

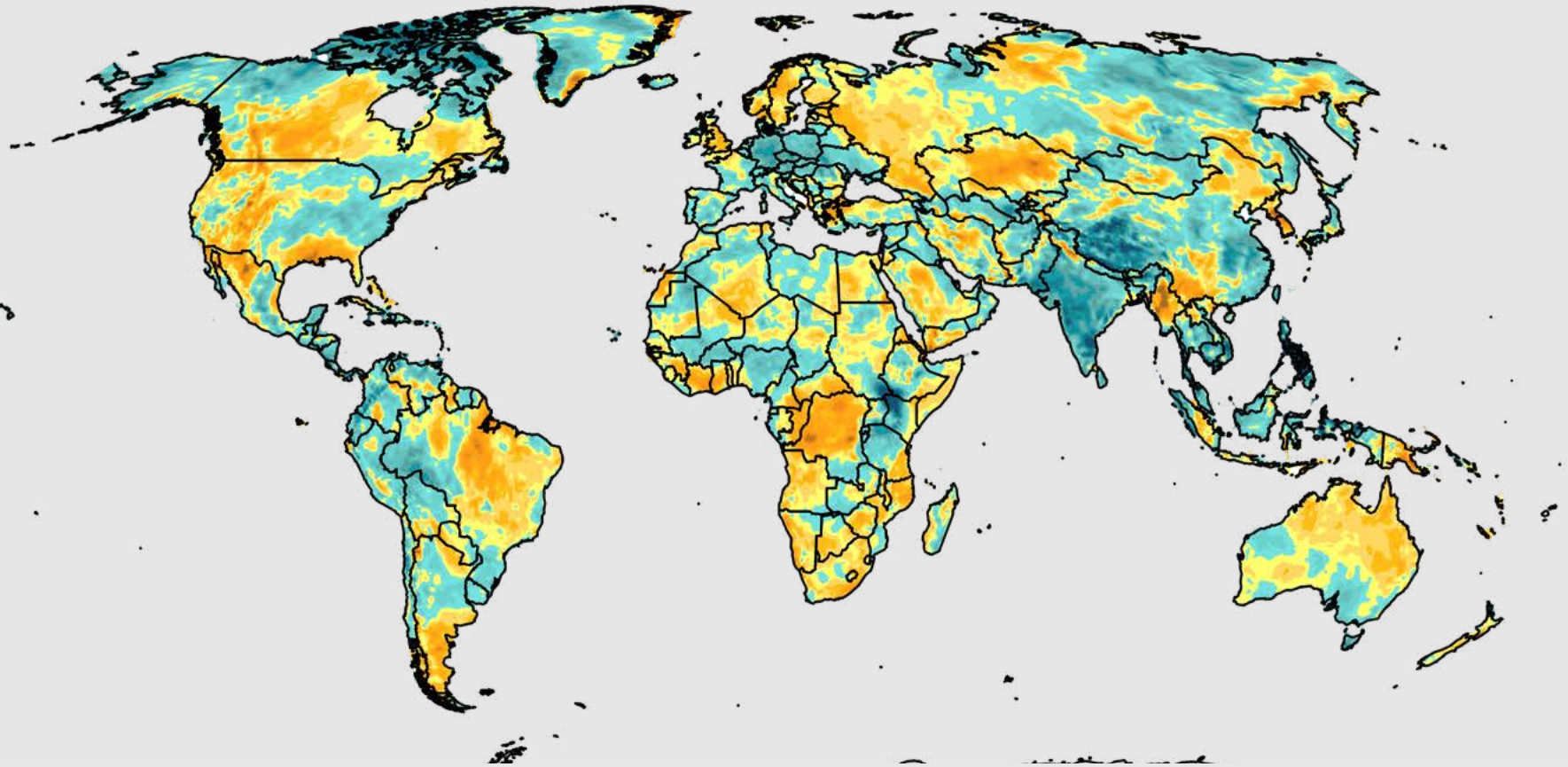
WIND TRENDS

GLOBAL WIND SPEED PERFORMANCE

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Global
Q3 2020



Global wind speeds remained below the long-term norm for the third quarter of 2020, dominated by a wind speed deficit across Europe and Asia. Near-normal wind speeds continued across much of North America, although a deficit established across wind power producing areas of Mexico and Central America. The wind speeds across South America as a whole remained slightly above the long-term norm, however the pattern of wind speed anomalies changed quite a bit from the previous quarter. Winds rose above normal across key areas of Africa and the Middle East, and dropped below the norm in Oceania.



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Global
Q3 2020

Wind speeds remained near normal across North and Central America, although large swaths of wind speed deficits and localized areas of strongly above-normal wind speeds established. Wind speeds across much of the Central and Midwest U.S. held below the norm throughout the quarter. To the west, wind speeds rose moderately above the norm along the American Rockies, and across the Canadian Prairies, New Mexico, Utah, and Washington State (9% or more). A moderate wind speed deficit continued for Hawaii (-6% to -12%). Below-normal winds established along the Yucatan Peninsula and strengthened from the previous quarter across the high plains of Mexico (-3% to -12%). This deficit extended southward through much of Central America.

Wind speeds remained slightly above normal across South America, with concentrated areas of strongly above-normal speeds more than offsetting deficits. The strong deficit across southern Chile and Argentina present throughout much of the previous quarter (-3% to -15%) gave way to strongly above-normal wind speeds by August (15% to 21% or more). Weak to moderately above-normal winds established across much of northeast Brazil and held throughout the quarter. The wind speed anomalies waned across far northern portions of the region (e.g., Colombia, Venezuela, ABC Islands, and Peru), in addition to central areas (Uruguay and southern Brazil).

Wind speeds remained below the norm for much of Europe, a pattern held since the previous quarter. The wind speed deficit strengthened across Central Europe; particularly affected nations include Germany, Austria, Poland, and the Czech Republic (-6% to -12%). The wind speed deficit eased for the United Kingdom (which rounded out the quarter with moderately above-normal winds), and the Iberian Peninsula (where moderately below-normal wind speeds in Q2 eased to near normal in the third quarter). Wind speeds rose moderately above normal across western Turkey (9% to 21%) and much of Scandinavia (up to 12%).

Wind speeds across key wind-power producing areas of Africa and the Middle East strengthened above the norm. In the north, wind speeds across Morocco and Western Sahara transitioned from below normal in the second quarter (-3% or -6%) to moderately above normal in the third quarter (6% to 12%). Above-normal wind speeds still prevail across South Africa, where wind speeds have been above the norm for all of 2020.

The wind speed deficit continued for Asia, with the pattern of wind speed anomalies closely mimicking those in the second quarter for much of the region. Wind speeds across China held steady at slightly below normal on average, despite strong local variation in wind speed anomalies. Across areas in the northeast and southwest, wind speeds increased moderately to strongly above the norm (up to 18%). However, the above-normal wind speeds were not enough to offset moderately to strongly below-normal winds across the large central area where the majority of nation's wind power capacity is located (as low as -21%). The wind speed deficit across India continued for another quarter, driven by moderately to strongly below-normal winds across most areas in July and September. Widespread deficits in excess of -21% were experienced across much of India during these months. Quarterly wind speeds fell across Southeast Asia, most notably across Vietnam and Thailand (-4% to -18%). South Korea was the only nation in the region with wind speeds well above normal (3% to 21%).



Wind speeds across Oceania dropped below the long-term norm in the third quarter. A strong deficit across southern Australia in July (-6% to -21% or less) pushed the region into an overall deficit by the quarter's end. The previous quarter's wind speed deficit across the remainder of the region gave way to strongly above-normal conditions by September, allowing those areas to round out the quarter above the norm.

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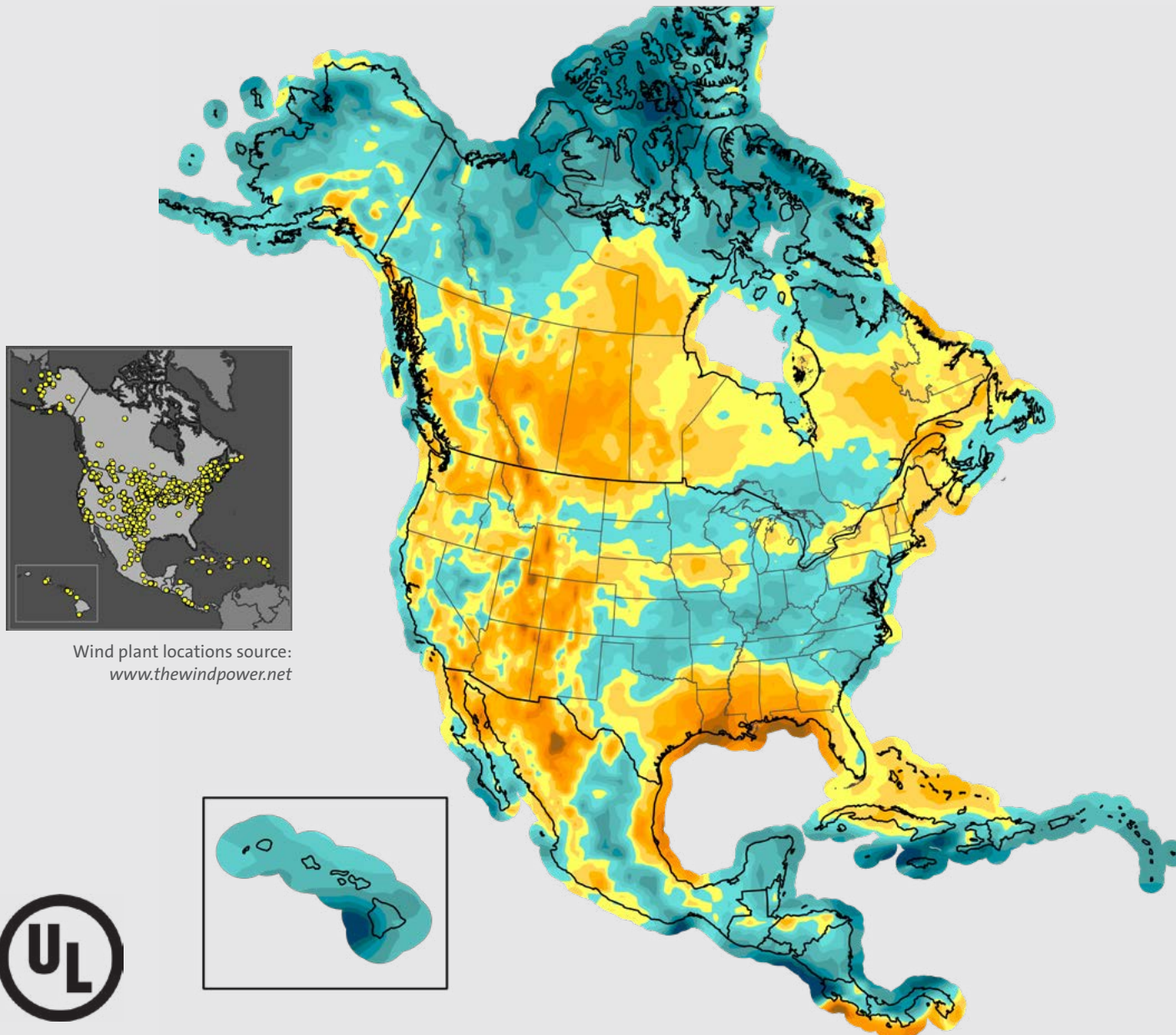
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GLOBAL WIND SPEED PERFORMANCE

North America
Q3 2020



Wind Speed Anomaly (%)



Below Normal:

- Midwest, U.S.
- Oklahoma & Northern Texas, U.S.
- Hawaii, U.S.
- Central Mexico
- Central America

Above Normal:

- Northeastern U.S.
- Northeast, U.S.
- Southwest, U.S.
- Pacific Northwest, U.S.
- Canadian Prairies

Wind plant locations source:
www.thewindpower.net

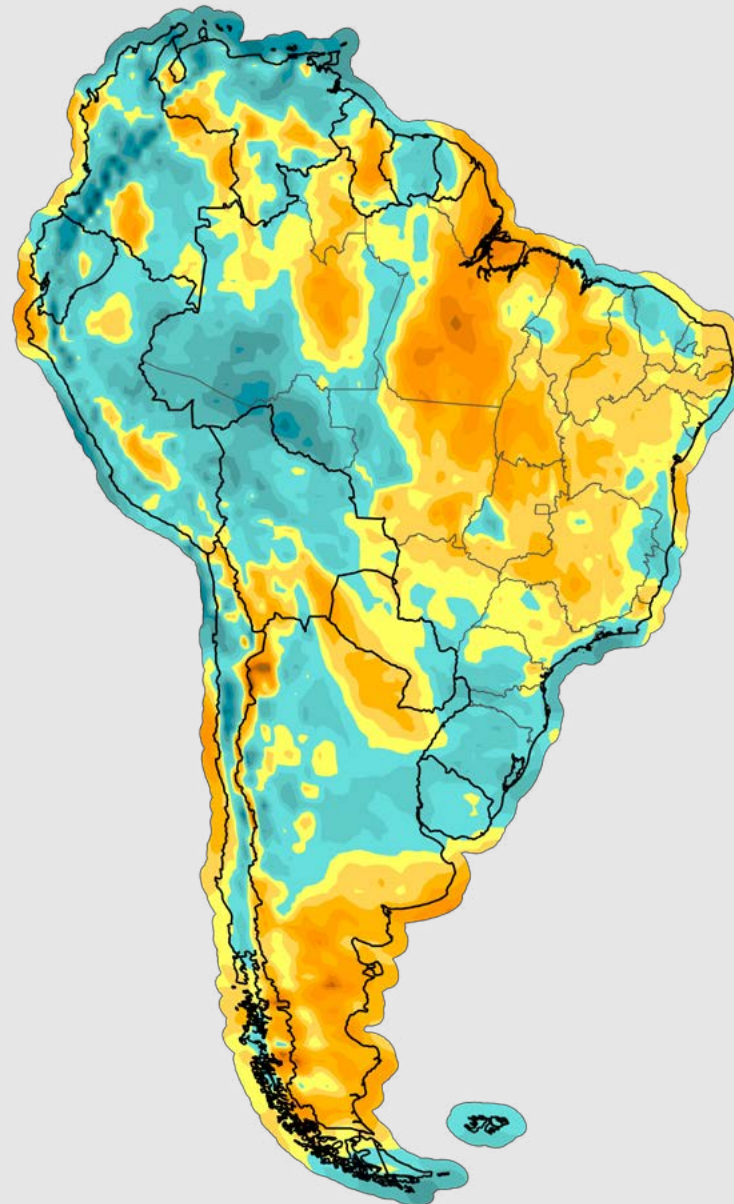
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South America
Q3 2020



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Below Normal:

- Peru
- Venezuela
- Colombia
- The ABC Islands
- Uruguay

Above Normal:

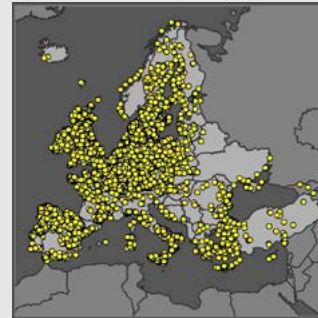
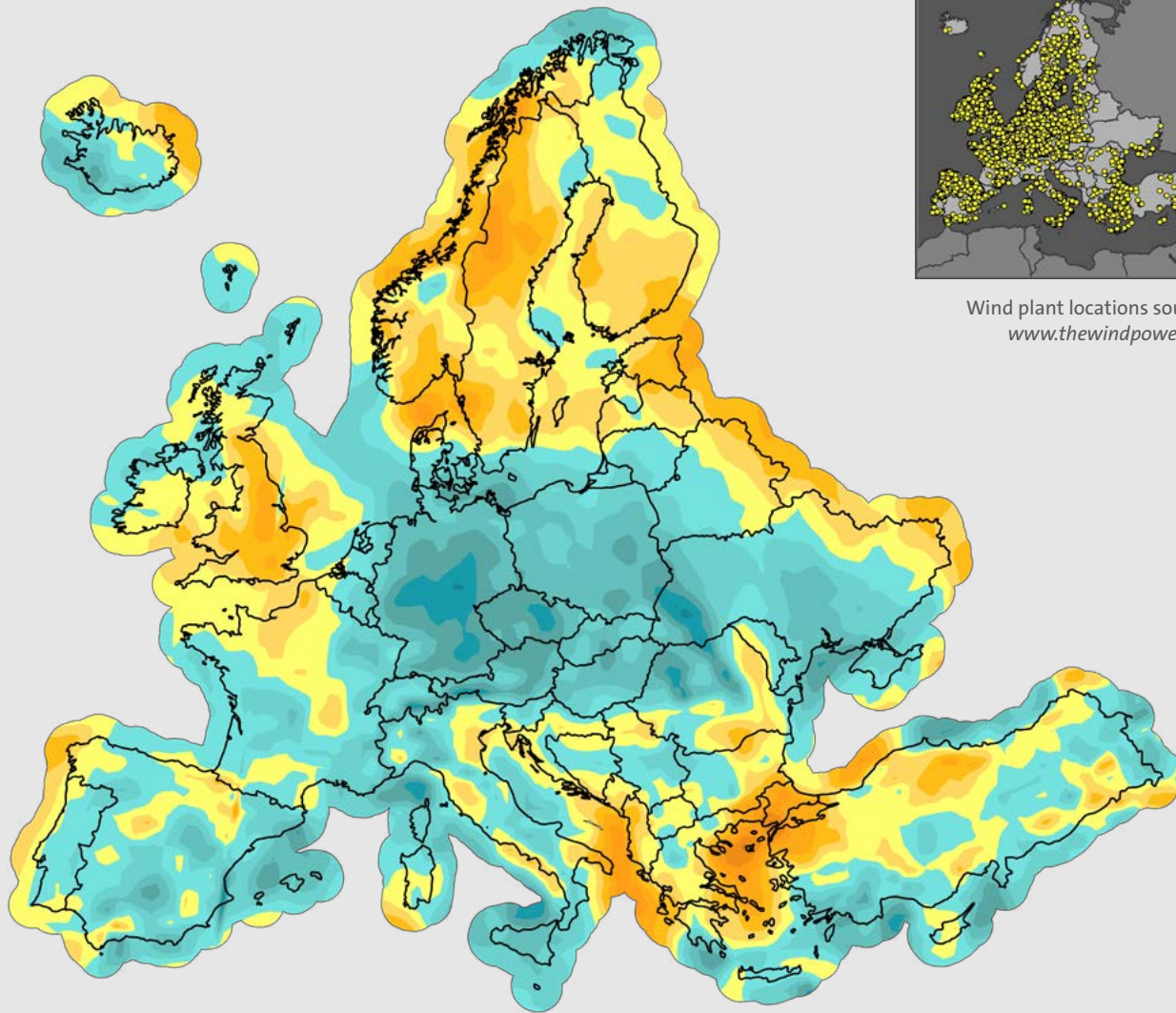
- Northern Brazil
- Southern Argentina
- Coastal Chile



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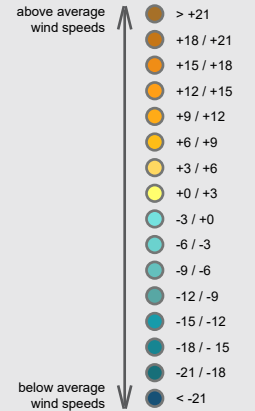
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Europe
Q3 2020



Wind plant locations source:
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Wind Speed Anomaly (%)



Below Normal:

- Central Europe
- Southern Europe

Above Normal:

- Scandinavia
- The United Kingdom
- Western Turkey
- Greece

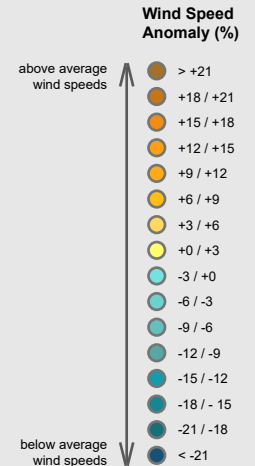
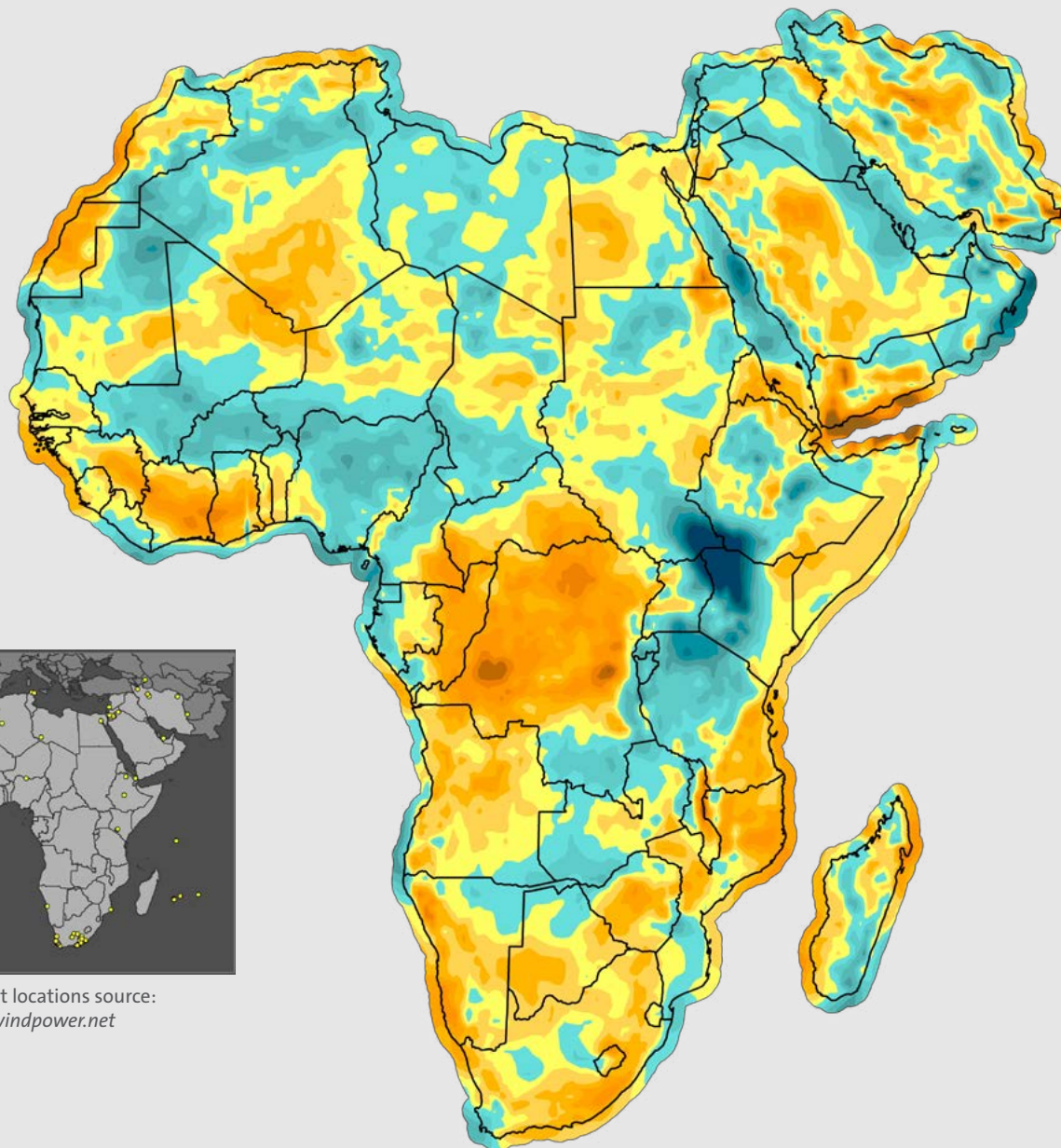


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GLOBAL WIND SPEED PERFORMANCE

Africa and the Middle East

Q3 2020

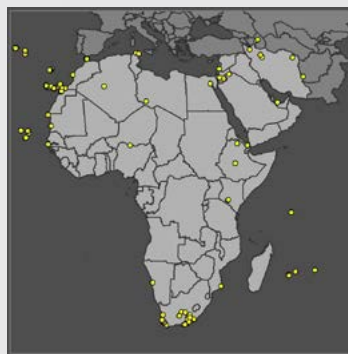


Below Normal:

- Kenya
- Cape Verde Islands

Above Normal:

- South Africa
- Morocco
- Western Sahara



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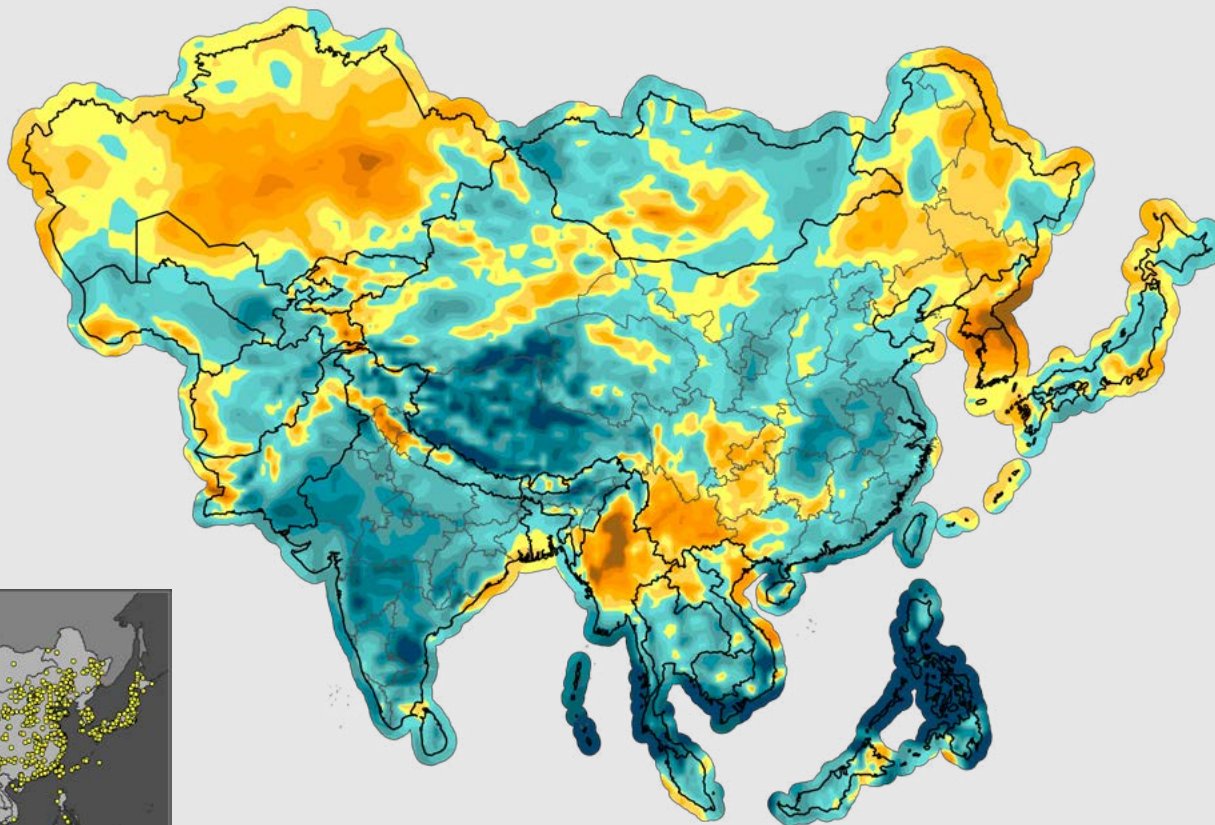


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Asia
Q32020

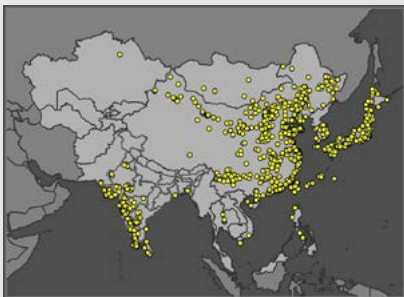


Below Normal:

- India
- Central China
- Southeast Asia

Above Normal:

- Northeast and Southwest China
- South Korea



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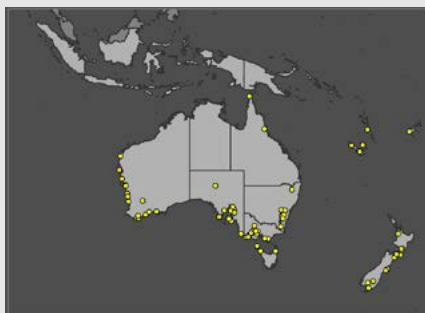
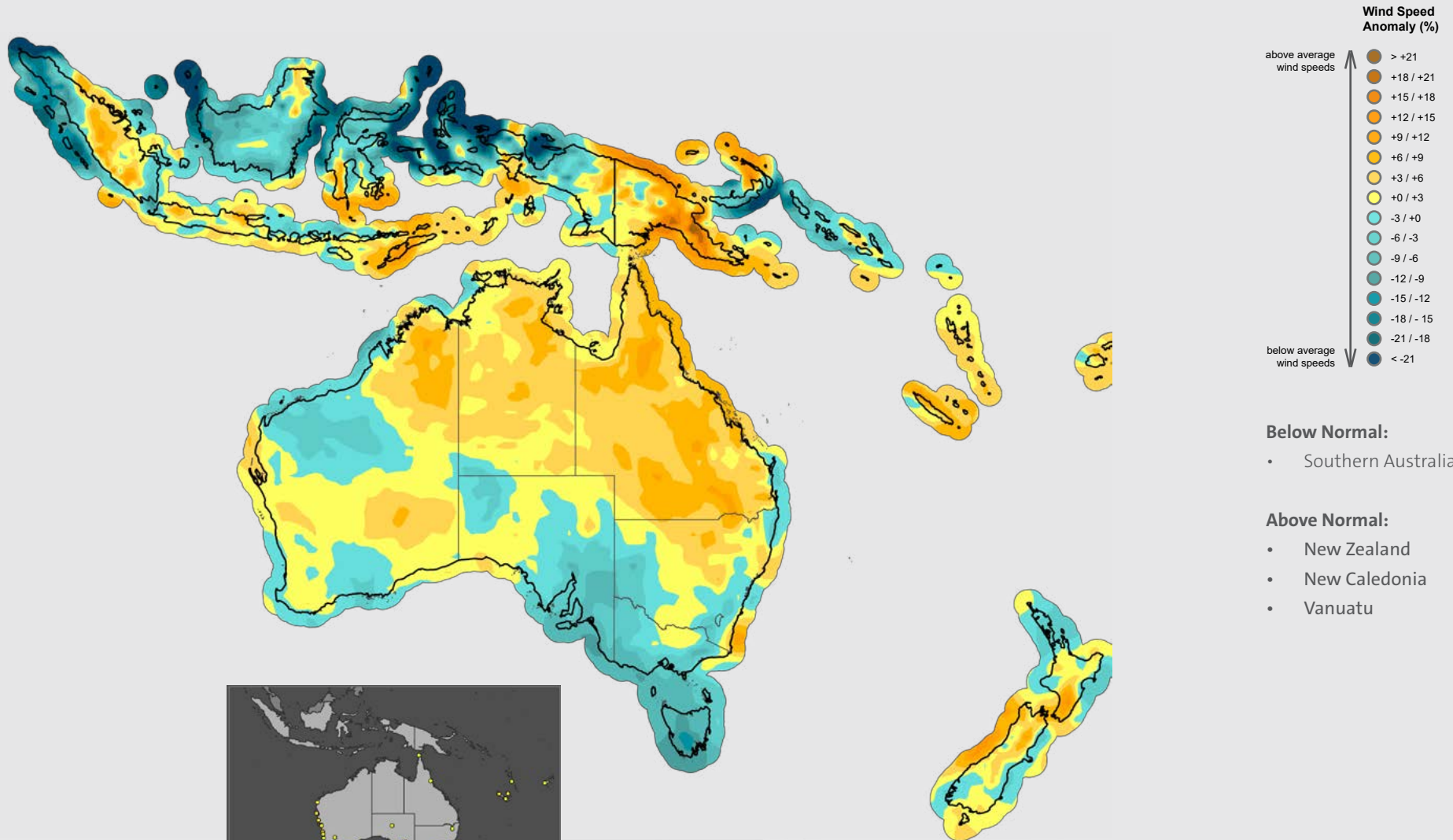
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GLOBAL WIND SPEED PERFORMANCE

Indonesia, Australia and Oceania

Q3 2020



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2020 Wind Index

This index represents the average wind anomaly (expressed as a percent deviation in mean speed from the 1988-2014 baseline for the corresponding calendar period) for each region and country shown, weighted by the location and megawatt capacity of wind projects in production by the end of 2019. The wind project locations and rated capacities are from The Wind Power database (TheWindPower.net). Note that not all operating projects are in the database, and coverage in certain countries such as China is weak. However, UL believes the findings are reasonably representative of wind conditions for the industry as a whole and for the key wind-producing countries.

[Click HERE](#) to download index values for even more wind producing countries!



Regions/Leading Wind Producing Countries	Jan	Feb	Mar	Q1	Apr	May	Jun	Q2	Jul	Aug	Sep	Q3	Oct	Nov	Dec	Q4	ANNUAL
North America	0.0	2.7	-1.3	0.2	-4.8	-1.0	7.3	0.2	-1.2	2.1	2.0	1.0					
Canada	-9.5	6.3	4.1	-0.1	5.6	6.2	1.2	4.5	-4.4	6.7	7.7	3.5					
USA	1.2	2.2	-1.9	0.2	-5.7	-2.0	8.2	-0.2	-0.3	1.7	1.8	1.1					
Mexico	2.4	5.7	-5.9	0.6	-12.2	3.3	6.5	-2.0	-13.3	1.4	-2.0	-5.0					
South America	-8.8	-6.7	-12.9	-9.3	0.8	4.5	2.5	2.7	0.9	2.9	1.3	1.7					
Brazil	-10.8	-9.6	-15.9	-11.9	-0.5	3.2	1.8	1.7	1.6	2.4	2.7	2.3					
Argentina	5.1	1.4	-4.1	1.0	-3.8	2.5	3.1	0.7	-1.9	13.7	11.0	7.6					
Europe	0.4	22.3	5.3	9.1	-5.6	0.0	-2.0	-2.7	-0.9	-2.9	-3.5	-2.5					
Denmark	8.2	25.8	0.0	11.4	2.8	6.6	-10.3	-0.2	17.3	-14.2	-8.4	-2.2					
France	0.4	36.6	11.5	15.7	-10.6	1.2	0.5	-3.2	-0.2	2.8	-2.7	-0.1					
Germany	1.0	39.4	5.5	14.7	-3.0	-2.8	-4.6	-3.5	-5.2	-5.9	-15.2	-8.9					
Great Britain	5.0	35.9	5.2	15.2	-9.4	-1.6	5.2	-2.3	7.1	0.6	2.7	3.4					
Ireland	-1.1	36.0	5.5	13.2	-18.9	1.7	7.2	-4.0	5.7	-4.4	-0.3	0.4					
Italy	-10.4	13.4	-7.8	-1.7	-11.6	12.7	11.8	3.6	-12.5	-0.6	2.4	-3.6					
Portugal	-1.5	-16.1	0.6	-5.3	-13.5	-10.2	1.3	-7.7	-5.2	0.5	0.6	-1.5					
Spain	-7.8	-15.1	6.5	-5.5	-16.8	-4.6	-4.5	-9.1	-1.2	-2.9	2.9	-0.6					
Africa / Middle East	-2.2	0.3	1.8	-0.1	-3.8	1.4	0.1	-0.7	5.3	6.7	1.4	4.5					
South Africa	2.4	2.8	4.2	3.2	1.7	2.3	3.2	2.6	9.3	6.3	1.0	5.6					
Egypt	5.8	-12.5	-8.0	-5.2	4.7	7.1	-3.6	2.5	7.1	-0.8	4.3	3.6					
Asia	-11.9	-0.1	-0.3	-4.1	-5.5	0.4	-3.1	-2.8	-6.3	1.8	-4.6	-3.1					
China	-13.5	-1.2	0.4	-4.7	-6.0	3.2	-1.3	-1.4	-3.7	2.9	-3.4	-1.5					
India	-5.5	6.6	-3.4	-1.1	-7.9	-14	-13.8	-12	-20.3	-2.0	-14.3	-12.3					
Ind, Aus, Oceania	0.0	-0.3	2.2	0.6	11.4	10.4	-10.2	3.2	-16.4	0.1	7.5	-2.8					
Australia	-0.1	-0.2	2.7	0.8	11.6	14.1	-11.5	4.0	-18.6	0.5	4.7	-4.3					
World	-5.3	8.3	4.6	2.3	-2.2	-0.4	0.1	-1.1	-2.5	-2.4	-2.6	-2.5					