FREQUENTLY ASKED QUESTIONS

What is "Site Wind Right"?

Site Wind Right is The Nature Conservancy's approach to promoting smart, renewable wind energy in the right places – areas that are low impact for conservation, including already developed lands. The strategy has several components:

- Promoting policies and incentives for low-impact renewable energy deployment;
- Advancing the science of low-impact siting;
- Providing the wind industry and public with information to support low-impact siting: and
- Pursuing opportunities to work with the renewable energy sector to advance good siting practices.

One of the resources we have developed as part of this strategy is a **Site Wind Right Map**. The map was designed to identify areas where wind development is unlikely to encounter wildlife-related conflict, project delays, and related cost overruns. Projects in low-impact places are also less likely to be cancelled, resulting in more reliable and efficient renewable energy deployment.

Why has The Nature Conservancy developed a site wind right map?

The Nature Conservancy supports the rapid transition to clean, low-impact energy. Renewable energy is an integral component of this transition. Renewable energy sources, like wind and solar, provide a host of environmental benefits beyond climate. For example, they consume less water than traditional energy systems, and the avoided air and water pollution have significant public health benefits.

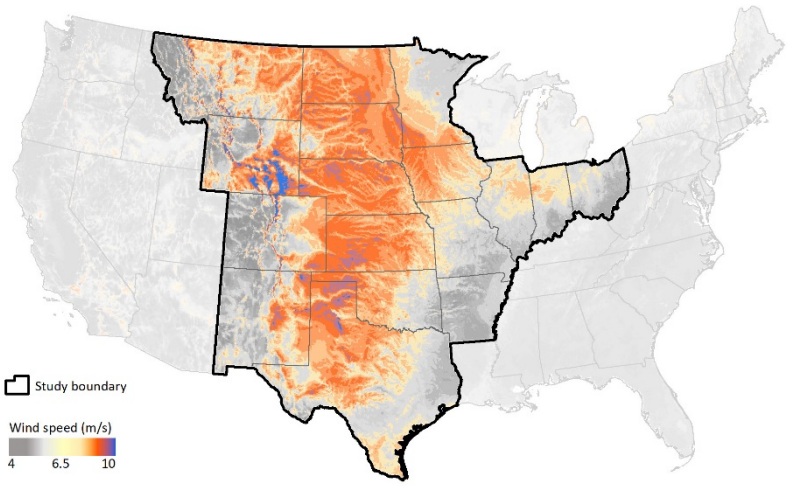
However, utility-scale wind and solar energy also requires a lot of land for development that can, if not sited correctly, have impacts to important habitats – by 2050, an area at least the size of Maine and possibly as large as Arizona could be developed or impacted to meet the projected onshore wind and solar energy needs in the U.S. alone.[1] By directing renewable energy development to low-impact areas, we can take advantage of its climate and environmental benefits, while protecting our lands and waters for future generations.

The good news is that we can meet our climate and land conservation goals *and* support sustainable populations of wildlife and critical habitat. Worldwide, there is enough modified land to provide 19 times the renewable energy needed.[2] In the Wind Belt alone, there is more than 1,000 gigawatts of low-impact wind potential.[3] This figure is more than 10 times current wind generation and is equivalent to total current U.S. electric generation capacity from *all sources*.[4]

I thought wind energy was good for the environment. Why does wind need to be sited right?

Wind energy has significant environmental benefits because it is an affordable source of clean, renewable energy that can help us meet our climate goals. But poorly sited wind energy can impact important ecosystems and wildlife. The Wind Belt, a vast region within the central United States, is home to the Great Plains and almost 80% of the country's current and planned onshore wind capacity.[5] The Great Plains is also home to our largest and most intact prairies – one of the most endangered, least protected habitat types in the world – and wildlife found nowhere else on Earth.[6] By directing renewable energy development away from critical lands and waters, we can meet *both* our renewable energy and habitat conservation goals. By using our Site Wind Right Map, we can improve wind siting decision-making and better ensure that such decisions take into full consideration the cumulative impacts to wildlife and habitat that can result from development of multiple projects across a landscape.

Figure 1. United States' 'Wind Belt'
Utility-scale land-based 80-meter wind speed map for United States



What does The Nature Conservancy mean by low-impact or "good" siting?

Our Site Wind Right strategy helps identify areas where wind development is unlikely to encounter wildlife-related conflict, project delays, and related cost overruns. We support rigorous application of the U.S. Fish and Wildlife Service's Wind Energy Guidelines[7] and our Site Wind Right Map can serve as one source of information to inform the analysis undertaken when the Wind Energy Guidelines are used. We also support further refinement of current siting practices and improvements to the science around the effects of wind energy development on species and habitat, including cumulative impacts.

How did The Nature Conservancy determine which areas are low impact for conservation?

The conservation information used to develop the Site Wind Right Map pulls together the best available science on high-quality wildlife habitat and intact landscapes. It is based on a review of the existing research and discussions with key partners, including local, state, and federal wildlife agencies, and other conservation professionals. Information on the data used in the analysis and the rationale for the assumptions reflected in the map are provided in the "methods" paper, which can be found on our Site Wind Right web page.

How important is the wind belt for conservation? Much of the land seems to be farmland or cattle ranches. What's special about this region?

The Wind Belt is home to some of the largest remaining grassland habitats, which are among the most threatened and least protected habitat types in the world.[8] The region's tallgrass prairies, for instance, currently occupy less than 5% of their historic expanse.[9] These and other wild places are essential to our cultural heritage and natural history. The Wind Belt encompasses many iconic landscapes – such as the Flint Hills, the Sandhills, and the Badlands – and supports important wildlife species, such as whooping cranes, prairie chickens, and eagles. Habitat fragmentation is a significant threat to these species. In many parts of the Wind Belt, so much of the natural habitat has already been converted that the remaining habitat is irreplaceable.

How does The Nature Conservancy intend for the site wind right map to be used?

There is not a one-size-fits-all solution to "good" wind energy siting, but the Site Wind Right Map can be a valuable source of information to identify wind project sites that support clean, low-impact energy - energy that is both low-carbon and that is sited in a manner that supports sustainable conservation outcomes. It was designed to serve as an important source of information for early screening of potential sites and to support application of the Wind Energy Guidelines, specifically the Tier 1 and Tier 2 analysis. The map is not intended to serve as a substitute for the Wind Energy Guidelines. It should not be the only source of information used during the Tier 1 and Tier 2 analysis, and it does not replace the need to consult with state and federal wildlife agencies or conduct detailed site-level analyses of impacts.

Who can use the site wind right map?

Our Site Wind Right Map is free and available for download (www.nature.org/sitewindright) to anyone who is interested in using it.

Will The Nature Conservancy update the site wind right map?

Yes. We will be updating the Site Wind Right Map to reflect new research on wind energy, wildlife, habitat fragmentation, cumulative impacts, and specific direct impacts to at-risk species. We welcome input on the data and assumptions that support the Site Wind Right Map.

Why should developers and energy purchasers use the site wind right map?

Siting wind energy in areas that are low impact to important ecosystems and wildlife will reduce conflicts and help accelerate the transition to a clean energy future. Poorly sited utility-scale renewable energy projects can expect to face more environmental conflicts.[10] This can lead to project delays, higher costs, and even project abandonment, wasting limited resources and time. By siting all energy projects in low-impact areas, we can reduce the risks associated with these projects and accelerate the adoption of more wind energy.

Why is The Nature Conservancy encouraging additional development? Is there nothing worth protecting or restoring in the low impact areas you identified in the Site Wind Right Map?

To avoid the most catastrophic impacts of climate change, we must achieve net zero greenhouse gas emissions by mid-century. We need to accelerate the development of renewable energy, and wind energy has an important role to play in achieving our clean energy goals. There will still be impacts from renewable energy development, but our Site Wind Right strategy demonstrates that we have ample lands of low conservation value available to meet our low-carbon energy goals – we can have our renewable energy and avoid significant impacts to high-priority conservation areas and at risk-wildlife.

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[1] TNC reviewed three studies that projected the energy production mix in the United States through 2050 and considered a "high-renewables" or "deep decarbonization" scenario (NREL 2012, Haley et al. 2019, Williams et al. 2014). For these projections we focus on industrial onshore wind and utility-scale solar because these are expected to provide the bulk of new renewable energy, noting that this may change due to unforeseen technological advances. A review of these studies finds a large range of wind and solar capacity: from 840,000 – 2,300,000 MW. Considering the amount of current renewable capacity, this reflects a net increase of roughly 725,000 – 2,192,000 MW. We estimate spatial impacts for future utility-scale solar PV development between 3 – 6 million acres (Ong et al. 2012) and future onshore wind development of 19 – 70 million acres (DOE 2008). We find a total land requirement range of 22 – 76 million acres (including turbine spacing and assuming all utility-scale solar PV would be ground-mounted). See: U.S. Department of Energy (DOE). 2008. 20% Wind Energy by 2030. DOE/GO-102008-2567. https://www.nrel.gov/docs/fy08osti/41869.pdf; Haley, B., R. Jones, G. Kwok, J. Hargreaves, J. Farbes, J. Williams. 2019. 350 ppm Pathways for the United States. Evolved Energy Research. https://docs.wixstatic.com/ugd/294abc_95dfdf602afe4e11a184ee65ba565e60.pdf; National Renewable Energy Laboratory (NREL). 2012. Renewable Electricity Futures Study. Hand, M.M.; Baldwin, S.; DeMeo, E.; Reilly, J.M.; Mai, T.; Arent, D.; Porro, G.; Meshek, M.; Sandor, D. eds. 4 vols. NREL/TP-6A20-52409. Golden, CO: National Renewable Energy Laboratory. https://www.nrel.gov/analysis/re-futures.html; Ong, S., C. Campbell, G. Heath. 2012. Land Use for Wind, Solar, and Geothermal Electricity Generation Facilities in the United States. EPRI, Palo Alto, CA:1023819. https://www.epri.com/#/pages/product/1023819/?lang=en-US; Williams, J.H., B. Haley, F. Kahrl, J. Moore, A.D. Jones, M.S. Torn, H. McJeon. 2014. Pathways to deep decarbonization in the United States. The U.S. report of the Deep Decarbonization Pathways Project of the Sustainable Development Solutions Network and the Institute for Sustainable Development and International Relations. Revision with technical supplement, Nov 16, 2015. http://deepdecarbonization.org/wp-content/uploads/2015/11/US_Deep_Decarbonization_Technical_Report.pdf

[2] S. Baruch-Mordo, S., J.M. Kiesecker, C.M. Kennedy, J.R. Oakleaf, and J.J. Opperman. 2019. "From Paris to practice: sustainable implementation of renewable energy goals." *Environmental Research Letters*, 14: 024013. https://iopscience.iop.org/article/10.1088/1748-9326/aaf6e0

[3] The Nature Conservancy (TNC). 2019. Site Wind Right: Accelerating Clean, Low-Impact Wind Energy in the Central United States. TNC Great Plains Renewable Energy Initiative. http://www.nature.org/sitewindright

[4] The Nature Conservancy estimates that there are enough low-impact lands available in the Wind Belt to generate 1,099 gigawatts of wind energy. See: The Nature Conservancy (TNC). 2019. Site Wind Right: Accelerating Clean, Low-Impact Wind Energy in the Central United States. TNC Great Plains Renewable Energy Initiative. http://www.nature.org/sitewindright. This figure is based on 96,433 megawatts of current installed wind capacity in the Wind Belt states (American Wind Energy Association. 2019. "U.S. Wind Industry Annual Market Report: Year Ending 2018") and a total current total U.S. electric generation capacity of 1,097.6 GW (U.S. DOE Energy Information Agency. "Electric Power Monthly: Table 6.1. Electric Generating Summer Capacity Changes (MW), March 2019 to April 2019." https://www.eia.gov/electricity/Monthly/epm_table_grapher.php?t=epmt_6_01. Last visited July 2, 2019.
"AWEA Third Quarter 2017 Wind Project Database." Total current total U.S. electric generation capacity from U.S. DOE Energy Information Agency (link).

[5] The American Wind Energy Association reported that at the end of 2018, there were 96,433 megawatts of installed wind capacity in the U.S. and 73,554 megawatts of installed wind capacity in the Wind Belt (American Wind Energy Association. 2019. "U.S. Wind Industry Annual Market Report: Year Ending 2018."). AWEA reported that at the end of 2018, there were 35,095 megawatts of wind under construction or in advanced development, 29,777 megawatts of which was in the Wind Belt (American Wind Energy Association. 2019. "U.S. Wind Industry Fourth Quarter 2018 Market Report.").

[6] Hoekstra, J.M., T.M. Boucher, T.H. Ricketts, and C. Roberts. 2005. "Confronting a biome crisis: global disparities of habitat loss and protection." *Ecology Letters* 8(1):23 – 29.

[7] U.S. Fish and Wildlife Service. 2012. "Land-Based Wind Energy Guidelines." https://www.fws.gov/midwest/wind/resources/guidances.html. Last visited November 15, 2018.

[8] Hoekstra, J.M., T.M. Boucher, T.H. Ricketts, and C. Roberts. 2005. "Confronting a biome crisis: global disparities of habitat loss and protection." *Ecology Letters* 8(1):23 – 29.

[9] Sampson, F., Knopf, F. 1994. "Prairie conservation in North America." *Other Publications in Wildlife Management.* 41. https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1040&context=icwdmother

[10] Tegan, Suzanne, Eric Lantz, Trieu Mai, Donna Heimiller, Maureen Hand, and Eduardo Ibanez. July 2016. "An Initial Evaluation of Siting Considerations on Current and Future Wind Deployment." National Renewable Energy Laboratory. Technical Report NREL/TP-5000-61750. https://www.nrel.gov/docs/fy16osti/61750.pdf.