



## *Discussion and Activity Guide for Teachers Before and After the Assembly*

The Shrinking Bigfoot assembly introduces students to the concepts of energy conservation and how the energy they use contributes to climate change. Students leave the assembly understanding the choices they can make in their everyday lives to “shrink” their footprints. The Shrinking Bigfoot assembly encourages students to “stop being a Bigfoot” and start conserving at home and at school. This will help the City of Seattle meet its climate change goals.

Use this discussion guide to prepare your students or to review concepts introduced in the assembly. The guide provides —



**vocabulary**



**interesting facts**



**discussion questions**



**fun follow up activities**

Select what is appropriate for your students or curriculum.

## DISCUSSION PROMPTS

### What is an Energy System?

An energy system is a connected set of inputs (resources) and outputs (energy). Water is an example of a resource input, and the energy output is electricity. The water is stored behind dams then falls through turbines that power generators. The generators transform that energy into electricity. Then that electricity flows through the wires to our homes and school.

All of our inputs come from natural resources, some that are renewable and some that are non-renewable (as explained on the next page).

### What are the resource inputs of electricity provided by Seattle City Light?

Seattle City Light gets approximately 90 percent of its electricity from hydropower – using the power of water to generate electricity. Our electricity starts as stored water from melted snow in the Cascades. Another 10 percent of Seattle City Light electricity comes from a variety of resources including wind, nuclear, coal and petroleum.

### How have you used electricity today?

Electricity for lights, TV, computer, DVD player, electronic games, home appliances such as refrigerator and microwave, electric toothbrush, toaster, clock, radio, hairdryer, cell phone.

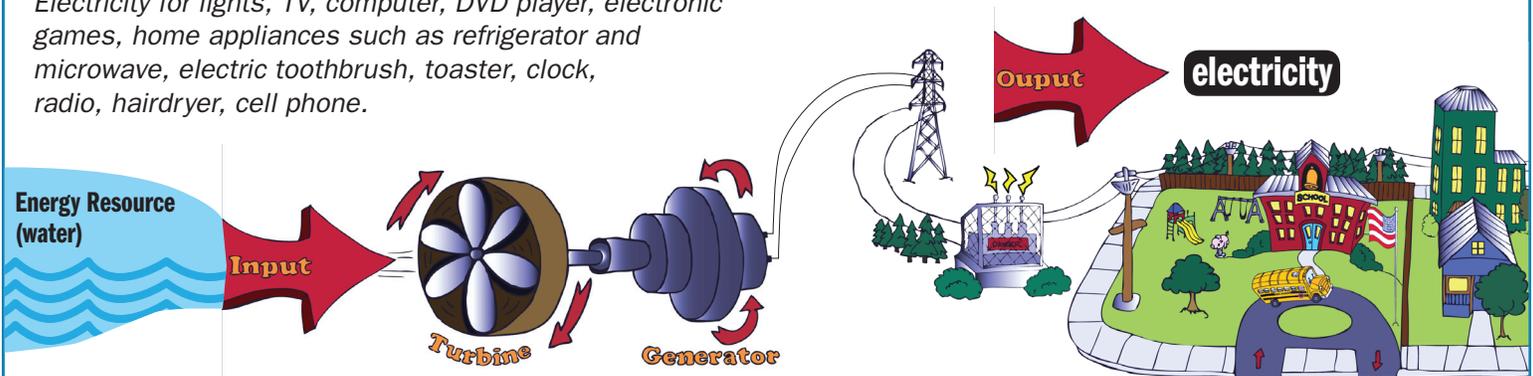
## ACTIVITY



As homework, ask students to explore how they use electricity for lighting their homes. Have students create a basic diagram of a house and make a note of how many lights are in each room, how many bulbs are used, and what kind of bulbs they are. (Hint: tell students to ask an adult about CFL and LED light bulbs.) Don't forget to include lamps and night-lights.

Discuss the findings as a class. Which room has the most lights? Which lights are used the most? What surprised you about the electricity you use just for lighting? How could you reduce the amount of electricity you use at home for lighting?

Ask students to pledge to turn off lights or lamps when they leave a room for one week. Have them report back to the class how easy or difficult this was. Ask students: Did it become a natural habit? Would you consider this an easy way to conserve (save) electricity? Why or why not? How can you help your family and friends remember to turn off lights?



## Vocabulary

..... electricity, energy system, energy source, turbine, generator, energy input, energy output, hydropower



### DID YOU KNOW?

- Forty percent of total energy consumed in America is used to generate electricity. Aside from heating and cooling, we spend the most money on lighting.
- The five light fixtures that use the most electricity in a home are typically kitchen ceiling lights, living room table and floor lamps, bathroom vanity lights, and outdoor porch or post lamps.
- Light emitting diode (LED) light bulbs cut energy use by more than 80 percent, and they can last for 25,000 hours or more.
- If every American home replaced just one light bulb with a compact fluorescent light (CFL) bulb, we would save enough energy to light more than 3 million homes for a year, more than \$600 million in annual energy costs, and prevent greenhouse gases equivalent to the emissions of more than 800,000 cars.



# Renewable and Non-Renewable Energy

After Earth Club members discuss renewable and non-renewable energy in their own lives, they learn how non-renewable energy contributes to climate change by emitting greenhouse gases into the atmosphere.

## DISCUSSION PROMPTS

### What is an example of a renewable resource?

This is a resource from nature that can be replenished. When used as an energy source, its output is electricity and the resource can be used again.

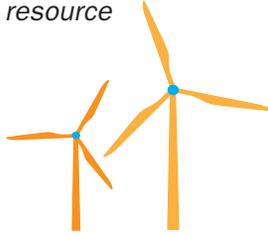
Examples include:



water



sun



wind

### How do we use renewable resources?

Seattle City Light and other utilities use hydropower and wind to generate electricity for its customers. Solar power is often used on homes, or on signs and lights.

### What is an example of a non-renewable resource?

This is a resource with a limited supply that is being used up, like fossil fuels.

When they run out, they're gone forever. Their outputs are electricity, carbon dioxide (CO<sub>2</sub>), and other harmful gases that warm the planet and contribute to climate change. Examples include:



coal



natural gas



oil

### How do we use nonrenewable resources?

We use these to power our cars and to heat homes and water. Many other parts of the country use fossil fuels to generate all their electricity. Everything we buy and use also takes energy to make, transport, and dispose of, which contributes to climate change.

## ACTIVITY



Have students play an energy search game individually or in teams by making a list of everything they see that uses energy for the day. Ask them to think creatively. Their lists could include heating and cooling, exit signs, computers, the school bus, streetlights, planes flying overhead, human energy they generated by walking, or even their solar-powered calculator. As teams present their lists to the class, record them on a t-chart labeled "renewable" and "non-renewable" sources of energy. Then have them brainstorm, draw, or creatively write about other possible sources of alternative energy that were not included in the chart.



## Vocabulary

non-renewable and renewable resource, climate change, greenhouse gases, fossil fuels, carbon dioxide (CO<sub>2</sub>)



## DID YOU KNOW?

- Non-renewable fossil fuels, like coal, oil, and natural gas, come from the remains of plants and animals that died millions of years ago.
- Ninety-one percent of energy used in the US is from non-renewable resources.
- About 95% of Seattle City Light's energy comes from renewable resources.
- Thirteen Seattle schools, including Greenwood Elementary and Meridian Park Elementary, use solar panels to generate renewable energy and reduce CO<sub>2</sub> emissions.

## Website Resources

Seattle City Light  
[www.seattle.gov/light/conserve/](http://www.seattle.gov/light/conserve/)

Edison Electric Institute  
[www.getenergyactive.org](http://www.getenergyactive.org)

Seattle City Light Solar Energy  
[www.seattle.gov/light/solar/](http://www.seattle.gov/light/solar/)

U.S. Department of Energy Teacher Site  
[www.eia.gov/kids/energy.cfm?page=teacher\\_guide.html](http://www.eia.gov/kids/energy.cfm?page=teacher_guide.html)

EPA – A Student's Guide to Climate Change  
[www.epa.gov/climatechange/kids/index.html](http://www.epa.gov/climatechange/kids/index.html)

U.S. Department of Energy Kids' Site  
[www.eia.gov/kids/index.cfm](http://www.eia.gov/kids/index.cfm)

# Reducing Your Footprint on the Planet

After Eartha, Stanley Megawatts, and Earth Club members learn about the science of climate change, they learn what actions they can take to reduce their own footprints.

## DISCUSSION PROMPTS

### What is a “footprint” on the earth?

A footprint is a way of measuring the impact our personal actions have on the planet, such as how many resources we use. When talking about our personal contribution to climate change, we refer to a “carbon” footprint.

### What contributes to your footprint?

Everyday actions including driving a car, riding the bus, using electricity for lights, appliances and electronics, and using energy to heat our homes and schools or to heat water. We are adding to our carbon footprint every time we plug something in or turn something on. It also takes energy to make everything we buy and use, so simply using “stuff” adds to your footprint’s size.

### What is Climate Change?

Climate change is the change in weather patterns caused by global warming. Human activities can release greenhouse gases, such as carbon dioxide, into the atmosphere that trap the sun’s heat and warm the planet. This can affect plants and animals that need certain temperatures to survive. Some human activities have a bigger footprint on climate change than others.

### What are some ways to shrink your footprint?

To conserve energy, turn off lights, switch to CFL or LED lights, turn down the heater at home, turn off or unplug appliances when they aren’t being used, carpool, bike, walk, or take the bus instead of a car. You can also take shorter showers to conserve both water and energy, wash clothes in cold water and hang them to dry, and simply buy and use less “stuff”!



## ACTIVITY

Ask students to brainstorm a list of all the activities they do that they think contribute to their footprint on the earth. Ideas could be added to a list that’s shown at the front of the classroom. Then identify alternatives for each activity that would help reduce their footprint at home and at school. Which of the alternatives would be difficult to continue and why? But reducing one’s footprint does not have to be difficult! Which actions would be really easy to do? Ask the students to try at least three actions over the next week and report to the class at least one action they’d be willing to continue in the future. What is one action they could teach someone else at home or at school?



**Vocabulary** - footprint, carbon footprint, climate change, conservation, standby power (vampire loads), embodied energy



## DID YOU KNOW?

- Electricity consumed by standby power (power used by appliances even when they’re turned off) accounts for 5–10% of energy consumed by US homes. These are also called “vampire loads.”
- Get rid of vampires! Unplugging vampire loads like TVs, DVD players, game consoles, and other electronics when not in use can reduce your carbon footprint by 500 pounds of CO<sub>2</sub> per year.

- In the US, heating accounts for 42% of the electricity used in homes, and appliances account for 30%. Turning down the heat and unplugging appliances when not in use can go a long way toward reducing your footprint on the earth!
- Everything around us that is made by humans – from our clothes, to computers, to airplanes – requires energy to make. The sum of all the energy used to make a product is its “embodied energy.” That’s why simply using less “stuff” is a great way to save energy!