



Environmental Impacts of Technology

The Production of Electricity *Power from Wind*



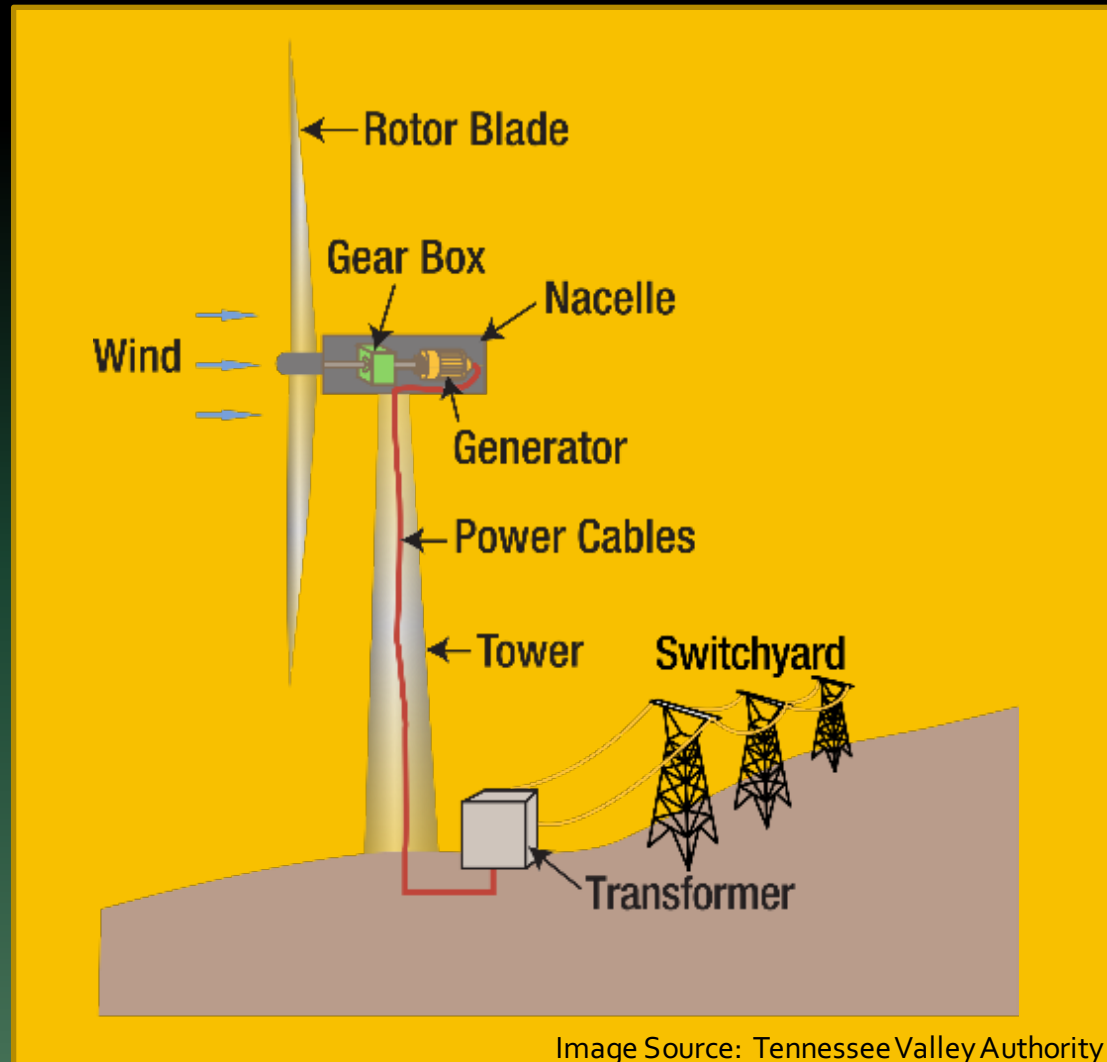
Image Source: Leaflet, Wikimedia Commons



Photo by Kim Hansen. Postprocessing (crop, rotation, color adjustment, dust spot removal and noise reduction) by Richard Bartz and Kim Hansen.

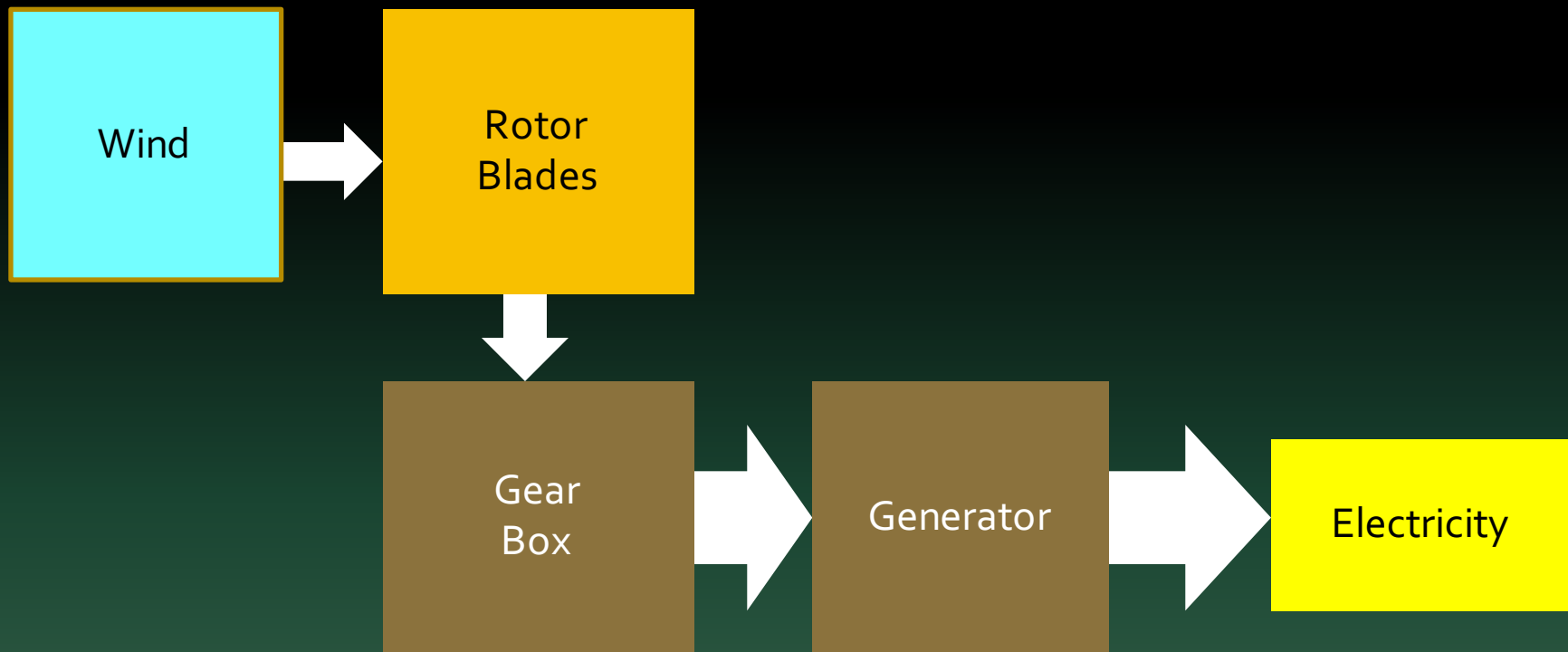
Wind Power

How does it work?



Producing Electricity from Wind

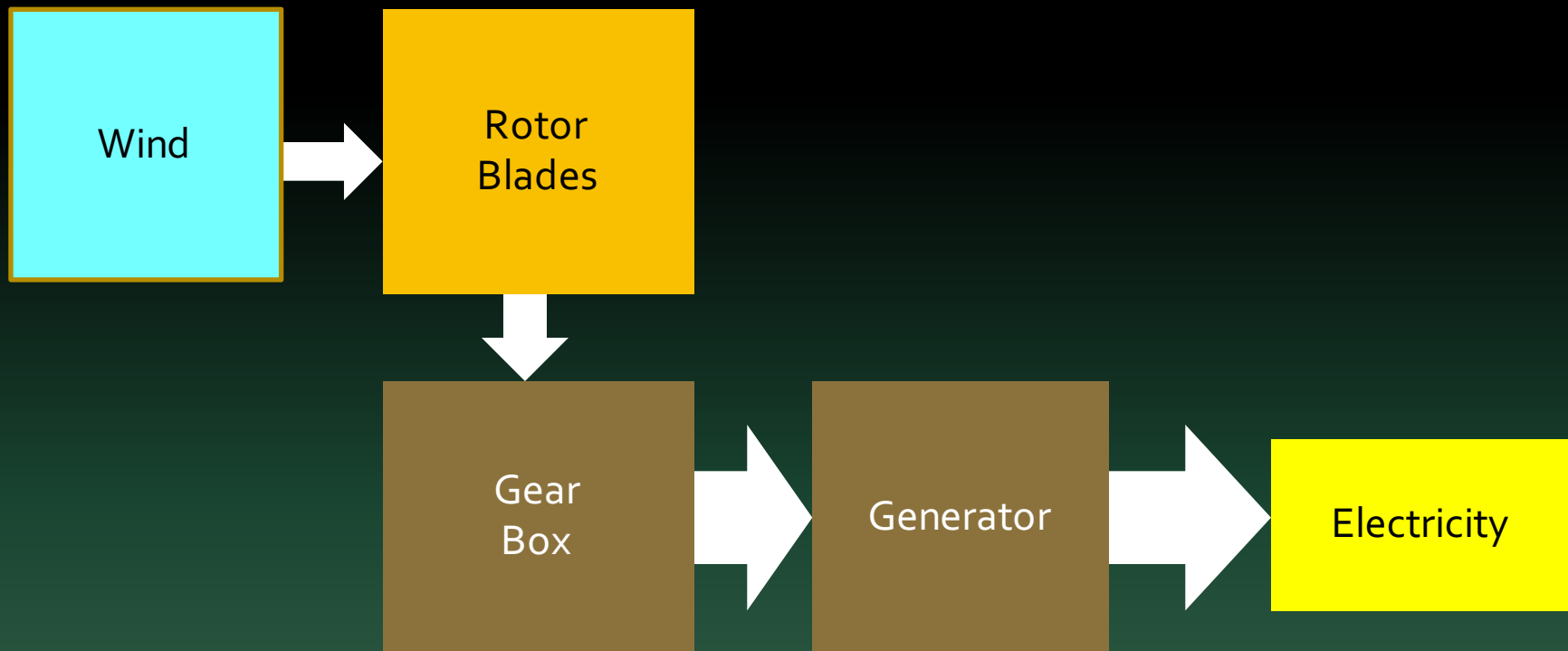
How does it work?



1. Wind turns the rotor blades which turn a low speed shaft at about 30 to 60 rpm. A motor may turn the rotor blades to face an optimal spot relative to the wind.
2. The gear box converts the rpm of the low speed shaft to a high speed shaft which turns at over 1,000 rpm.
3. The high speed shaft drives an electricity generator.

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How does it impact the environment?

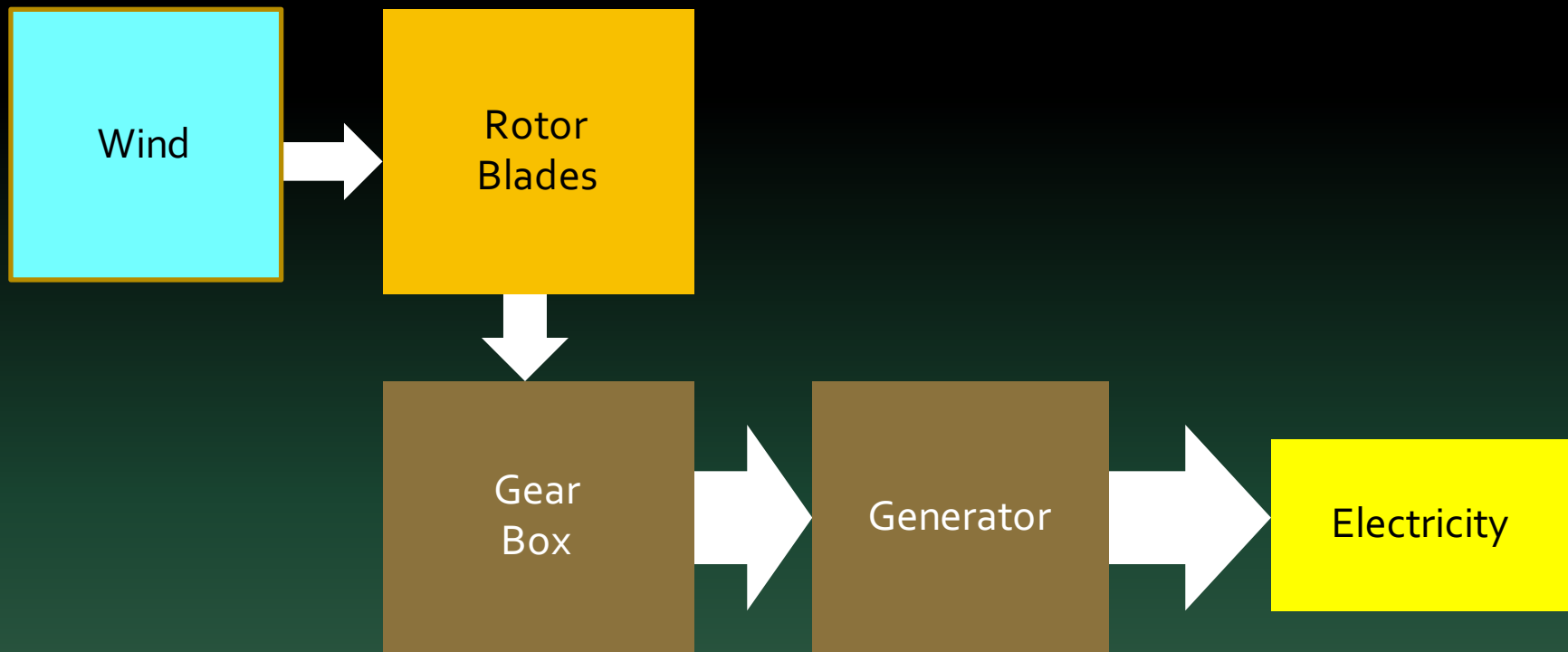


Air Quality and Greenhouse Gas Emissions from Wind Turbines

- Wind power has ZERO GHG emissions and ZERO air pollution during use.
- Wind turbines produce small amounts of GHG emissions during manufacturing, transport, and installation – about 0.05 pounds of carbon dioxide equivalent gases per kWh of energy produced compared to 2 pounds per kWh for burning coal.

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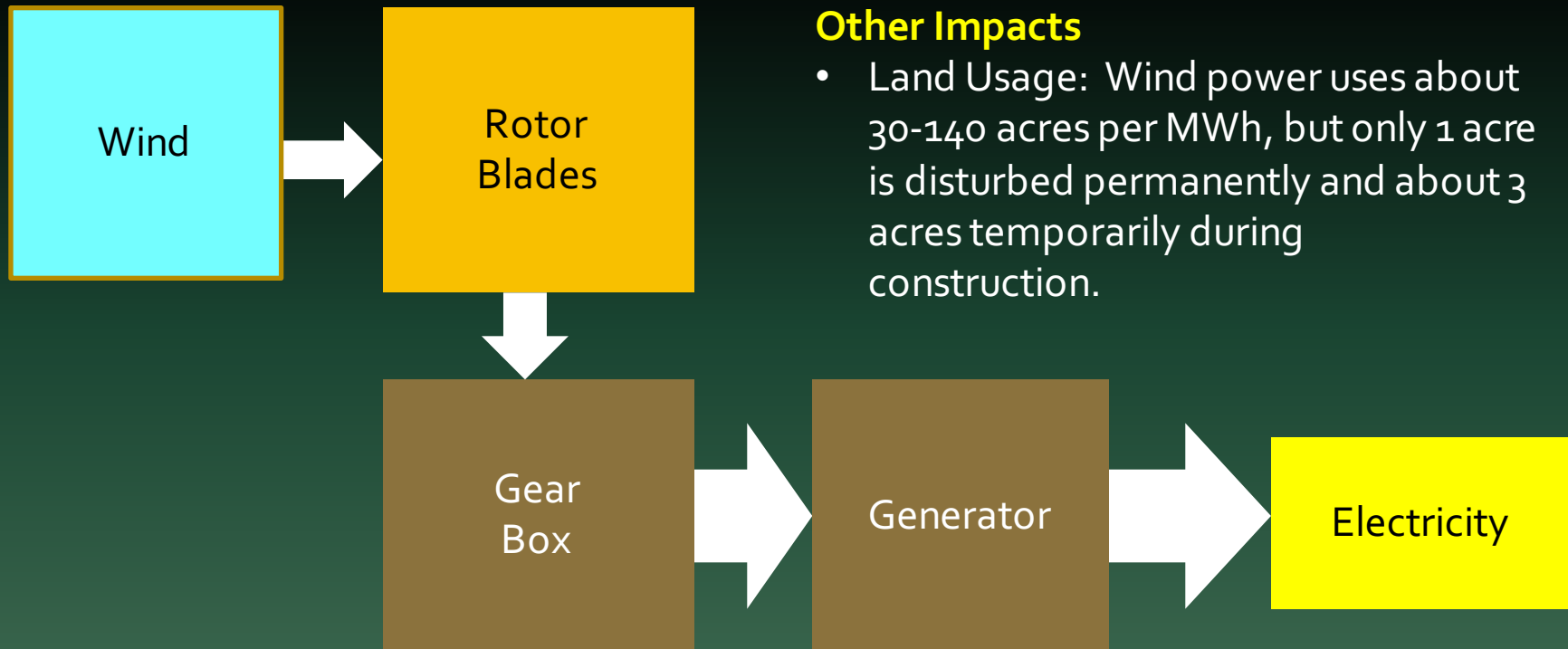


Water Usage

Wind power uses no water during regular operation and only small amounts of water during manufacturing and transport.

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How does it impact the environment?



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How does it impact the environment?

Image Source:
Leaflet, Wikimedia Commons



About 388,000 birds
killed annually



About 1,400,000,000 birds killed annually

Other Impacts

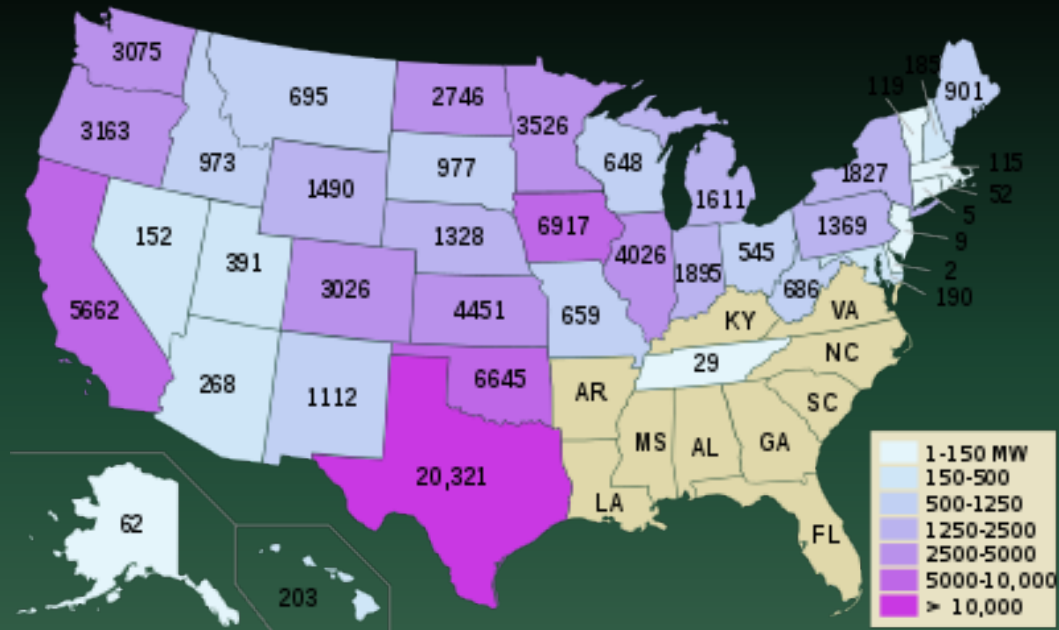
- Wildlife: Wind turbines can kill bats and birds, but they do so in small numbers, and certain strategies such as keeping turbines still in low wind can reduce deaths by as much as 50% without impacting power production.

Producing Electricity from Wind

Why does the U.S. use wind power?

Wind energy is clean, renewable, abundant, and cost effective. Although it is not a reliable and consistent form of electricity because of natural variations in wind speed due to climate and season, it can be used to complement and supplement other forms of electricity production.

Wind
Generating
Capacity in
2016



Did you know?

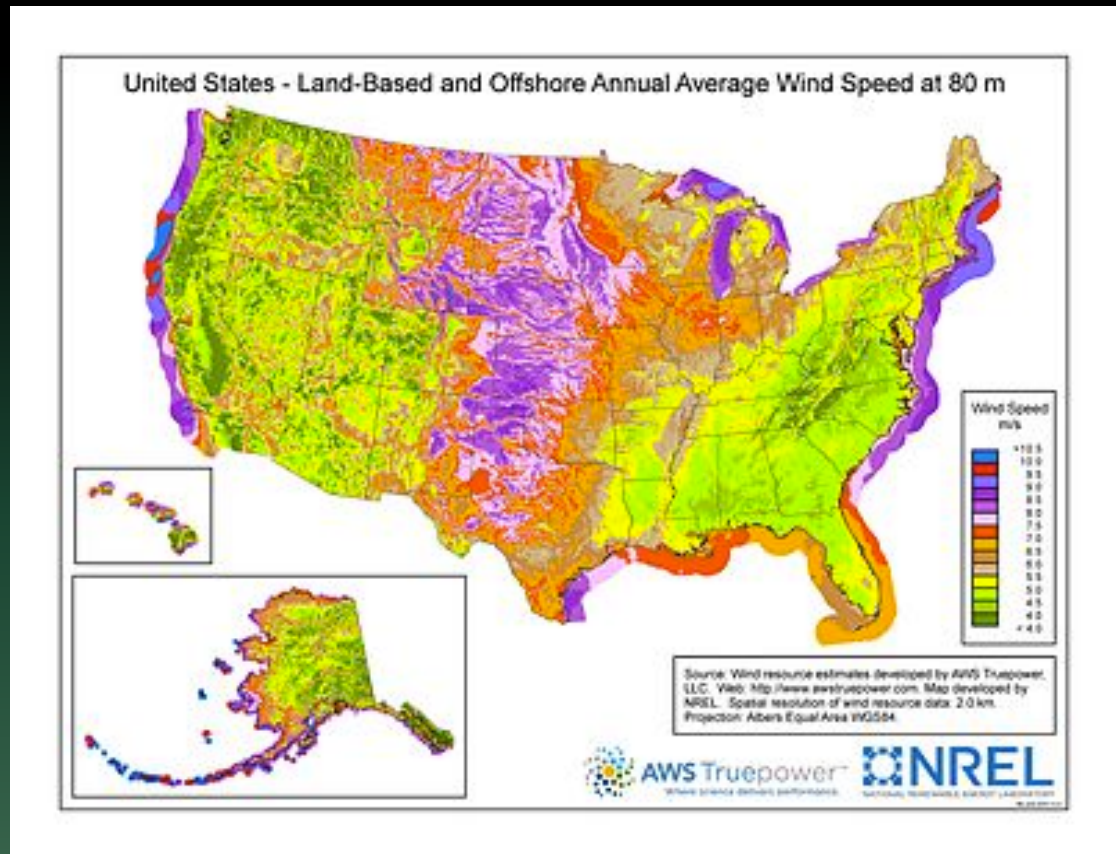
While wind turbines have no public health impact and minimal environmental impact, one of the major obstacles to installing more wind energy is that wind turbines can annoy people through sound, vibration, shadow flicker, and perceptions of disturbed landscapes.

Image Source: Aflafla1, Wikimedia Commons

Producing Electricity from Wind

What's next for the U.S.?

Wind Energy is clean and renewable with minimal overall environmental impacts. It is abundant, cost-effective, and its use is expected to expand rapidly in the next decade.





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Additional Impacts

<http://comingalongside.org/Technology/>

<http://labs.ee.washington.edu/community/EnvironmentallImpacts/>