

# WIND ENERGY

## How Wind Energy Works



Wind energy works the opposite of your fan at home. Instead of transferring electricity to movement and then movement to air, wind creates movement and movement creates electricity. The instrument used for this process is called a turbine.



**Wind**, or fast moving air, is created by the earth's rotation, temperature, and uneven surfaces. Wind directions and patterns can change when there are obstructions in its path, temperature changes, bodies of water, or other elements.

**Movement.** The wind moves the rotors or "fan" portion of the wind turbine. This fan movement goes to a generator where the generator transfers the movement into electricity.

**Electricity** made by the generator is then sent out to be divided among the local energy uses.

## Educate Gains

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## WIND ENERGY FACILITIES

PROVIDED BY THE GAINES CHARTER TOWNSHIP PLANNING AND ZONING DEPARTMENT

Positives

### Clean energy

### Abundant Resource

Homegrown Resource, no shipping necessary.

Common in Rural Areas, farmers can "rent" turbine locations but still continue to farm the land

Concerns

### Visual Effects

### Effect on wildlife habitats

Intermittent resource, not constant

Common in Rural Areas, often far away from the properties and structures it serves

## Sensibility of Wind Energy

While gases, coal and nuclear resources have been traditional fuels, their prices rise and fall as wind stays the same. A small residential wind turbine can cost anywhere between \$3,000 and \$50,000, although small residential models are available locally for around \$8,500 plus installation. This may be a lot out of pocket initially, but may be worth it to reduce or avoid energy costs and decrease emissions. Property owners with wind turbines may also qualify for tax credits.

kWh or kilowatt hour is a measurement of energy.  
1 kWh = 1,000 watts per hour.

According to the U.S. Energy Information Administration (USEIA), wind energy has increased from providing 0.14% of the nation's energy in 2004, to providing 0.51% in 2008. The chart to the right provides the nation's overall renewable energy fuel % uses of 2008. (USEIA)

### 2008 Renewable Fuel Use

Wind	7%
Solar	1%
Geothermal	5%
Biomass	53%
Hydroelectric	34%

"Clean Energy" is energy created with little or no harm to the environment and made from sources that are not "used up"

Gaines Charter Township does have zoning regulations for Wind Energy Facilities. Please contact Planning and Zoning Department staff if you are interested in installing a wind turbine on your property.

You can find additional information at:

[www.energy.gov](http://www.energy.gov)

[www.awea.org](http://www.awea.org)

[www.eere.energy.gov](http://www.eere.energy.gov)

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Certification?



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[www.gainestownship.org](http://www.gainestownship.org)

## Gaines with the Wind

The Wind Energy Resource Atlas of the United States shown below, was published by the National Renewable Energy Laboratory and sponsored by the U.S. Department of Energy. This map shows the Gaines Charter Township area as the second to lowest of the 7 classes of wind power, density and speed. The U.S. Department of Energy's Michigan Wind Power Map shows the area as the lowest and second to lowest classifications of "Poor" and "Marginal" for wind power, with wind speeds ranging from 0 miles to 14 miles per hour. However, the Michigan coastline rates very high in wind energy potential, wind speed and density.

Land terrain affects the size, height and cost of the wind turbines. Low land, obstructions such as trees and buildings, and low wind speeds means the taller, larger and more expensive the wind turbine needed. While Gaines Charter Township has ample rural land and many residential lots that meet the recommended 1 acre minimum area for a small wind turbine, the large amounts of vegetation, low terrain, and low wind speeds do not make the Township a good candidate for wind energy.

Wind Energy Resource Atlas of the United States

