

# EARTH DAY



# EVERY DAY

FUN BOOK



Every day is an opportunity to celebrate and protect our precious Earth. This fun book contains great information and fun activities to help us learn more about our environment and ways we can engage to protect it!

Thank you to Wisconsin's Gaylord Nelson for his amazing spirit that spearheaded the Earth Day movement!

## Gaylord Nelson – a Wisconsin native and the founder of Earth Day.



Photo: WHS-93130

*Gaylord Nelson, the Founder of Earth Day, was born in Clear Lake, Wis., and was 89 when he died in 2005.*

Nelson was elected Governor of Wisconsin in 1958. Four years later, he was elected to the U.S. Senate and served from 1962 until 1981.

During his time in the U.S. Senate, Nelson was an advocate for the environment. The

idea for Earth Day evolved over a period of years starting in 1962. Through Nelson's conservation tours with President Kennedy in 1963 and then again in 1969 and 1970, he brought national attention to what was happening to the environment. The biggest day of the demonstration became the first Earth Day and was beyond what Senator Nelson had anticipated. "It organized itself," Nelson recounted. To this day, millions of people celebrate Earth Day on April 22 by participating in events and activities to protect our environment. See what you can learn and do!

*You can learn more about the history of Earth Day at [nelsearthday.net](http://nelsearthday.net).*

## What is climate change?

Everyone is talking about it, but what is climate change and what can you do to reduce its effects?

### What?

The Earth has warmed by about one degree over the past 100 years. Some think the Earth is getting warmer on its own, but many scientists around the world agree that humans are making the Earth warmer.

### What happens when the Earth gets warmer?

- 🌊 Glaciers melt causing water levels to rise.
- 🌍 Delicate ecosystems become threatened.
- 🦋 Wildlife that depends on a delicate climate balance becomes endangered.

### How?

Scientists think climate change is caused by the greenhouse effect. Certain gases, like carbon dioxide (CO<sub>2</sub>) and water vapor, trap the sun's rays in our atmosphere. Our atmosphere is like a blanket that helps trap the sun's heat near the surface of the Earth. Buildup of greenhouse gases prevents the heat from escaping back into space, causing the Earth to warm at an unnatural rate. Many scientists believe this is the cause of climate change.

### Why?

#### Human causes of climate change include:

- 🔥 Burning fossil fuels. We burn these fuels for:
  - 🚗 Transportation (cars, planes and boats).
  - 💡 Electricity to power our homes and businesses.
  - 🏠 Heat for our homes and businesses.
- 🌲 Deforestation – cutting down trees that help keep our air clean.

## Plug into the electric ride!

Whether it's to reduce carbon emissions from gas-powered vehicles or to power an electric vehicle (EV) with more renewable sources of energy, like wind and solar, EVs are a super cool choice for getting from here to there. More modes of transportation are going electric!

### Buses

Madison buses are going electric! The City of Madison Metro Transit (Metro) has three battery-electric buses. Metro is working to electrify its bus fleet. In addition to zero emissions and outstanding fuel economy, these buses create little to no noise when idling. In motion, they operate at a noise level that is measured below that of a normal conversation. It is also expected that these vehicles will carry a much lower maintenance cost than standard diesel buses.



### How do EVs work?

An EV is powered by an **electric motor** rather than a gasoline or diesel engine. While some newer EVs have their own distinctive exterior designs, you'll really notice the difference under the hood. The speed and direction of the vehicle (forward or reverse) are determined by a **controller**, and the motor gets its power from an array of **rechargeable batteries**. (Source: [auto.howstuffworks.com](http://auto.howstuffworks.com))

### Charge up here and there!

**Plug 'em in, charge 'em up and go!** MGE has installed more than 50 charging stations in the Madison area. Many apartments and companies are adding charging stations for their residents and employees. Check out [mge.com/evcharging](http://mge.com/evcharging) to find the closest one to your home or school.

### How far can they go?

EVs are now available that can travel hundreds of miles on a charge. Automotive engineers are working on technology to help extend the range so they can go even farther.



Watch a video from Nelson, MGE's peregrine falcon, to see how EVs work. Visit [mge.com/k3earthday](http://mge.com/k3earthday).



### Benefits of EVs

- 1 Reduced gasoline use.
- 2 Lower fuel costs. Electricity is less expensive per mile driven than gasoline or diesel fuel.
- 3 Reduced air emissions. MGE customers can offset electricity emissions by supporting renewable energy for their homes and vehicle charging through MGE's Green Power Tomorrow program. Visit [mge.com/gpt](http://mge.com/gpt) to learn more.

Is your house

# ENERGY SMART?

## Home energy investigation

Look for ways to save energy. You'll save natural resources and reduce our impact on the environment.

Need more energy-saving tips? Visit [mge.com/saving-energy](http://mge.com/saving-energy) or contact the MGE Energy Experts by email at [AskExperts@mge.com](mailto:AskExperts@mge.com).

### Doors and windows

Check your exterior doors. Do the doors shut tightly? Is there weatherstripping around the edge? It reduces drafts. In summer, pull shades down to keep out sunlight and heat. In winter, open shades to let in light and heat on sunny days.

### Lighting

Replace a 75-watt incandescent bulb with a 17-watt LED bulb to save in energy costs.

### Bathroom

Do you use low-flow showerheads? Standard showerheads use three to five gallons of water per minute. Low-flow showerheads use one to two gallons per minute. They save water and energy to heat the water.

### Refrigerator

The inside temperature of your refrigerator should be 37°F to ensure food safety and energy savings.

### Dehumidifiers

Do you have a dehumidifier? Operate your dehumidifier on a timer so that it runs at night instead of at high energy-use periods during the daytime.

### Home electronics

An estimated 10% to 15% of all electricity used in American homes can be attributed to the buzz of electronic devices. Unplug small devices that aren't being used.

### Water heater

Locate the EnergyGuide label on the tank. It compares your water heater to other water heaters of similar size. With an adult, place a household thermometer under hot running water. Check the temperature. MGE recommends a water temperature of 120°F to prevent scalding and to save energy.

## Find the energy users in the home below.

- Name and rank the energy users in each room from most to least power used.
- The answer key is below the house. You might be surprised at the things that use a lot of power and the things that don't use that much!



### Thermostat settings

Set the temperature no higher than 68 degrees in the winter and no lower than 78 degrees in the summer.

### Furnace and air-conditioning systems

Furnace and air-conditioning systems should be inspected each year by qualified professionals. It helps to ensure safe and efficient operation. MGE recommends that you change standard furnace filters monthly during the heating and air-conditioning seasons. High-efficiency filters should be changed every three months.

## How long to charge your car?

You can plug your electric car into your charger. How long will it take to charge it? Find information about charging at [mge.com/LovEV](http://mge.com/LovEV).

Bedroom has 3 energy users: Ceiling fan - 75 watts; lamp - 10 watts; exhaust fan - 10 watts. Bathroom has 2 energy users: Light - 10 watts; shower - 4 watts. Laundry room has 4 energy users: Dryer - 3,000 watts; clothes iron - 1,100 watts; washer - 500 watts; light - 10 watts. Living room has 5 energy users: Home audio system - 270 watts; TV - 100 watts; lamp - 10 watts; electric cooktop - 1,000-3,000 watts; dishwasher - 1,800 watts; toaster - 800 watts; coffee maker - 800 watts; microwave - 800 watts. Kitchen has 11 energy users: Oven - 3,000 watts; refrigerator - 600 watts; TV - 100 watts; exhaust fan - 100 watts; ceiling light - 30 watts. Garage/mechanicals room has 3 energy users: Electric vehicle charger - 6,000 watts; hot water heater - 4,000 watts; fluorescent light - 14 watts.

# Learning about good ENERGY for today and tomorrow

## [WIND energy]

MGE is growing its use of clean energy sources. Wind energy is a clean, renewable energy source produced by the daily cooling and heating patterns on the surface of the Earth. Wind energy can be harnessed to produce electricity.



Wind turbines capture the wind's energy with propeller-like blades that are mounted on a rotor. Turbines are placed on top of high towers to take advantage of the stronger wind at 100 feet or more above the ground. Utilities build a large number of wind turbines close together to form a wind farm.

**Wind energy facts** On wind farms, the turbines take up only 5% of the land, leaving the rest for other uses like farming. The total wind resource in the United States is very large. All states have some windy areas, but the Great Plains and Midwest lead the rest of the country. The states of Texas, Kansas and North Dakota could provide enough electricity to power the entire U.S.

MGE customers are served by a 17-turbine wind farm in Kewaunee County, Wis.; an 18-turbine wind farm in Kensett, Iowa; a 33-turbine wind farm in Saratoga, Iowa; and a 28-turbine wind farm in Grant County, Wis. All of these wind farms save hundreds of thousands of tons of CO2 from being produced annually from fossil fuels.

Learn more about wind power at [eia.gov](http://eia.gov).

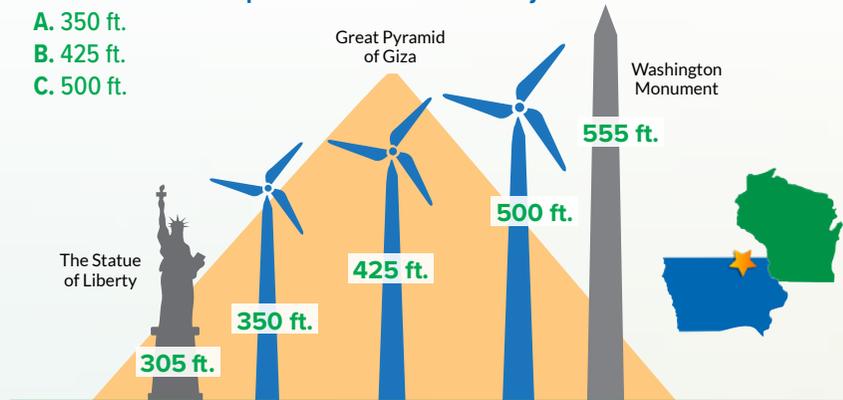
## Bring on good energy ideas!



MGE is committed to building a smarter, cleaner energy future for all of us. We have set goals to reduce carbon emissions and produce more energy from renewable sources. MGE's Living in Balance website helps promote green living and environmentally friendly practices by engaging families in energy-saving ideas. Visit [livinginbalancemadison.com](http://livinginbalancemadison.com).

Which wind tower will produce the most electricity?

- A. 350 ft.
- B. 425 ft.
- C. 500 ft.



Saratoga Wind Farm, MGE's largest wind farm, is located about 200 miles west of Madison near Saratoga, Iowa, an area known for its wind. The 66-megawatt wind farm serves about 47,000 households. The turbines reach nearly 500 feet in the air.

**Green careers** Most green careers require a post-high school degree. Can you fill in the blanks to spell six green energy careers?

A \_ \_ h \_ \_ \_ c \_ \_ H \_ dr \_ \_ og \_ \_ t  
 \_ \_ \_ v \_ y \_ r \_ \_ o \_ an \_ \_ t  
 Ar \_ \_ r \_ \_ t  
 \_ \_ vi \_ \_ \_ g \_ \_ eer



Answers: C - 500 ft.; Architect; Hydrologist; Surveyor; Botanist; Arborist; Civil engineer

MGE partners with FOCUS ON ENERGY®, which can help you find ways to save energy with an energy assessment that can identify things like more efficient appliances and light bulbs to reduce your energy use. Get a free box of goodies to improve your energy efficiency by visiting [focusonenergy.com](http://focusonenergy.com)!

## [SOLAR energy]

Solar energy, or SUNLIGHT, can be used to generate electricity; provide HOT WATER; and HEAT, COOL and LIGHT buildings.

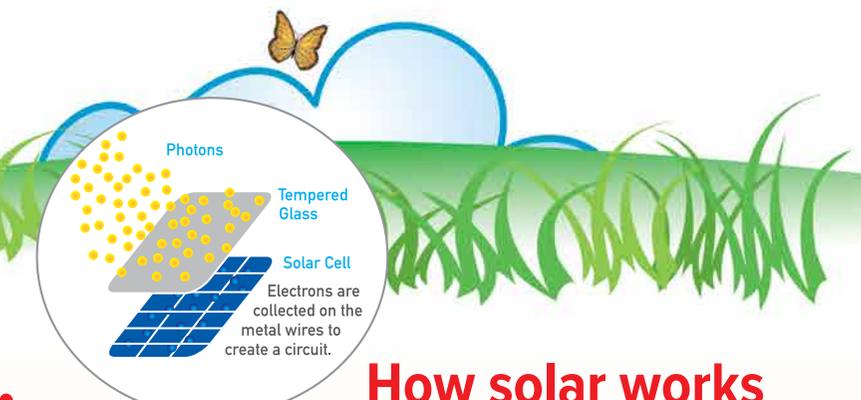
**Passive solar** No mechanical devices are used in passive solar heating. Buildings designed for passive solar heating often have large windows that face south to absorb as much sunlight as possible. They might also use building materials that absorb and slowly release the sun's heat. Passive solar designs can reduce heating costs.

**Photovoltaic (solar cells)** Photovoltaic cells turn sunlight directly into electricity. The simplest cells might power your watch or calculator. To power a building, many cells are combined into a system or array.

**Concentrating solar power** Some power plants use a concentrating solar power system. The sun's energy is concentrated in one area using mirrors. This creates a lot of heat. The heat produces steam used to run a generator that creates electricity.

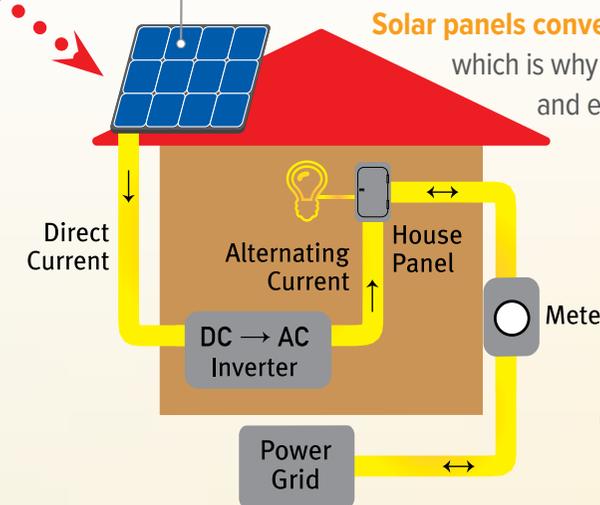
**Solar hot water** Solar water heaters use the sun to heat water that flows through a panel that faces the sun. These systems can reduce the need for conventional water heating by two-thirds. Sometimes, the hot water that is collected also can be used to heat a building.

**Solar energy in our schools** MGE has installed photovoltaic systems on area schools and community sites to create more awareness of renewable energy. Visit [mge.com/solarschools](http://mge.com/solarschools) for more information.



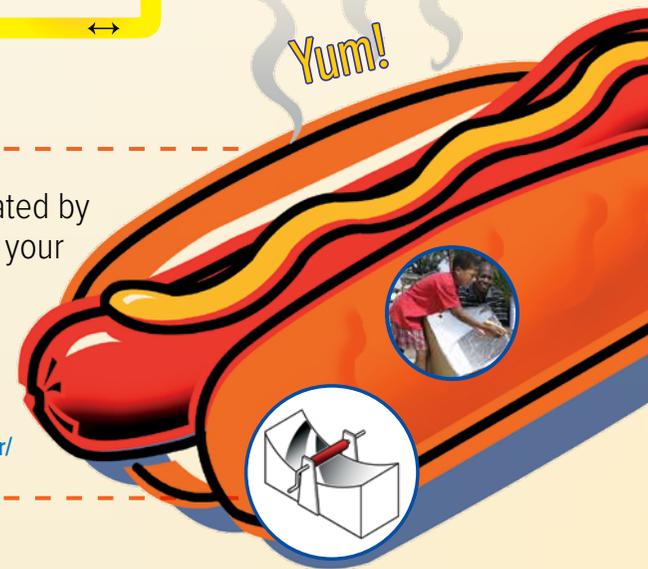
## How solar works

Solar panels convert light into electricity, which is why they work in the cold and even with indirect sun.



See the solar energy generated by the sun firsthand. Work with your teacher and classmates to build this fun and tasty solar hot dog cooker.

<https://www.education.com/science-fair/article/solar-hot-dog-cooker/>



Watch a video from Nelson, MGE's peregrine falcon, to learn how solar energy is produced.

[mge.com/k3earthday](http://mge.com/k3earthday)

MGE's O'Brien Solar Fields in Fitchburg, Wis.

# How can you help? Reduce your carbon footprint!

**1) Reuse and repurpose!** Instead of throwing plastic containers away, wash and reuse them to store crafts and supplies you use around the house. Donate clothes you grow out of to local charities and organizations that take them. Organize a clothing drive in your neighborhood.

**2) Vacation can-do!** Reuse your towels and bedding more than one day when you're staying in a hotel. This reduces water consumption and electricity use by the hotel.

**3) Eat your veggies!** Livestock accounts for much of the pollution in the air and land (methane gas from cow toots and chips!). Eating more veggies is good for your body and for the planet. Land is dedicated to gardens and agriculture where CO<sub>2</sub>-eating plants thrive.

**4) Be an environment ambassador!** Learn all you can about the science behind climate change and talk about it with your family and friends. The more we all engage and work together, the better chance the planet has to make it many more thousands of years!

**5) Plant trees!** Trees do so much for our planet! Trees are like the Earth's lungs, and the rainforests filled with trees are in jeopardy. But trees do more than just give us oxygen to breathe, they also:

- Remove harmful CO<sub>2</sub>, a major greenhouse gas that warms our planet.
- Catch rainwater in roots that can cause flooding during heavy rains.
- Filter the soil, removing harmful chemicals that can get into drinking water.
- Keep homes warm during winter by blocking chilly winds and cool in the summer by blocking hot rays from the sun.
- Provide food and habitat for wild animals.

Planting trees here in your community can make a big difference for the whole world. There are many smaller tree options if you don't have a lot of room. Go to [mge.com/landscaping](http://mge.com/landscaping) to find "10 Best Trees to Plant Near Power Lines" for a helpful list.

## Green Power Tomorrow

MGE electric customers can support renewable energy for their homes. Visit [mge.com/greenpower](http://mge.com/greenpower) to learn more!

## Are there Energy Vampires in your home?



**Reduce your carbon footprint!** Many of the electronic devices in your home stay on, even when they're "off." Chargers for cell phones, computers, power tools and other gadgets suck energy from your home. Unplugging electronics that are not in use can decrease phantom energy.

Learn more about phantom energy at [mge.com/saving-energy](http://mge.com/saving-energy).

## Use smart home technology to save

New home automation can control lighting, climate, entertainment systems, appliances and home security, and many can be controlled remotely through a smartphone or the internet. With heating and cooling being the biggest home energy users, a smart thermostat is a wise investment.

Smart power strips are an effective way to prevent phantom energy by detecting when a device is in standby mode and then cutting off power to that device. Also, LED-based smart bulbs connect to your home's Wi-Fi network, allowing you to control lights from anywhere you have internet access.

Go to [mge2050.com](http://mge2050.com) for ideas to save energy.

