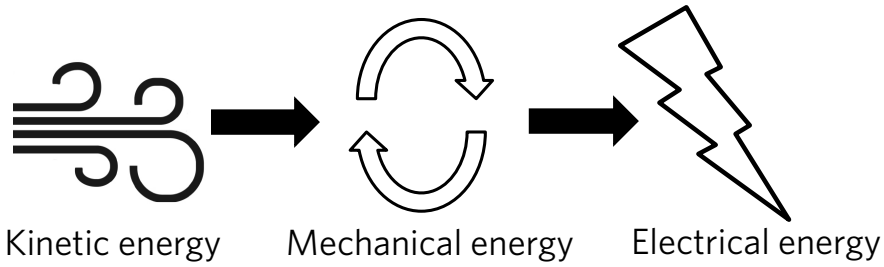
Wind Energy

Have you ever tried to make a toy pinwheel spin by blowing on it? We can harness the power of moving air on a much larger scale and use it to produce electricity with wind turbines. When the wind is strong enough (has enough kinetic energy), the blades of a wind turbine turn, which spins a shaft connected to a generator. The generator converts the mechanical energy of the spinning shaft into electrical energy that can be transmitted to homes and buildings through power lines.



There are many different kinds of wind turbines, from small turbines that can be put on the roof of a house to really large turbines that can be built together in wind farms to power entire communities. Wind energy—a renewable resource—can be produced anywhere where there is wind, but the stronger and more consistently the wind blows, the better. Unfortunately, in most places the wind isn't blowing all of the time, and in places that aren't very windy, wind turbines probably aren't a good way to generate reliable electricity.

Wind energy doesn't directly produce carbon dioxide or other greenhouse gases that can cause damage to the climate. Wind power is also relatively inexpensive. The wind itself is a free resource, and although it costs money to build and operate wind turbines, advancements in technology have significantly reduced these costs over time. Wind energy doesn't pollute like coal burning, and pollution can cause health problems for people[1]. However, like with any infrastructure, some people express concern about wind turbines being too noisy or ruining the look of a landscape, and therefore don't necessarily want wind turbines near their homes.

Some kinds of wind turbines, particularly larger ones, can cause harm to birds and bats[2]; however, people are working on ways to reduce the impact of wind turbines on birds and bats, such as changing the height or location of the turbines.

1 World Health Organization: What are the effects on health of transport-related air pollution?

2 Smallwood, 2013

Weighing the Benefits and Drawbacks of Wind Energy

For a complex problem, we need to evaluate how a solution fares across multiple dimensions:	Benefits	Drawbacks
Environmental Factors		
Social & Cultural Factors		
Economic Factors		

Exploring Energy

Weighing the Benefits and Drawbacks of Wind Energy

For a complex problem, we need to evaluate how a solution fares across multiple dimensions:	Benefits	Drawbacks
Environmental Factors	• Wind energy does not produce greenhouse gases like carbon dioxide that contribute to global warming and climate change. • Wind power does not produce air and water pollution.	• Wind turbines can harm bats and birds.
Social & Cultural Factors		• Some people are concerned about the way wind turbines might look or the noise they might generate.
Economic Factors	• The 'fuel' for wind power—the wind!—is free. • Wind power technology is relatively inexpensive	• Wind power isn't a feasible option for energy generation everywhere, since not every region has a lot of wind. Even in places that have a lot of wind, it still isn't blowing all of the time.

Additional resources

California Academy of Sciences: **Our Clean Energy Future**
California Academy of Sciences: **Birds vs. Energy**