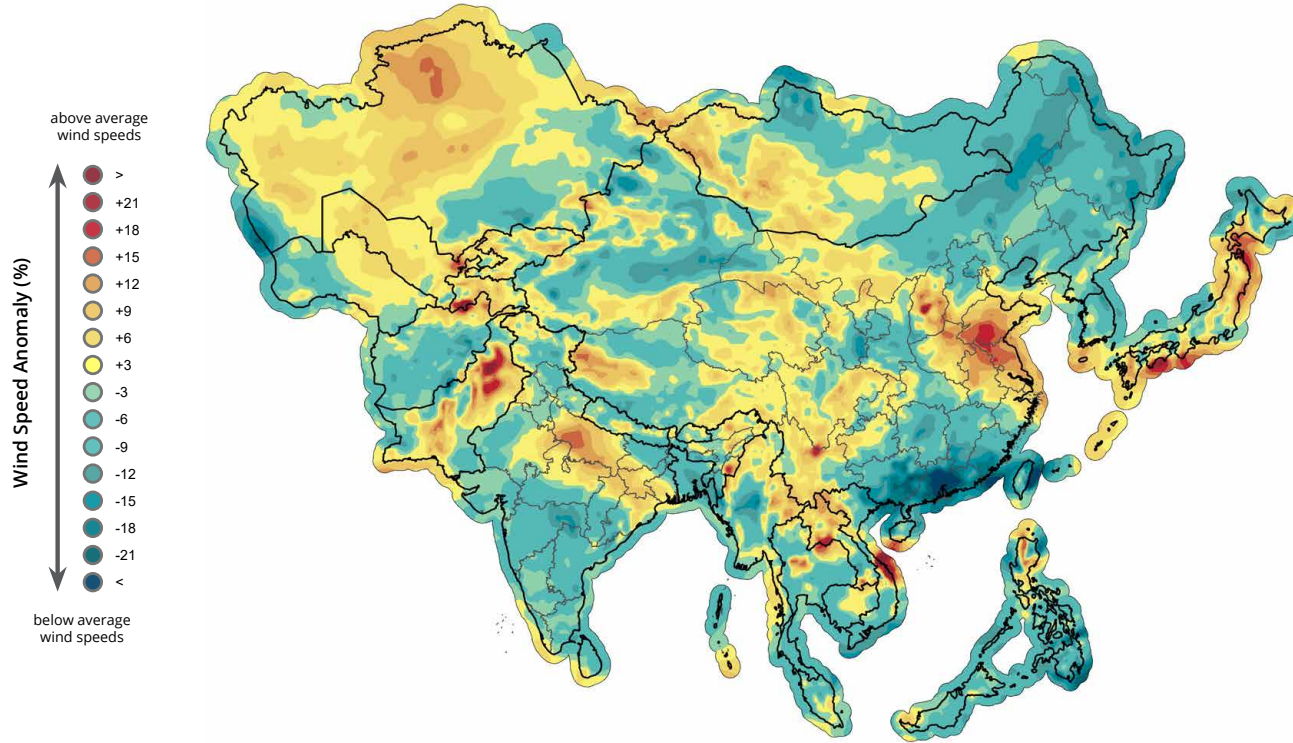
- Southeast and Northeast China
- South Korea
- Taiwan
- Thailand
- India

Above normal:

- Shandong, Jiangsu, Anhui and Henan Provinces of China
- Japan
- Northern Philippines



Wind plant locations source:
www.thewindpower.net



above average wind speeds

Wind Speed Anomaly (%)

below average wind speeds



Oceania

Below normal:

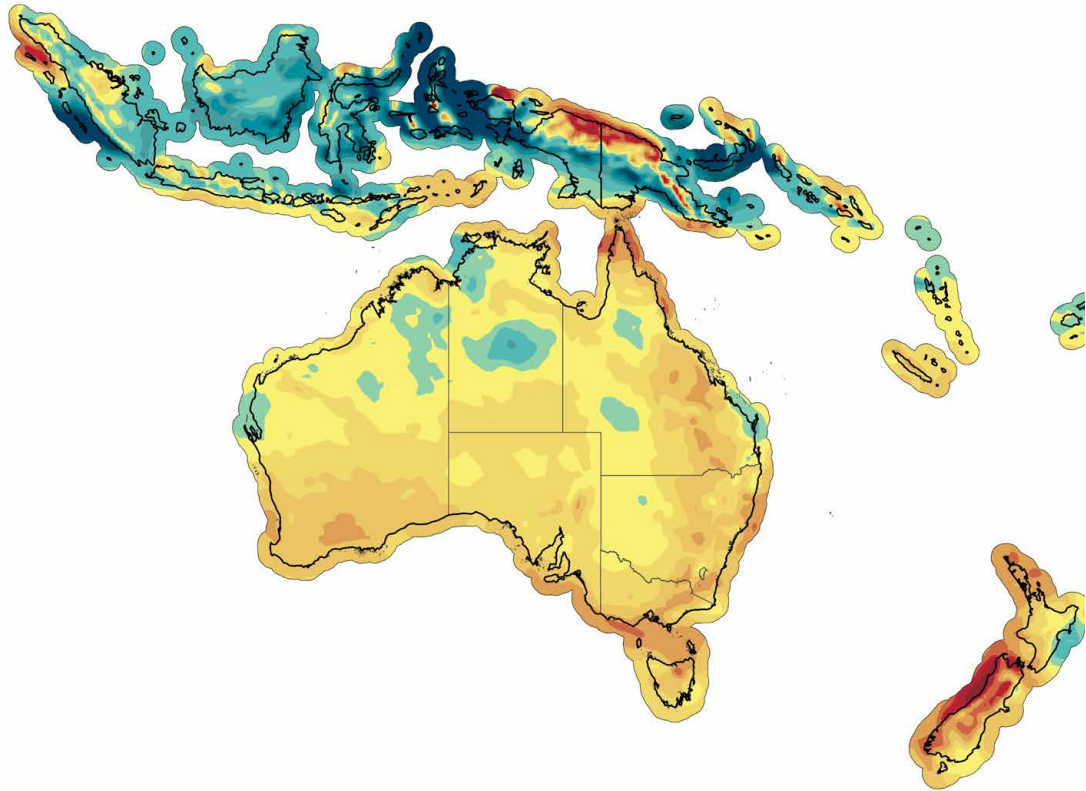
- Indonesia

Above normal:

- Australia
- New Zealand
- New Caledonia

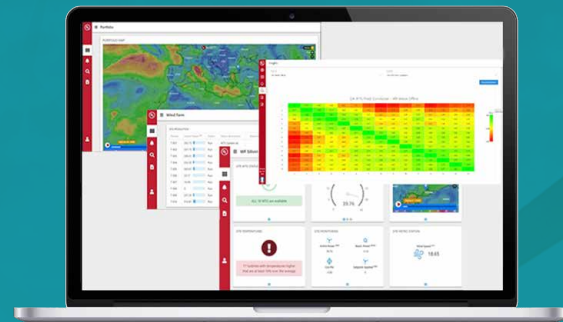


Wind plant locations source:
www.thewindpower.net



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Locations	Jan	Feb	Mar	Q1	Apr	May	Jun	Q2	Jul	Aug	Sep	Q3	Oct	Nov	Dec	Q4	ANNUAL
North America	-4.9	-1.5	8.1	0.5	-3.4	-1	-4	-2.9	-6	4.4	3.7	0.7					
USA	-4.2	-1.3	7.6	0.7	-3.3	-1.5	-4.7	-3.2	-6.5	5.7	3.6	0.9					
Canada	-12.1	-2.6	14.2	-0.4	-6	-3.7	9.7	-0.5	-2.8	-1	8.6	1.9					
Mexico	-3.7	-4.1	5.8	-0.7	0.2	9	-18.3	-2.3	-5.6	-3.8	-1.9	-3.9					
South America	7.4	-5.4	-0.3	0.7	1.9	-1	-4.7	-1.7	-2.3	-0.2	-3.1	-1.8					
Brazil	10.2	-5.8	1.2	2	3.5	-2.5	-5.9	-2.2	-3.2	1	-4.2	-2.1					
Argentina	1.1	-4.9	-3.1	-2.2	-4.7	0.6	-4.1	-2.8	3.9	1.3	-1	1.4					
Chile	-0.1	-4.2	-2.8	-2.4	-0.8	-0.1	-5.1	-2.1	-8.8	0.5	-0.7	-2.8					
Europe	-1.7	1.3	-3.8	-1.5	-4.4	7.9	-10.7	-2.4	-2.9	0.6	-9	-4					
Germany	-8.9	-7.8	-4.7	-7.2	1.6	17.3	-19.7	0.1	-8.6	6.1	-14.7	-6.1					
Spain	11.7	8.2	-10.7	3.1	-15.1	1.5	-3.5	-6.2	3.7	-2.8	-7.6	-2.2					
France	-2.0	5.3	-1.5	0.6	-2.5	21	16.4	1	6.2	6.2	-14	-0.9					
United Kingdom	-18.5	14.9	2	-0.7	-21	-8	-6	-12	-28.6	-16.4	-16.2	-20.1					
Italy	19.9	-10.3	-10.9	-0.6	-4.3	13.2	-8.7	0.3	1.4	7.9	-13.4	-1.8					
Portugal	10.9	15.4	-9.6	5.4	-23	4.8	0	-6.6	6.7	-7.7	4.4	1.1					
Denmark	-15.1	-3.1	-3.4	-7.4	4.5	-6.9	-13.7	-5.2	-4.3	5.1	-13.6	-4.6					
Ireland	-15.9	15.8	-0.1	-0.2	-15	-1.8	-4.6	-7.3	-25.7	-12.5	-17.2	-18.3					
Africa / Middle East	3.8	0.5	1.8	2.1	-3.7	2.3	3.4	0.7	4.4	-3.5	2.9	1.3					
South Africa	-0.1	1.6	-1.1	0.2	-9	4.4	2.3	-0.5	5.3	-3.2	5.3	2.5					
Morocco	6.7	-4.6	-7.1	-1.8	-13.3	4.8	1.3	-2.6	9.3	-3.8	-4	0.5					
Egypt	3.1	11.7	11.8	9.1	9.6	7	7.5	8	4.5	-3.7	6.5	2.4					
Asia	10.4	3.4	-3.8	2.9	-4.6	5	-1.8	-0.5	1.2	-2.4	-3.7	-1.8					
China	12.0	4.2	-4.4	3.4	-4.4	6.6	-1	0.3	1.8	-2	-4.5	-1.6					
India	-0.9	-3.9	0.7	-1.6	-7.7	-6.9	-8.2	-7.8	-2.6	-7	3.3	-2.8					
Thailand	10.4	5.2	-6.5	3.3	-12.5	-7.8	10.5	-1.8	2.5	-14.3	-7.1	-6.2					
Ind, Aus, Oceania	3.6	-0.1	-2.5	0.4	-1.1	3.5	-1.2	0.4	11.3	1.7	4	5.6					
Australia	3.6	1	-1.9	0.9	-1.6	3.4	-0.8	0.4	12.7	1.1	3.3	5.6					
New Zealand	4.7	-18.3	-11.4	-8	1.7	3.6	-4.5	0.3	-3.7	10.9	16.4	8					
World	3.5	1.3	-0.8	1.1	-4	4.1	-4.6	-1.6	-1.5	0.1	-3.1	-1.6					

2021 | Q3

Wind index

The wind index represents the average wind speed anomaly across all plants of the country or region in production by the end of 2020. The anomalies are calculated as a percent deviation from the 1995 – 2019 mean speed at 100 m above ground level for the calendar period, and are weighted by the location and rated capacity of wind projects.

The wind project details have been obtained from [Windpower Monthly Intelligence](#).

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