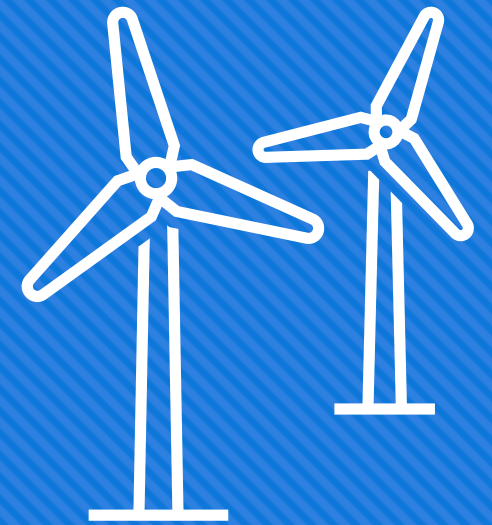


Renewable Energy: Wind



What is wind?



- Wind is the natural movement of air/other gases around the Earth's surface. This movement is caused by the uneven heating of the Earth's surface by the sun.
- This uneven heating creates differences in atmospheric pressure, causing wind. Warm air rises higher into the atmosphere and moves toward the poles, called a low-pressure system.
- At the same time, cool, denser air moves over Earth's surface toward the Equator to replace the heated air. This is a high-pressure system. Winds generally blow from high-pressure areas to low-pressure areas.
- There is enough wind every day to generate 35 times the amount of energy all of humanity uses every day.

What is wind energy?

Renewable energy is energy that has been derived from natural, infinite resources. Examples include moving water or air, or solar power. Renewable energy is becoming an increasingly common alternative to traditional, non-renewable energy sources (like oil or coal).





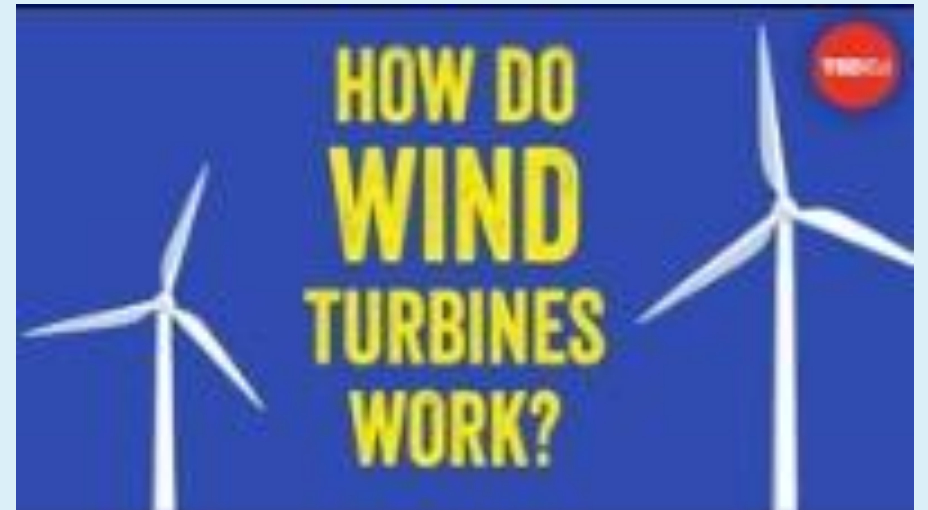
WHERE CAN WE GET WIND ENERGY?

- ⦿ While some power can be generated from individual windmills, most of the wind energy on the electrical grid comes from large-scale wind farms. Wind farms are where multiple very large wind turbines are placed in one area to generate lots of power.
- ⦿ The placement of wind farms is strategic, turbines can't just be built in any windy area. Wind farms are often built in tops of smooth hills; open plains and water; and mountain gaps that can funnel and intensify gusts of wind. Areas of higher elevations above the earth's surface are typically best for generating wind energy.

How does wind energy work?

Wind energy is turned into electricity by using wind turbines. Traditional windmills turn the kinetic energy of the wind into rotational energy, while modern wind turbines take this process one step further and turn the rotational energy into electricity.

One large turbine (100m tall) can power approximately 750 average homes.



How can we use wind energy?

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Electricity generated by wind turbines/windmills can be used locally or placed on the electric grid to power homes or other buildings farther away from the wind farm.

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What are the benefits of wind energy?

Environment	Infinite	Cost	Jobs
Wind energy does not produce any toxic by-products, it does not use other resources for cooling (like nuclear energy) or damage the environment.	Wind is a renewable resource. There is no limit to the amount of wind that can be used to create energy.	Wind can be one of the lowest-priced energy sources available. Some projects source it at only 2-4 cents per kWh.	The wind energy industry is very fast growing and employment in the sector is increasingly rapidly.

What are the disadvantages of wind energy?

Aesthetics	Wildlife	Noise	Locations
While wind turbines and farms don't pollute the environment, many people do not like to look at them. This limits where they can be placed.	Wind turbines can cause a threat to wildlife. Most notably, if placed in the path of migrating birds.	While actually very minor, many critiques of wind turbines and farms comes from the low-level noise they emit.	Unfortunately, generation of significant wind energy requires placement in very specific locations. This often means wind farms can't be located where they are most needed.

Solving the problems



While harnessing wind energy can come with a few disadvantages, scientists have done their best to minimize these issues as technology has developed.

- Special consideration is given to birds migratory patterns to avoid harming wildlife.
- Developers choose areas where wind farms will be the least unsightly. In many instances wind farms are only temporary. Multiple wind projects in Nova Scotia have a twenty year time limit before the sight is reclaimed.
- While old wind turbines were much louder, new models have been updated to reduce noise pollution and impact on citizens near them.

Wind turbines

- Wind turbines require a minimum height and speed to work well. Turbines typically require a minimum wind speed of about 12-14 km/h to begin turning and generating electricity. Strong winds, around 50-60 km/h, are best to generate at full capacity. When winds reach approximately 90 km/h the turbines must be stopped to avoid damage.
- While there are many different models of wind turbines, they are usually built to be anywhere between 100-900ft, with most being 200-600ft, including the blades.

Wind farms around the world

Many different countries around the world have wind farms of their own. The countries generating the most wind power include China, the U.S.A., Germany, India, and Spain.

Canada also generates significant wind power, with the largest wind farm in the country located in Rivière-du-Moulin in Quebec.

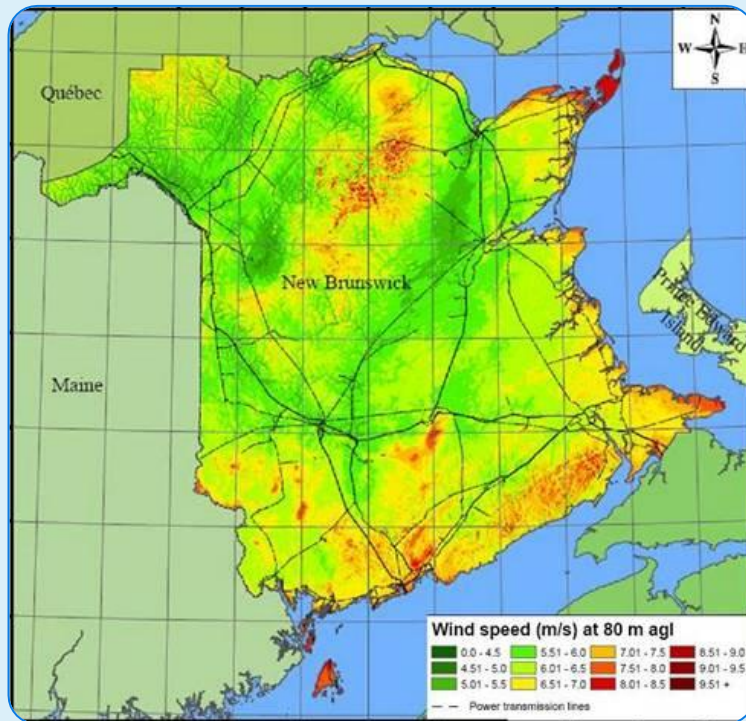


Measuring wind energy

Wind turbines require certain environments to successfully generate significant amounts of energy. As stated before, specific locations are carefully selected by experts. Experts use tools like an anemometer to help them choose a location for wind turbines and wind farms.

Anemometers can calculate average wind speed in multiple different ways. The first, and most common type of anemometer uses three or four cups attached to horizontal arms attached to a vertical rod. It uses rotation from the wind to calculate wind speed. The other most common kind uses windmill style blades to do the same.

Wind in New Brunswick



New Brunswick has yet to use much of its wind energy. Many of its most viable sites either line the coast or sit in the middle of the province, where there are fewer large cities and communities to push for the development of wind farms and less need for energy.

New Brunswick wind energy

New Brunswick has five large wind farms currently producing energy. N.B. has wind farms in Lamèque, Caribou Mountain, and Kent Hills. There are smaller projects in Cap-Pelé, Richibucto, Riverside-Albert, and Kings County. Together these projects generate 355 MW of wind energy, which has the capacity to power approximately 180,000 homes in the province.

Pictured here is art done by Indigenous artists on the turbine nacelles (or the turbine hub) at the Wocawson Energy Project in Kings County on the Wocawson Indigenous reserve.



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