For the wind energy industry to expand, an accurate estimate of wind resources is needed to ensure maximum operating conditions. Accurate design leads to cost savings and a reduction in the cost of equipment. To maximize the return of investment, the design of wind turbines is determined on the 50-year return period, which is 50 years of sustained wind speed (U50 m/s). Stable and consistent wind speeds are one of the major determining factors when considering turbine design and wind turbine farm placement.

Cornell researchers Sara C. Pryor, professor in the Department of Earth and Atmospheric Sciences, and Rebecca J. Barthelmie, professor in the Sibley School of Mechanical and Aerospace Engineering, recently released a new global wind atlas—a digital compendium of sites around the world with extreme wind speeds. This type of wind atlas is the first publicly available, uniform, and geospatially explicit dataset of locations, according to their research “A Global Assessment of Extreme Wind Speeds for Wind Energy Applications.”

According to the research, the global wind turbine installed capacity was more than 651 GW, with 90 percent placed onshore by 2019. China and Europe are leading the way with 36 and 31 percent of installed capacity, respectively. The region maps below are provided by the Global Wind Atlas 3.0 (2019). The regions shown are the windiest in the world, according to the atlas.

Let’s explore eight locations around the world that have the fastest wind speeds and energy capacity worldwide.