

# GREEN REVOLUTION



## Wind



### About the Series

Coming up with better ways to get where we need to go and power the lives we live requires development of new technologies, along with research to help us minimize the impact of these technologies on our environment. The overall goal of this series is to encourage people to ask questions and look beyond fossil fuels for innovative solutions to our ever-growing energy needs. Interest in science and technology provides the necessary foundation for our future in a world powered by clean energy. The series also provides insight into what careers in science, engineering and other topics related to clean energy technologies are really like.

### In this Episode

We visit Colorado, a leader in wind energy technologies, to learn more about one of the fastest growing sources of renewable energy in the U.S. We also investigate how generators can turn the kinetic energy of wind into electrical current.

Lisa Van Pay of the National Science Foundation (NSF) talks to Kathryn Johnson, an electrical engineer at the Colorado School of Mines who studies large, utility-scale wind turbines. Kathryn's research aims to make the turbines more efficient, to help capture as much of the wind's energy as possible.

The next step is NSF's National Center for Atmospheric Research ([NCAR](#)), where scientists are working with local utility companies to create an advanced wind energy prediction [system](#). Using data from sensors mounted on each turbine, the system generates a forecast specific to each turbine on a wind farm. This helps the utility company provide as much energy as possible from clean sources.

The NCAR team also hopes that someday the prediction system could be used to predict the amount of electricity utility companies could generate from other intermittent [renewable sources](#), such as solar energy.

### Concepts

- Stationary and moving charged particles result in the phenomenon known as electricity and magnetism
- Electrical systems generate, transfer and distribute electricity
- The Earth system and its cycles are driven by energy, including gravity and electromagnetism

### Content Standards

Physics/Earth and Space Science  
High School\*

- 5.4 (Phys) Attractive or repulsive forces between objects relate to their charge
- 5.5 (Phys) Electric current is a flow of charge caused by a potential difference
- 5.6 (Phys) Moving charges produce magnetic forces and moving magnets produce electric forces
- 1.3 (Earth) Transfer of energy via radiation, conduction and convection contribute to atmospheric processes like wind and current