

POWER TRIP!

THE FUTURE OF ELECTRICITY

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Words in **bold** are in the glossary.

INTRODUCTION

WIRED

Plug in. Flip a switch. Power stations deliver instant electricity. It travels through cables across the country. But most power plants burn polluting **fossil fuels**. Luckily, we have cleaner ways to generate power. We have sunlight, wind, and water. We have mirrors, salt, rubber bands, and even juice!



WHAT'S THE BUZZ ON ELECTRICITY?

What is electricity?

Electricity is a natural force. It can be used to make light and heat or to make machines work.

Where does electricity come from?

Everything in the universe is made of super-tiny building blocks called **atoms**. Each atom has **protons**, **neutrons**, and **electrons**. Sometimes, electrons can move from one atom to the next. That movement creates electricity.

What's the difference between a conductor and an insulator?

Electricity moves through **conductors**. Conductors are materials that help electrons flow easily. Water and certain metals are conductors. **Insulators** slow or stop the flow of electrons. Wood, plastic, and rubber are insulators.

How is electricity measured?

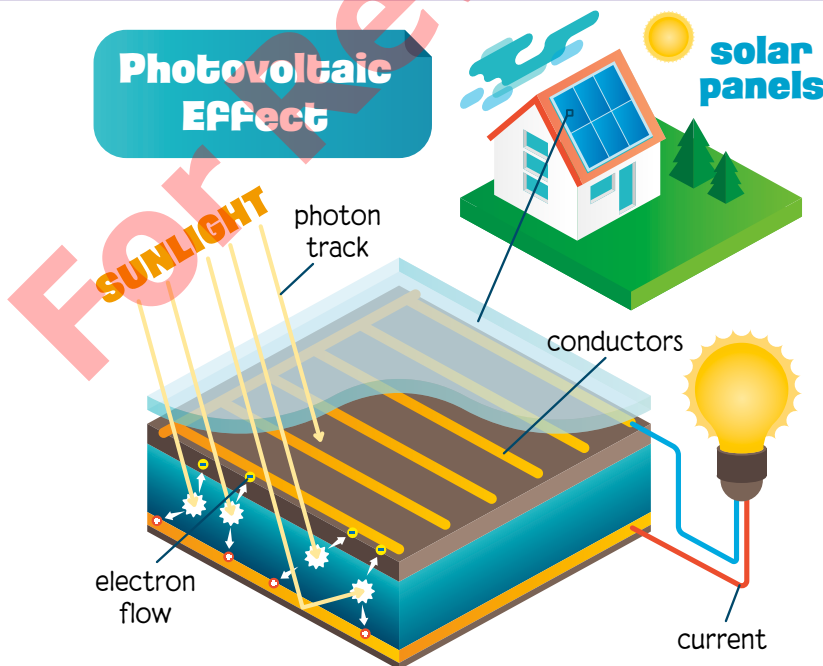
Amps tell you how quickly the electrons are moving. Volts tell you how much pressure there is on the electrons. The energy of electricity can be put to work. The difficulty of the work is measured in watts.

$$\text{Watts} = \text{Amps} \times \text{Volts}$$

HARVEST THE SKIES

Solar energy systems turn sunlight into electricity. All light is made of **photons**. Photovoltaic (PV) cells are super thin chips with special minerals. Photons crash into the minerals. That pushes electrons into motion. This electrical current flows to power stations that supply towns and cities.

PV cells stack up thin layers of minerals, plastic, and glass. Photons crash into electrons in the minerals. This crash knocks the electrons loose from their protons. Flowing electrons create electrical currents. The glass and plastic protect the minerals from damage.



Mirror, Mirror on the Wall

Concentrating Solar Power (CSP) systems use mirrors and photons. They focus the sun's beams onto a receiver. Receivers are tubes of oils or salt that heat up fast. Power stations use the heat to make electricity. Heat can also be stored for later.



This CSP system collects solar energy. One CSP plant can generate enough energy to power 90,000 homes.



Maria Telkes invented the first solar-powered home heating system in the 1940s. She was nicknamed the Sun Queen.

Positives and Negatives

Solar power is **renewable** energy. It never runs out. Solar is quiet. It does not pollute the air. But this bright energy has a dark side. The minerals in PV cells must be mined. Mining can cause air and water pollution. As trash in landfills, old solar panels release **toxins**.

Sun Paint and Night Sponges

Scientists are developing super tiny solar cells. They are small enough to sit on a soap bubble. But they can produce a lot of power. These tiny cells could be painted on buildings. Imagine wall paint powering the lights!

New PV cells can work at night. They act like sponges. They soak up leftover heat from the sun.



As of 2025, the world's largest concentrated solar plant was in Morocco. The plant is the size of 3,500 football fields.