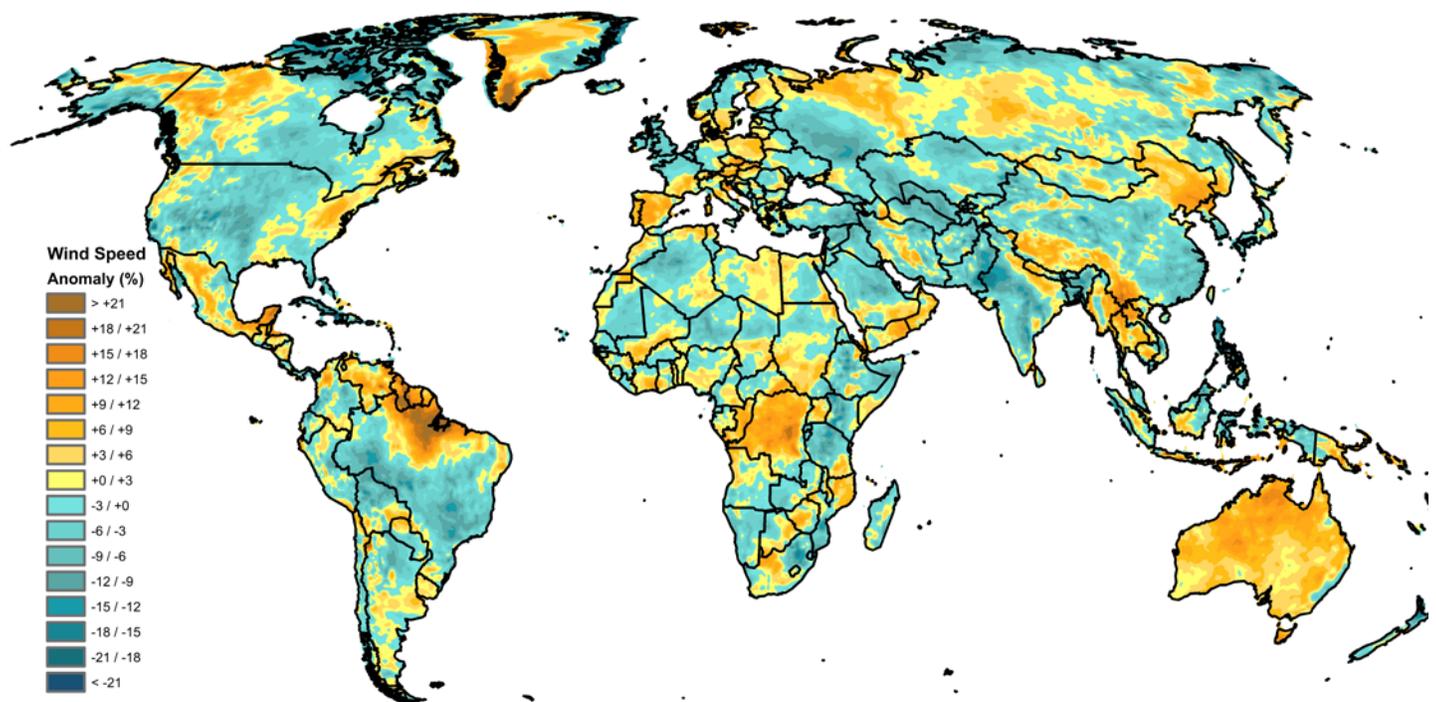


# Wind Trends Bulletin

WIND SPEED PERFORMANCE

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## GLOBAL

Q2 2019

The global wind anomalies have held nearnormal to only slightly below normal for the first two quarters of 2019. This contrasts with a pattern of below-normal global wind speeds evident for much of the previous year. In Q2 of 2019, the United States, the United Kingdom, India, and France exhibited the strongest wind speed deficits for countries with high installed wind capacity. Conversely, above-normal

winds overspread many high wind capacity areas such as, the Iberian Peninsula, Central Europe, and Scandinavia.

Below-normal wind speed conditions have held for over a year across key wind power producing areas of the United States and Mexico. In the second quarter of 2019, moderate to strong deficits established across much of the interior United States, particularly the southern High Plains,



# Wind Trends Bulletin

## WIND SPEED PERFORMANCE

northern Texas, and the upper Midwest (-6 to -12%). Moderate to strongly above-normal conditions held steady across much of the southern Appalachian Mountains (6 to 12%), while a strong start to the period across the Northeast allowed for above-normal quarterly wind speed departures (3 to 9%). Well below-normal winds continued for the Hawaiian Islands (-18% to more than -21%). Wind speeds across northeast Mexico fell below the norm largely due to a wind speed deficit in June, while strongly above-normal conditions held steady across the Yucatan Peninsula (up to 18%). Key wind power producing areas of eastern Canada experienced a strong start to the quarter, although the above-normal conditions since the beginning of the year across the Canadian Maritimes and southwest Ontario waned in May and June.

Many key wind power producing areas of South America finished the period with near-normal wind speeds after much month-to-month variability. Moderate deficits across inland Brazil during April and May countered a strong wind speed surplus across much of the country in June, thus Brazil as a whole rounded out the quarter at its long-term norm. The wind speeds across Argentina were also at the long-term norm. Strongly above-normal wind speeds across Patagonia in April gave way to below-normal wind speeds in May and June, while the reverse was true for much of central and northern Argentina. Both Chile and Uruguay had a weak start to the quarter in April, although wind speeds rebounded and resulted in slightly above-normal conditions for Q2 as a whole.

Europe rounded out the second quarter of 2019 at near normal. Strongly above-normal wind speeds overspread much of the Mediterranean region during the months of April and May, while much of the Iberian Peninsula remained well above the long-term norm throughout the quarter (6 to 18%). Although wind speeds rose above normal across the United Kingdom and northern France by June, this wind speed surplus did not counteract deficits earlier in the quarter and resulted in below-normal winds there (-3 to -18%). Well above-normal winds across central Europe during April outweighed deficits later in the quarter. Below-normal wind speeds across Scandinavia during April gave way to strongly above-normal conditions, particularly for the key wind power producing areas of southern Sweden and western Finland, resulting in above-normal conditions (up to 9%).

Wind speed departures moderated across Africa and the Middle East during the second quarter of 2019. The quarterly wind speeds across South Africa fell to the long-term norm. After much month-to-month variability, Morocco finished the period near-normal. Although the wind-speed surplus in far northern and western Egypt at the start of the year waned during the second quarter, the year's early wind speed deficit across key areas to the east now eased. Elsewhere across northern Africa, significantly above-normal wind speeds waned, particularly across Tunisia and northern portions of Algeria and Libya.

The recent wind speed deficit across Asia moderated to near normal. Although below-normal winds abated across much of Asia, the wind speeds across only two wind power producing countries rose above the long-term norm: Sri Lanka and Thailand. Wind speeds across India fell moderately below the norm, with some areas of strong wind speed deficits in western and central India (as low as -21%). China moderated to near normal as a whole. Deficits in central and eastern China prevail (although they have waned since the first quarter), while a wind speed surplus continues for northeast and southwest China (up to 18% in far southwest China). The Philippines continue well below their long-term norm, a trend that has prevailed very steadily in recent years.

Above-normal winds spread over much of mainland Australia and the island of Tasmania. Quarterly wind speeds dipped below the long-term norm for most other wind power producing areas of Oceania, although only mildly below normal for most areas (-3%). Some strong deficits were experienced across localized areas of New Zealand (as low as -16%).



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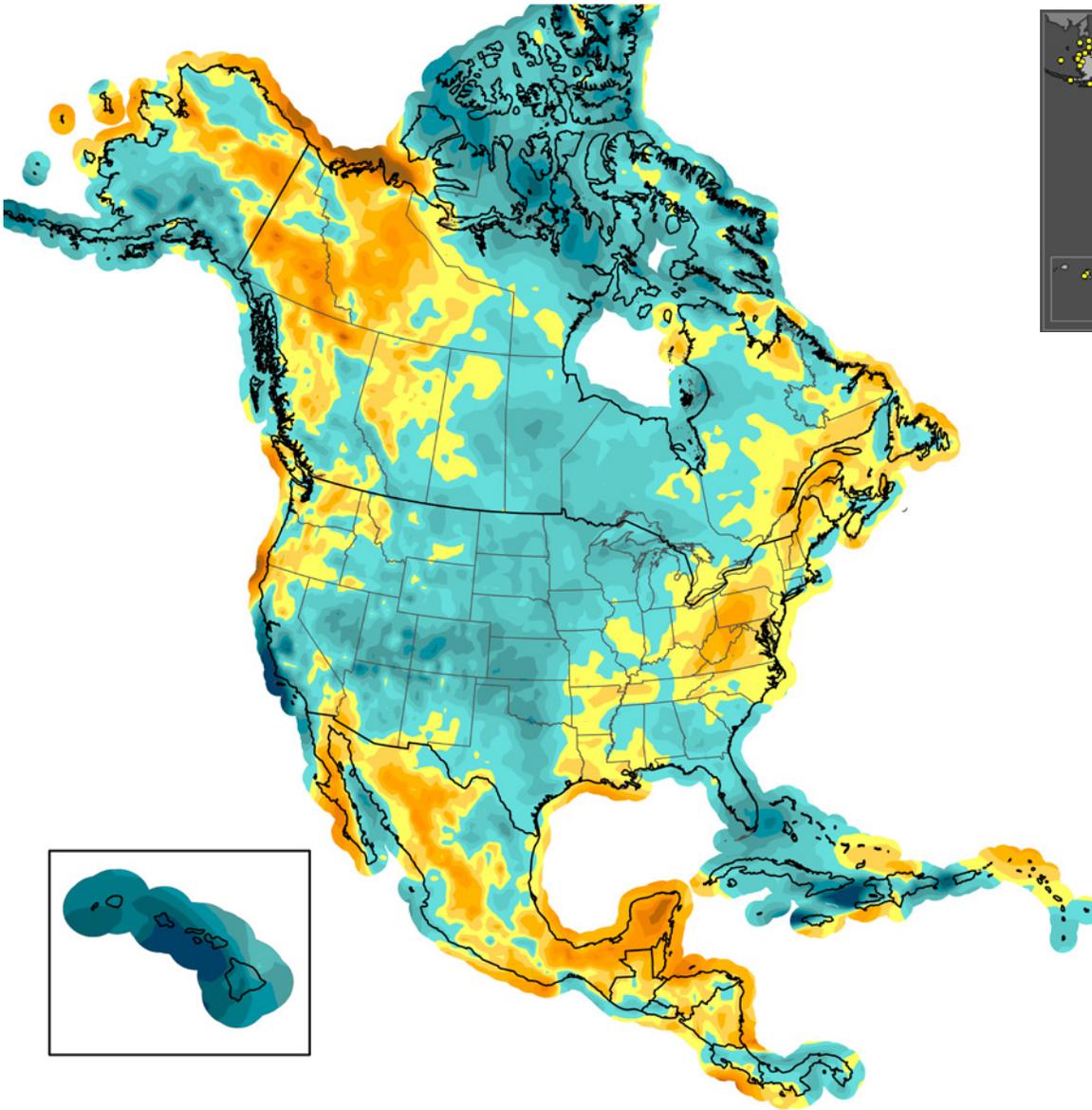
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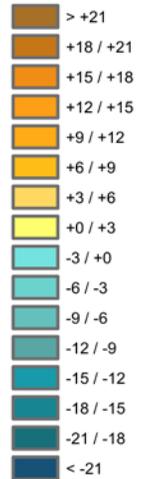
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Wind plant locations source:  
[www.thewindpower.net](http://www.thewindpower.net)

### Wind Speed Anomaly (%)



## NORTH AMERICA

Q2 2019

### Areas with below-average winds:

- The Great Plains, USA & CAN
- The Midwest, USA
- Central California, USA
- Texas, USA
- Hawaii, USA

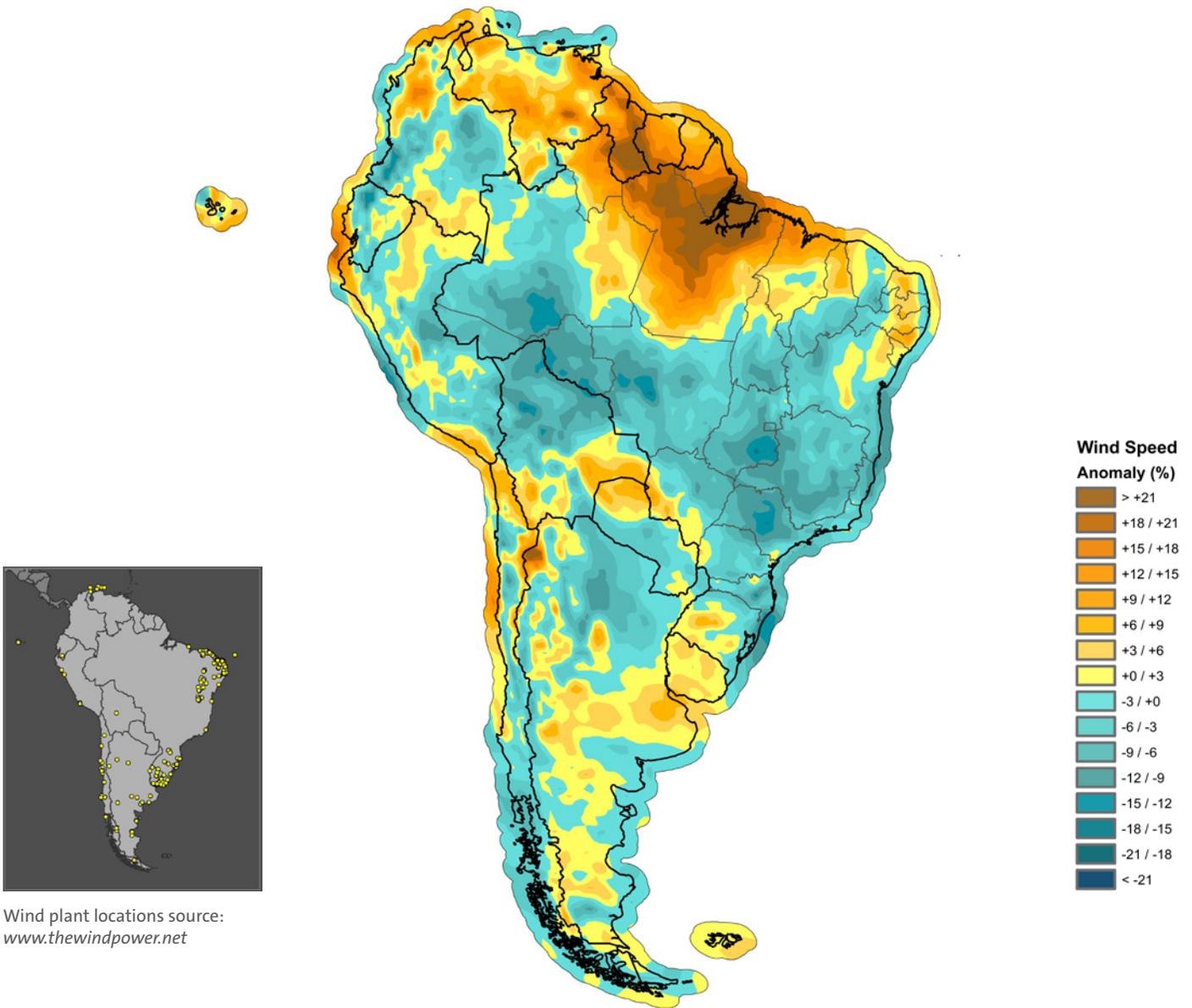
### Areas with above-average winds:

- Northeast, USA
- The northern Appalachians, USA
- Canadian Maritimes, CAN
- Pacific Northwest, USA



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## SOUTH AMERICA

Q2 2019

Areas with below-average winds:

- Central & Southeast Brazil
- Southern Chile

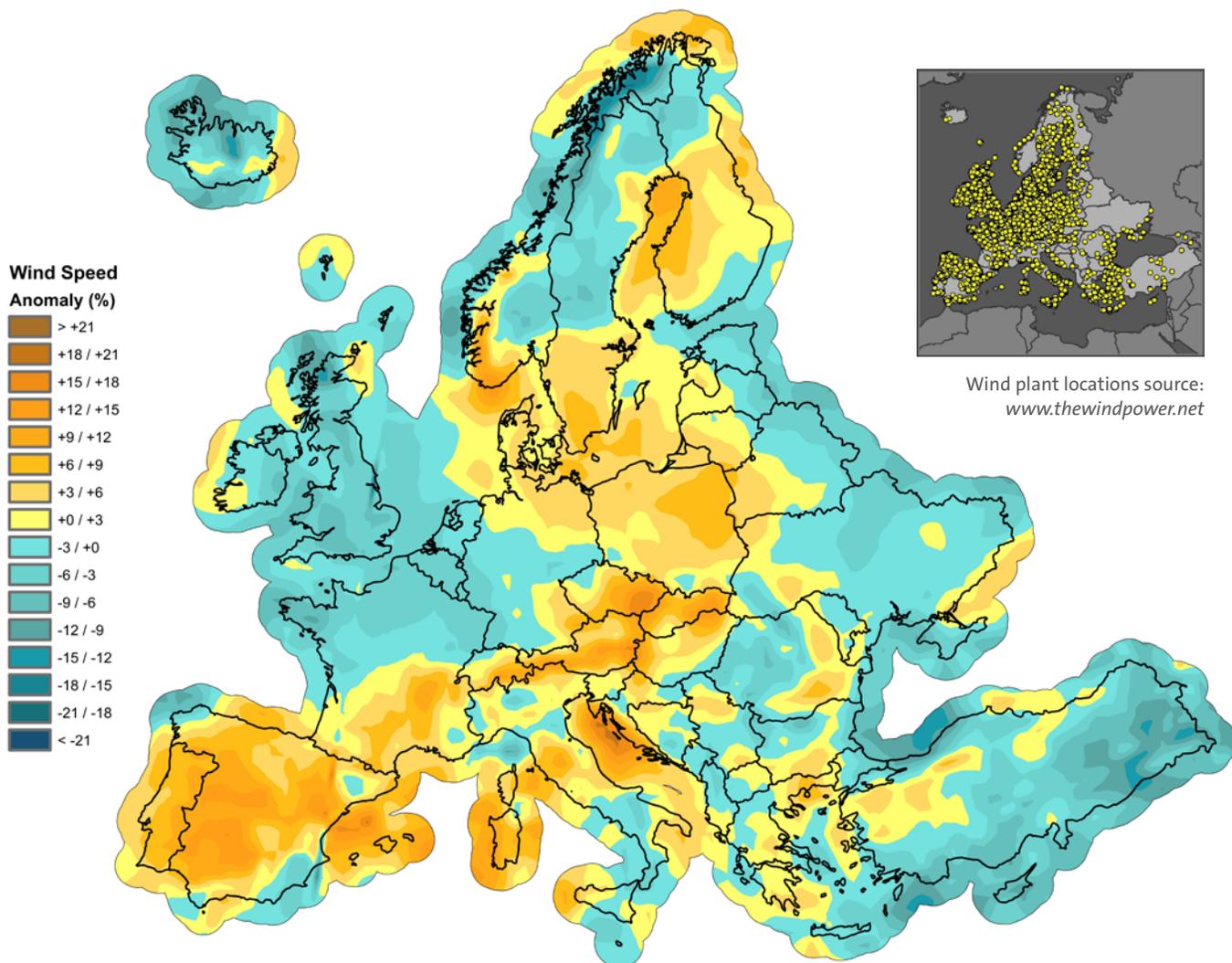
Areas with above-average winds:

- Northeast Brazil
- Northern Chile



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## EUROPE

Q2 2019

### Areas with below-average winds:

- The United Kingdom
- Northern France
- Southern Germany
- Belgium
- Netherlands

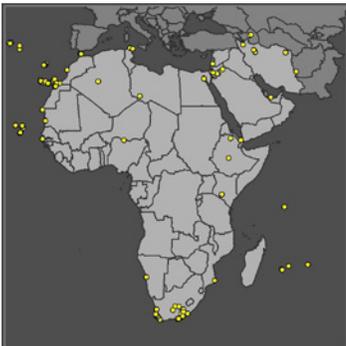
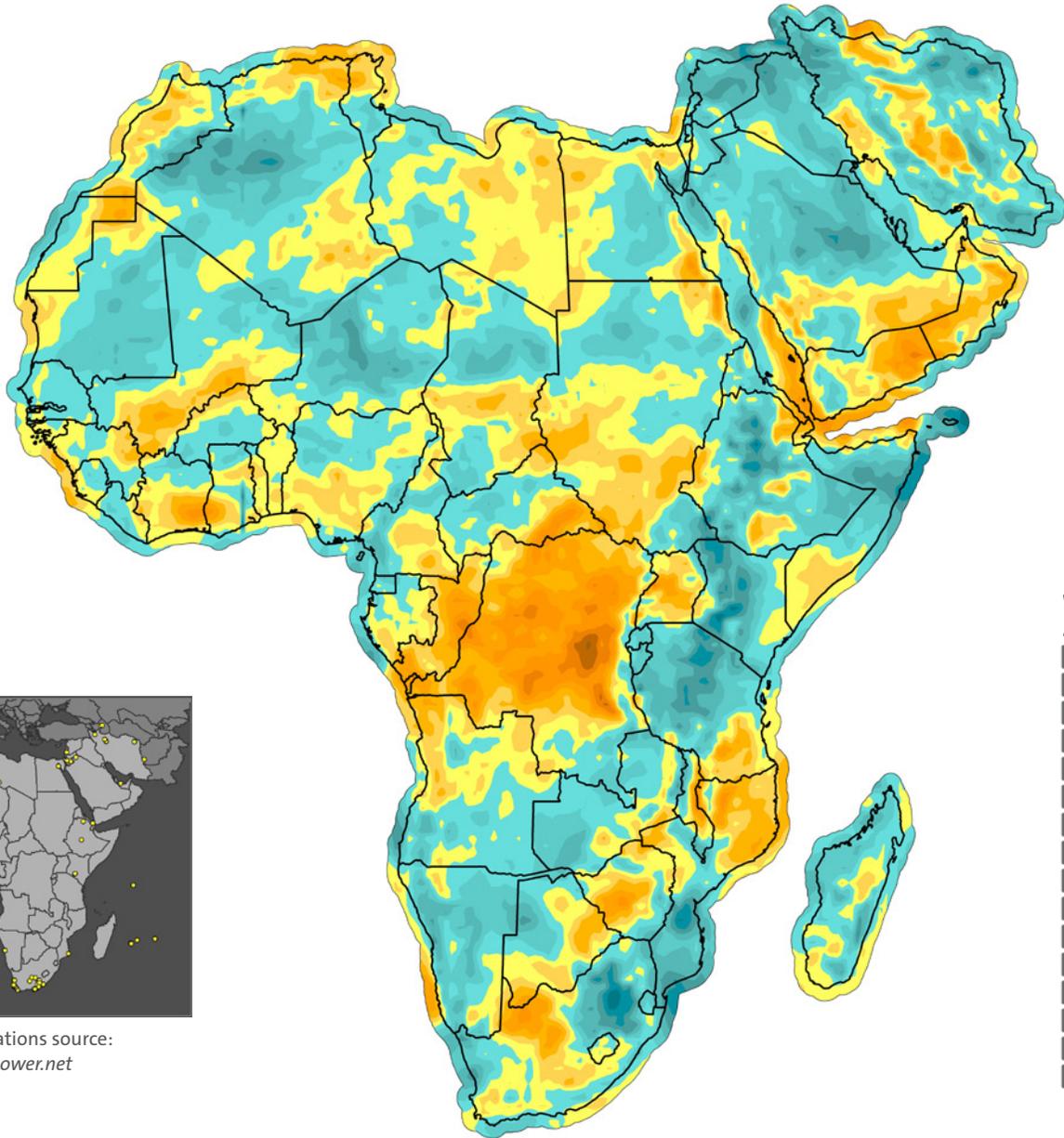
### Areas with above-average winds:

- The Iberian Peninsula
- Southern France
- Central Europe
- Southern Scandinavia & Western Finland



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## WIND SPEED PERFORMANCE



Wind plant locations source:  
[www.thewindpower.net](http://www.thewindpower.net)

## AFRICA / MIDDLE EAST

Q2 2019

### Areas with below-average winds:

- Red Sea Riviera, EGY
- Ethiopia
- Western Sahara
- Iran

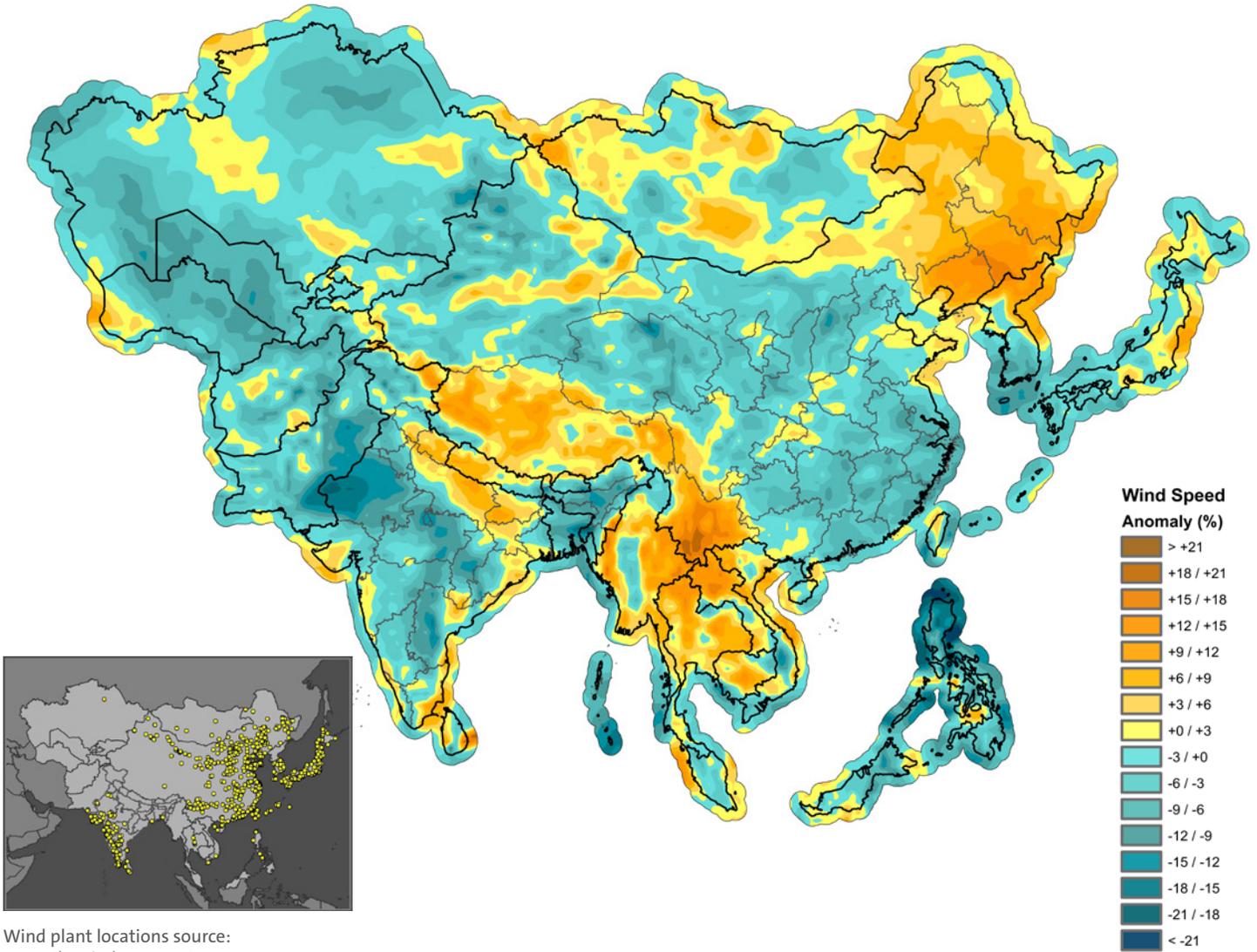
### Areas with above-average winds:

- Tunisia
- Reunion
- Mauritania
- The southern Arabian Peninsula



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## WIND SPEED PERFORMANCE



Wind plant locations source:  
[www.thewindpower.net](http://www.thewindpower.net)

### ASIA

Q2 2019

#### Areas with below-average winds:

- India
- Philippines
- South Korea
- Eastern & south-central China

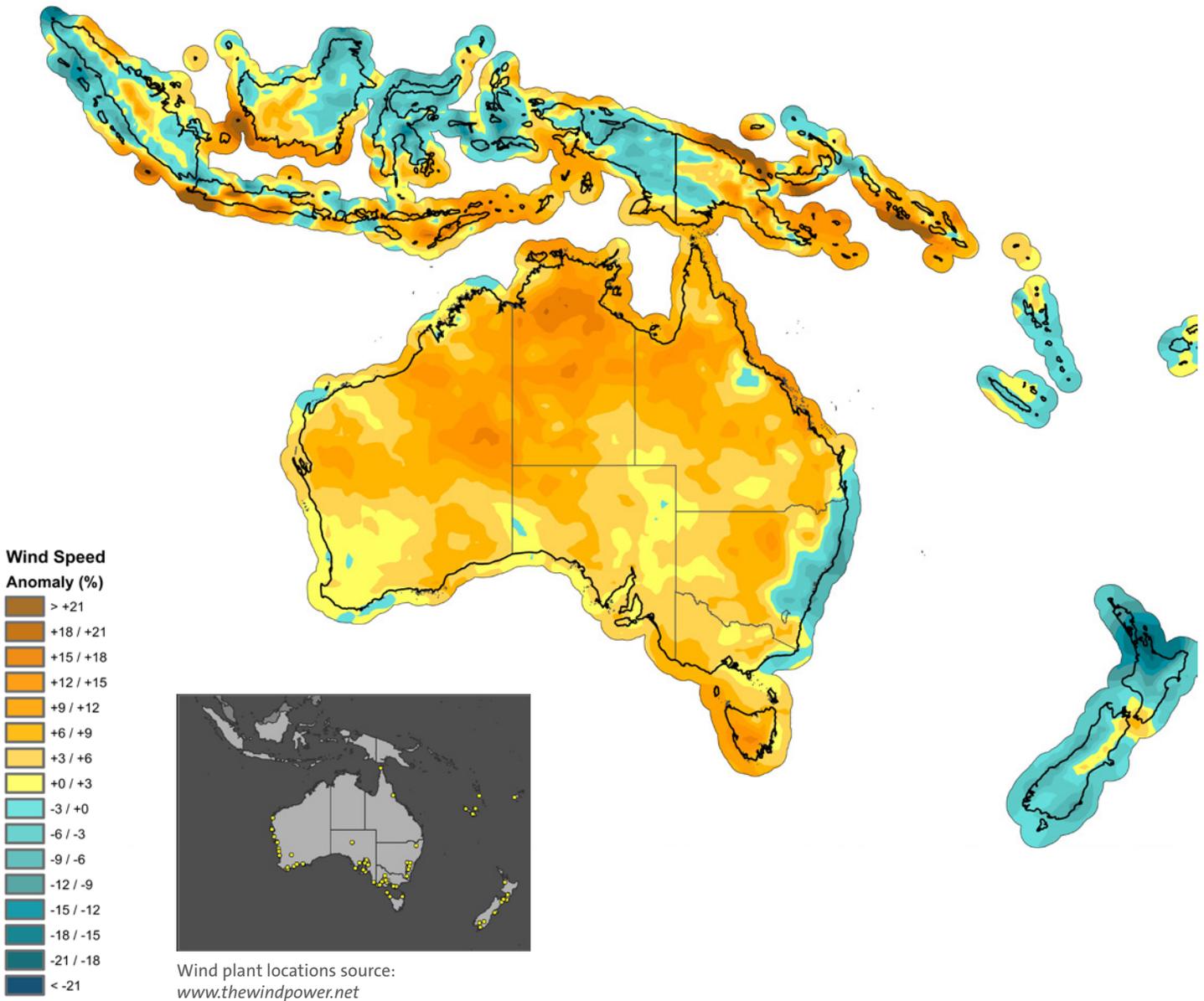
#### Areas with above-average winds:

- Northeast & southwest China
- Mainland Southeast Asia



# Wind Trends Bulletin

## WIND SPEED PERFORMANCE



## INDONESIA, AUSTRALIA AND OCEANIA

Q2 2019

Areas with below-average winds:

- New Zealand
- New Caledonia
- Fiji
- Vanuatu
- Papua New Guinea

Areas with above-average winds:

- Mainland Australia
- Tasmania, AUS



# Wind Trends Bulletin

## 2019 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 2018. 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.

Regions/Leading Wind Producing Countries	Jan	Feb	Mar	Q1	Apr	May	Jun	Q2	Jul	Aug	Sep	Q3	Oct	Nov	Dec	Q4	ANNUAL
<b>North America</b>	-1.1	3.1	-4.9	-1.3	-1.0	-5.2	-4.0	-3.4	1.0								
<b>Canada</b>	3.0	8.1	0.7	3.9	9.6	-5.2	0.8	2.0	-2.0								
<b>USA</b>	-1.6	3.2	-6.0	-1.8	-2.4	-5.1	-4.8	-4.1	1.5								
<b>Mexico</b>	-2.5	-13.5	0.5	-4.9	1.4	-3.8	-3.5	-2.1	-5.9								
<b>South America</b>	8.8	-9.2	-3.9	-0.9	-6.5	2.1	4.9	0.6	-1.0								
<b>Brazil</b>	11.1	-10.7	-6.6	-1.5	-7.8	1.9	4.7	0.1	-2.1								
<b>Argentina</b>	-0.7	5.9	1.2	2.0	1.7	-4.7	2.9	0.0	-4.0								
<b>Europe</b>	0.1	-4.8	11.0	1.9	0.6	2.1	-0.1	0.8	-3.6								
<b>Denmark</b>	-2.9	-3.2	13.5	2.2	-4.6	15.8	-1.8	3.1	7.5								
<b>France</b>	-7.7	-14.0	18.1	-1.7	-5.7	-1.6	-0.1	-2.6	-2.5								
<b>Germany</b>	1.9	-7.6	19.7	4.6	3.8	1.1	-2.8	0.8	-4.8								
<b>Great Britain</b>	-16.2	-7.5	9.8	-5.3	-2.1	-14.3	4.1	-4.4	-6.0								
<b>Ireland</b>	-22.1	12.9	4.7	-2.8	12.9	-14.3	3.5	-1.2	-7.2								
<b>Italy</b>	17.3	16.4	6.4	13.2	-4.3	11.9	-7.2	0.2	-2.9								
<b>Portugal</b>	5.3	-7.3	-2.1	-0.9	5.8	15.8	1.4	7.6	-6.2								
<b>Spain</b>	7.0	-12.1	-1.3	-1.9	1.5	9.8	3.3	4.7	0.9								
<b>Africa / Middle East</b>	5.7	-3.8	1.2	1.3	-1.5	0.7	-2.1	-0.9	5.7								
<b>South Africa</b>	-5.5	-3.4	-1.0	1.6	-0.7	-2.8	3.0	0.0	17.4								
<b>Egypt</b>	8.0	-15.1	-3.7	-7.8	2.9	2.3	-11.1	-2.4	-1.2								
<b>Asia</b>	-4.5	-2.8	-3.1	-3.5	-4.6	4.3	-1.8	-0.8	-3.0								
<b>China</b>	-4.9	-4.0	-3.7	-4.2	-5.1	7.2	-1.3	0.2	-4.1								
<b>India</b>	-4.1	5.7	0.3	0.3	-1.5	-9.0	-5.4	-5.5	1.5								
<b>Ind, Aus, Oceania</b>	-2.5	1.7	-1.4	-0.9	3.9	13.0	-6.7	3.1	5.8								
<b>Australia</b>	-4.5	0.9	0.3	-1.3	5.4	13.3	-6.0	3.8	6.6								
<b>World</b>	-0.6	-1.7	2.2	-0.2	-0.9	0.4	-1.1	-0.5	-1.4								

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

