

# ENERGY ACTION AT HOME



**Families, learn how to make wise energy  
decisions and protect the environment.  
Take action now!**

# Introduction: Taking Energy Action

Energy is essential in our daily lives. We use energy day and night, whether we are aware of it or not. Out of convenience, we have developed technologies that enhance our standard of living. However, the more technology we use, the more energy we need.

To live a sustainable lifestyle means the decisions we make today will affect many future generations. Sustainability is the practice of using a resource responsibly, so it is not depleted or permanently damaged.

Let's take a look at our energy use at home and how it impacts our environmental footprint. From Niagara Falls to Manhattan to the beaches of Long Island, New York is a diverse state with a variety of communities. We use energy in different ways depending on where we live. Family transportation is one way in which our energy use differs. It depends on the type of community in which you live. For example, if you live in the country or in the suburbs, you may depend on a car. If you live in a large city, you may rely more on mass transportation, bicycling, or walking.

The New York State Energy Research and Development Authority (NYSERDA) is committed to reducing our energy use and to sustainable living. The goal of this guide is to help you make wise energy choices and reduce your environmental impact without compromising your standard of living.

## What Is Inside?

This workbook, for students and their families, focuses on energy literacy and energy efficiency. It is divided into four sections: Energy Literacy, Energy Efficiency Activities, Energy Tips, and Energy Actions.

- **Energy Literacy-** This section highlights the importance of energy in our lives. You will discover interesting statistics about energy use in New York and the United States. This section also focuses on carbon footprints and how they impact the environment.
- **Energy Efficiency Activities-** You will find hands-on activities for you and your family that will encourage you to think about your personal energy use.
- **Energy Tips-** Practical behavior changes will help you save energy, use energy more efficiently, and save your family money.
- **Energy Actions-** Families can commit to save energy by completing the Energy Savings Plan and returning it to school or NYSERDA.

# ENERGY LITERACY

## THE IMPORTANCE OF ENERGY

Energy is the ability to do work or produce change. Virtually everything we do or use at work and home uses energy:

- Heating, air conditioning, and ventilation
- Computers
- Electronic equipment such as entertainment systems and TVs
- Appliances
- Manufacturing
- Transportation
- Food storage and preparation
- Security systems

Between 1990 and 2005, energy consumption worldwide rose 33%. People living in the U.S. consume 21.8% of the energy, yet they represent less than 5% of the worldwide population.

## WHERE DOES ENERGY COME FROM?

Today, most of our energy comes from **nonrenewable energy sources**, including fossil fuels and uranium.

**Fossil fuels** – coal, oil, and natural gas – were formed from plants and animals that lived 300 to 400 million years ago in swamps and oceans. When these living things died, they decomposed and were buried.

During the millions of years that passed, different types of fossil fuels were formed depending on the combination of animals and plants present, how long the material was buried, and the temperature and pressure. All fossil fuels release carbon when they are burned. The heat content of a fuel is measured in British thermal units, abbreviated as Btu.

**A Btu is the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit.**

- **Coal** is the most abundant nonrenewable energy source in the world. There is an estimated 930 billion short tons, which is more than a 132 year supply. Coal releases approximately 205 pounds of CO<sub>2</sub> per million Btu when it is burned.
- **Oil** use for transportation in America is increasing rapidly, which creates increased dependence on foreign countries for the needed supply. When oil is burned, it releases approximately 155 pounds of CO<sub>2</sub> per million Btu.
- **Natural gas** is a major source for electrical generation, which places heavy demands upon supply and impacts cost. Natural gas releases approximately 116 pounds of CO<sub>2</sub> per million Btu when it is burned.

**Uranium** is the fuel most widely used by nuclear plants. **Nuclear energy** is the energy inside the nucleus (core) of an atom of uranium. The energy is released through nuclear fusion or nuclear fission. In nuclear fusion, energy is released when atoms are combined together to form a larger atom.

This is how the sun produces energy. In nuclear fission, atoms are split apart to form smaller atoms, releasing energy. The energy generated by the release is used to heat water into steam, which in turn spins a turbine that generates electricity. Increased use of nuclear energy is proposed by some as a way to reduce emissions of greenhouse gases.

### Fact:

**New York produces more hydroelectric power than any other state east of the Rocky Mountains.**

*– U.S. Energy Information Administration*



# ENERGY LITERACY

**Fact:**

**Nuclear energy provides 19 percent of the United States' electricity and is the country's number one source of emission-free electricity.**

*- U.S. Energy Information Administration*

**Renewable Energy Resources** can be quickly replenished through natural processes. When "green" energy alternatives such as solar, wind, biomass, or hydropower are used to generate electricity, there are fewer harmful greenhouse gases produced. Renewable energy is safe, plentiful, and shows tremendous potential to replace existing fossil fuels. In 2004, New York State adopted the goal of increasing the proportion of renewable energy used to generate electricity from the current 20% to at least 25% by 2013. To learn more about renewable energy and NYSEERDA's incentives, visit [www.nyserda.org](http://www.nyserda.org).

**Fact:**

**New York ranks 20th in the country in energy production and 51st in total energy consumption per capita (including Washington DC as a ranked entity). This result may be attributed to New York City's massive mass transit systems.**

*- U.S. Energy Information Administration*

## TOTAL ENERGY PRODUCTION 2007 (Trillion Btu)

<u>Rank</u>	<u>State</u>	<u>Total Energy</u>
1	Texas	11,341
2	Wyoming	10,290
3	Louisiana	6,893
20	New York	873
51	District of Columbia	1.09

*Source: U.S. Energy Information Administration*

## TOTAL ENERGY CONSUMPTION PER CAPITA, 2008 (MILLION Btu)

<u>Rank</u>	<u>State</u>	<u>Energy Consumption</u>
1	Wyoming	1,016
2	Alaska	946
3	Louisiana	783
51	New York	205

*Source: U.S. Energy Information Administration*

**Secondary Energy Sources**, such as electricity and hydrogen, are created from the conversion of other sources of energy.

- **Electricity** is the flow of electrical power or charge. It occurs in nature as lightning and as static electricity. A generator converts mechanical energy into electrical energy.
- **Hydrogen** is the most abundant element in the universe. It does not occur naturally as a gas on the earth; it is combined with other elements. Hydrogen separates from hydrocarbons through a heating process. It is colorless, odorless, tasteless, and non-toxic. Currently, most hydrogen comes from natural gas and has great potential because it is high in energy and, when burned, produces almost no pollution.

# ENERGY LITERACY

## ELECTRICAL GENERATION

<u>Energy source</u>	<u>New York</u>	<u>U.S.</u>
Petroleum	2%	2%
Natural Gas	26%	21%
Nuclear	26%	19%
Coal	12%	49%
Hydropower	17%	6%
Other*	17%	3%

*\*includes other renewables and net imported electricity*

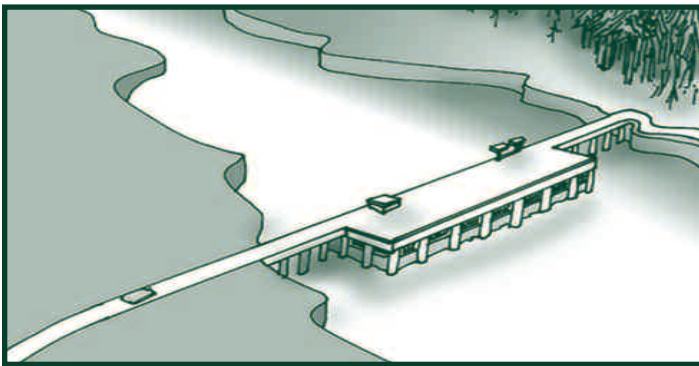
Source: NYSERDA, Patterns and Trends, 2010

There are 28 large projects and 340 small (less than 10 megawatt) electrical generation projects in New York. The largest is Niagara Falls. The other 17% in the chart above includes electricity imported from our neighboring states and Canada (14%). The balance (2%) comes from biofuels (mainly wood, waste, and agricultural products) and 1% comes from wind.

### Fact:

**Currently, U.S. hydropower generation annually avoids 225 million metric tons of carbon emissions, equivalent to the output of approximately 42 million passenger cars.**

*-National Hydropower Association*



## ENERGY AND THE ENVIRONMENT

Every energy source has both positive and negative impacts on the environment. Many of the environmental problems we face today are a result of our fossil fuel dependence. America's primary source of energy, accounting for 84%, is fossil fuels.

While the fossil fuel industry continues to improve in sustainable practices, many challenges remain.

Some of those challenges include:

- Air pollution
- Climate change (global warming)
- Oil spills
- Water pollution
- Toxic waste
- Acid rain

## WHAT IS OUR CARBON FOOTPRINT?

The amount of CO<sub>2</sub> we put into the atmosphere through our energy use is our carbon footprint.

If we are going to make our carbon footprint smaller, we need to look at all areas that contribute to carbon dioxide emissions – cars we drive, buildings we live and work in, and how much energy we use.

Energy efficiency can provide many immediate environmental benefits. Many of these impacts and risks can be avoided. The reduced use of fossil fuels can help conserve our resources for future generations.

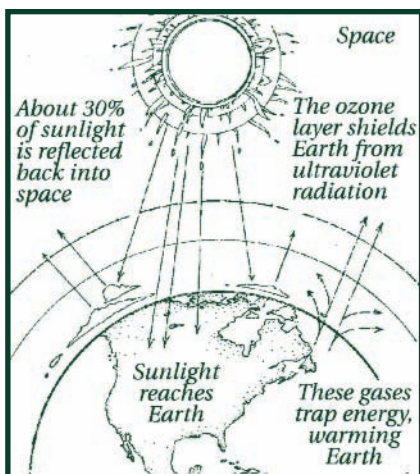


# ENERGY LITERACY

## CARBON FOOTPRINT

### What Is the Greenhouse Effect?

The greenhouse effect is a heat-trapping process that keeps the Earth warm enough to sustain life. Earth's atmosphere acts like the glass of a greenhouse – after sunlight passes through the atmosphere and warms the Earth, the heat is then radiated back towards space. A portion becomes trapped against the Earth by “greenhouse” gases in the atmosphere. Although there are several greenhouse gases, some scientists believe CO<sub>2</sub> accounts for half of the climate change trend.



China emits the largest amount of CO<sub>2</sub> in the world, closely followed by the United States. However, the average American generates 19.8 metric tons of CO<sub>2</sub> per year, while the average for China is 4.6 tons per capita. What can you do to reduce your carbon footprint?

### What is Air Pollution?

Air pollution is caused by gases and particles released into the air. It comes from natural sources such as volcanoes and wild fires. It also is generated by man-made sources such as factories, automobiles, homes, and electricity generation.

### Why Is Air Pollution a Serious Concern?

Air pollution is a major human health and environmental issue. Particulate matter affects human health, but we are also concerned about the harmful effects of other chemical or biological materials on our environment, such as acid rain, smog, ozone depletion, and the greenhouse effect.

**“You can never have an impact on society if you have not changed yourself.”**

*- Nelson Mandela*

Country	CO <sub>2</sub> Emissions from consumption and burning of fossil fuel (2006) (million metric tons of CO <sub>2</sub> ) <sup>1</sup>	CO <sub>2</sub> Emissions per capita (metric tons) <sup>1</sup>
China	6,018	4.58
United States	5,903	19.78
Russia	1,704	12.00
India	1,293	1.16
Japan	1,247	9.78
Germany	858	10.4
Mexico	436	4.05
South Africa	444	10.04

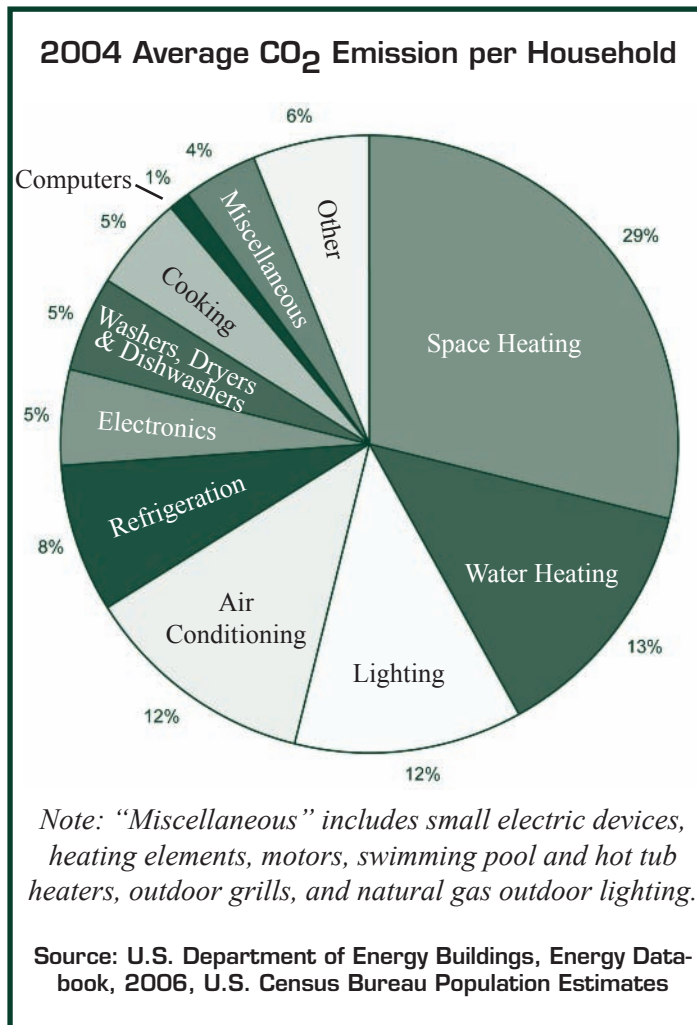
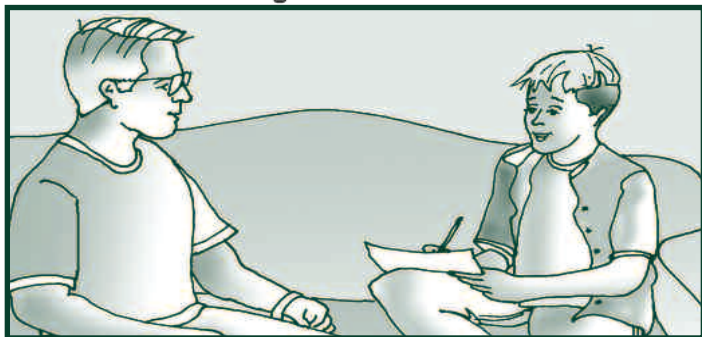
<sup>1</sup> Trends: A Compendium of Data on Global Change, CO<sub>2</sub> Information Analysis Center, Oak Ridge National Lab, U.S. DOE, 2004, [www.cdiac.esd.ornl.gov/trends/emis/tre\\_coun.htm](http://www.cdiac.esd.ornl.gov/trends/emis/tre_coun.htm) and Energy Information Administration (EIA) International Emissions Data 2008 Report, [www.eia.doe/environment.html](http://www.eia.doe/environment.html)

# ENERGY EFFICIENCY ACTIVITIES

## 1. DISCOVER YOUR CARBON FOOTPRINT

### Family Activity

How many pounds of CO<sub>2</sub> does your household produce in one month? The pie diagram on the right shows which energy users contribute to your carbon footprint. The table below will help you calculate that information. You will need to use one month's gasoline receipts and your electric, natural gas, or oil bill to fill out this chart. Write in the total gallons of gasoline purchased by everyone in your household, the kWh and therms from your utility bills, and the size of your trash can(s) multiplied by the number of pick-ups per month. Garbage produces methane, but it is converted below to a CO<sub>2</sub> equivalent (eCO<sub>2</sub>).



Household CO <sub>2</sub> Production			
Gas purchased	_____ gallons	x 20*	= _____ lbs of CO <sub>2</sub>
kWh of electricity	_____ kWh used	x .47	= _____ lbs of CO <sub>2</sub>
Therms of natural gas	_____ therms used	x 12	= _____ lbs of CO <sub>2</sub>
Gallons of propane	_____ gallons used	x 11	= _____ lbs of CO <sub>2</sub>
Gallons of heating oil	_____ gallons used	x 22	= _____ lbs of CO <sub>2</sub>
Trash (not including recycling)	_____ gallons	x 10	= _____ lbs of CO <sub>2</sub>
		<b>TOTAL</b>	= _____ lbs of monthly CO <sub>2</sub> emissions

Complete this exercise in both a warm and cold month to compare.

\*Coefficients are based on U.S. EPA data

# ENERGY EFFICIENCY ACTIVITIES

## 2. NEW YORK ENERGY USE DATA

The following activities will help you better understand your energy use at home. To complete the word problems below, use the New York Energy Smart Data in Table 1.

- 1) You have two lamps in your bedroom and both use 75 watt bulbs. Your lamps are on for four hours per day. Your parents pay \$0.24 per kWh. How much does it cost for your bedroom lighting for one month? For one year?
  - 2) Your bedroom is warm and you want to cool it. Which is a more cost-efficient option, an electric room air conditioner or a window fan? Using \$0.10/kWh, how much would it cost to run your room air conditioner for eight hours/day per month during the three warmest months of the year? How much would it cost to run your window fan for eight hours/day per month for three months of the year?
  - 3) It takes energy to wash and dry your clothes. It costs \$0.39 to dry your clothes for one hour in a gas dryer, if your family pays \$1.75/therm. How much does it cost to dry your clothes for one hour in an electric dryer, if your family pays \$0.18/kWh? Using the same rates, if your family does 10 loads/week, how much does it cost to dry them in a gas dryer? In an electric dryer? On a clothes line?
  - 4) Using \$0.24/kWh, how much does it cost per month to use your 27-inch TV, if you have it on for eight hours per day? How much would it be for a whole year? If you switched to a 42-inch HDTV, what would it cost for a month? What would it cost for a year?
  - 5) If your parents pay \$0.24/kWh, how much does it cost to leave your computer and monitor on for eight hours per day for a whole year?
- (Answer key on page 15)

New York Energy Smart Data - Electric Rates (\$/kWh)								
Table 1								
	CFL Bulb (20 Watts)	Incandescent Bulb (75 Watts)	Room Air Conditioner 10,000 btu/hr 1400 watts	Window Fan (120 Watts)	Clothes Dryer (electric)	27 in. TV	42 in. HDTV	Computer and monitor (270 watts)
	4 hrs day/per month	4 hrs day/per month	8 hrs day/per month	8 hrs day/per month	Cost for 1 hour	8 hrs day/per month	8 hrs day/per month	8 hrs day/per month
Rates								
\$0.10	\$0.24	\$0.90	\$25.20	\$2.88	\$0.49	\$2.71	\$5.81	\$6.48
\$0.14	\$0.34	\$1.26	\$35.28	\$4.03	\$0.69	\$3.80	\$8.13	\$9.07
\$0.18	\$0.43	\$1.62	\$45.36	\$5.18	\$0.89	\$4.88	\$10.45	\$11.66
\$0.24	\$0.58	\$2.16	\$60.48	\$6.91	\$1.18	\$6.51	\$13.94	\$15.55

Table 2					
APPLIANCE	AVG WATT	APPLIANCE	AVG WATT	APPLIANCE	AVG WATT
Heating and Cooling		Kitchen		Laundry Room	
Air conditioner (window)	1150	Coffee Maker	700	Washing Machine	500
Air conditioner (central)	3500	Dishwasher	1400	Clothes Dryer	4000
Fan (portable)	100	Microwave Oven	1045	Iron	1000
Fan	75	Stove	535	Home Entertainment	
Water heater	2550	Refrigerator	540	Computer + Monitor	260
Miscellaneous		Blender	300	Stereo	55
Clock	5	Can Opener	175	TV (36" Plasma)	240
Light bulb (incandescent)	75	Toaster Oven	1200	VCR	50
Light bulb (CFL)	20	Toaster	1100	Bedroom & Bathroom	
Vacuum cleaner	800			Hair Dryer	1000
				Curling Iron	40
				Electric Toothbrush	10



# ENERGY EFFICIENCY ACTIVITIES

## 3. ENERGY DETECTIVE ACTIVITY

Study the example below in Table 3a before completing Table 3b on page 8.

- In your bedroom, write in all the appliances and lighting that use electricity in the far left column in Table 3b (pg 8).
- Using Table 2 on page 6, enter the watts used by each appliance or lamp. Can't find it? Read the electrical name plate.
- Estimate the amount of time that the appliance or light is on per day (Column B or C).
- Multiply watts (A) by hours (C) and enter in Column D.
- Divide the watt hours (D) by 1,000 and enter in Column E.
- To find out the daily cost, multiply the kWh (E) by the electricity rate, found on your electric bill. (We are using \$0.173 in the example below.)
- To find out how much it costs to run the appliance or light for an entire year, multiply the daily cost (F) by 365.

After you complete the Energy Detective Activity for your bedroom, you can repeat this chart for each room in your house. Keep this in mind when you

complete the Energy Savings Action Plan on page 17. Are there any appliances you would like to use that are not listed on the chart? You can also find the wattage on the appliance nameplate.



### Fact:

The energy used in the average home can be responsible for more than twice the greenhouse gas emissions of the average car.

– ENERGY STAR®

Table 3a — Kid's Bedroom (Energy Detective Form Sample)

	A	B	C	D	E	F	G
			B/60	A x C	D/1000	E x rate (\$0.173)	F x 365
APPLIANCE	Watts	Minutes of use	Hours of use	Watt hours	kWh	Daily cost	Yearly cost
Clock	5		24	120	0.12	\$0.02	\$7.30
TV	240		5	1,200	1.20	\$0.21	\$76.65
VCR	50		2	100	0.10	\$0.02	\$7.30
Computer + Monitor	260		12	3,120	3.12	\$0.54	\$197.10
Stereo	55		8	440	0.44	\$0.08	\$29.20
<b>TOTAL</b>						<b>\$0.87</b>	<b>\$317.55</b>

# ENERGY EFFICIENCY ACTIVITIES

Table 3b — Energy Detective Form

	A	B	C	D	E	F	G
			B/60	A x C	D/1000	E x rate	F x 365
APPLIANCE	Watts	Minutes of use	Hours of use	Watt hours	kWh	Daily cost	Yearly cost
TOTAL						\$	\$

## 4. Cost To Light Your Home

### Incandescent vs. Compact Fluorescent (CFL)

Not all light bulbs are created equal. Some are much more energy efficient than others. The least efficient are incandescents because almost 90% of the energy is converted to heat instead of light. A more efficient light bulb is the CFL. It uses 75% less energy and can last up to 10 times longer than an incandescent.

### Take Action

- Count the bulbs in each room and record it in Table 4. Total each column. Refer to the example in Table 5a.
- In Table 5b, enter the total number of CFLs and incandescents (from Table 4) in Column A. For the purpose of this exercise, we are using only 20 W and 75 W bulbs.
- Using the data in Table 1 on page 6, enter the electricity cost per bulb for one month. Find the rate that most closely matches the rate that you pay and enter in Column B (Table 5b). (This assumes that a bulb is on for four hours per day, per month).
- To calculate the annual cost of electricity, multiply Column B by 12 and enter in Column C.
- To calculate the electricity cost for the entire year, for each type of bulb, multiply the number of bulbs (Column A) by the annual electricity cost (Column C) and record in Column D.

TABLE 4

LOCATION	Incandescents	CFLs
Bedroom 1		
Bedroom 2		
Kitchen		
Dining Room		
Living Room		
Hallway		
Laundry Room		
Outside Front Porch		
Family Room		
Other		
TOTAL		



# ENERGY EFFICIENCY ACTIVITIES

6) How much would it cost for electricity, per year, if all your bulbs were CFLs? Take the total number of bulbs (Column A) and multiply by the annual electricity cost (Column C) and enter in Column E. Do the same for incandescent bulbs.

**FACT:**

If every American replaced just one light bulb in their home with an ENERGY STAR® qualified bulb, we would save enough energy to light more than three 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.

- U.S. EPA



TABLE 5a					
COST TO LIGHT YOUR HOME - EXAMPLE					
	A	B	C	D	E
	Number of Bulbs (from Table 1)	Monthly Cost of Electricity for 1 bulb*	Annual Cost of Electricity for 1 bulb	Total Electricity Cost	Annual Electricity Cost If All Bulbs Were the Same
CFL 20 Watt	10	\$.43	\$5.16	\$51.60	\$154.80 (30 CFLs x \$5.16)
INCANDESCENT 75 Watt	20	\$1.62	\$19.44	\$388.80	\$583.20 (30 Incandescents x \$19.44)
TOTAL	30				

TABLE 5b					
COST TO LIGHT YOUR HOME - EXERCISE					
	A	B	C	D	E
	Number of Bulbs (from Table 1)	Monthly Cost of Electricity for 1 bulb*	Annual Cost of Electricity for 1 bulb	Total Electricity Cost	Annual Electricity Cost If All Bulbs Were the Same
CFL 20 Watt					
INCANDESCENT 75 Watt					
TOTAL					

\*(based on 1 bulb, 4 hrs/day per month, \$0.18/kWh)

# ENERGY EFFICIENCY ACTIVITIES

## 5. ENERGY ESCAPE

The biggest energy users in the kitchen are your refrigerator, stove, and dishwasher. The refrigerator is the number one user of energy in your kitchen. Whenever the refrigerator door is open, energy is escaping. Decide what you would like to get or put away before you open the door.

### Experiment

How many times a day is your refrigerator opened? It is not hard to find out. Cut out the box below and tape it to your refrigerator door. Ask your family members to mark down every time they open the door over a weekend.

Family Member	FRI	SAT	SUN	TOTAL

How many times did your family open the refrigerator?  
\_\_\_\_\_

How could you cut down on the number of times it was opened? \_\_\_\_\_

**Stove:** Whether your stove uses electricity or natural gas, these tips will help you save energy.

- Use lids to shorten cooking time.
- Use the lowest heat possible to maintain a boil. Most things will continue to boil on “low.”
- When the oven is in use, do not open the door more than is necessary. Every time you open it, heat escapes.
- Use a microwave or toaster oven whenever possible. Both use less energy than a conventional oven.
- Use glass or ceramic pans in the oven. They absorb more heat.



## 6. CONSERVE H<sub>2</sub>O

Pumping water from underground wells, purifying it, and delivering it to homes and businesses uses a lot of electricity. Also, one of the daily uses of energy is to heat water so we can wash dishes, wash clothes, and take showers in warm water. When you save water, you save energy, too. Reducing the temperature of your hot water tank and replacing your showerhead can result in real savings. Complete the chart below to see how much you can save.

Hot Water	# of Degrees Lowered		Natural Gas		Annual Savings
		X	\$2.44	=	\$
	# of Degrees Lowered		Electricity		Annual Savings
		X	\$8.37	=	\$
Shower Head	# Replaced		Natural Gas		Annual Savings
		X	\$25.00	=	\$
	# Replaced		Electricity		Annual Savings
		X	\$43.20	=	\$
<b>Total</b>					<b>= \$</b>

You may be amazed to learn that the average home in North America uses nearly 300 gallons of water a day. Much of this is used in the bathroom when you shower, bathe, or flush the toilet.

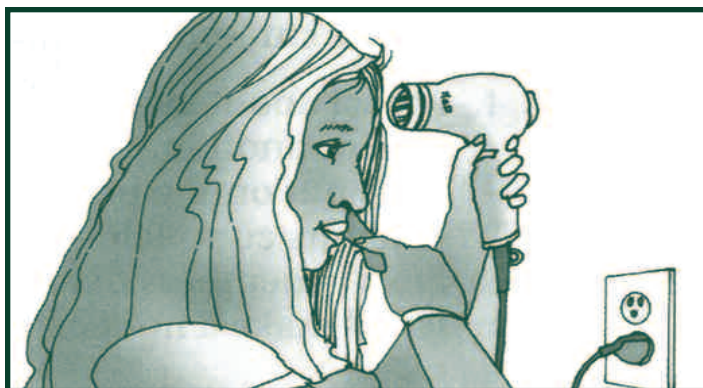


# ENERGY EFFICIENCY ACTIVITIES

## 7. COST OF LOOKING YOUR BEST

### Family Activity

It takes energy to look your best. Energy is needed to shower, blow-dry your hair, brush your teeth, and wash and dry your clothes. Use the chart below to es-



timate the energy costs for looking your best.

### Here's how:

With your parents, estimate the daily and weekly activities below. Enter the number in the column labeled "Units." Then multiply the "Units" by the "Cost per Use" column; write your answer in the "Cost for Activity" column. Enter the "Cost of Activity" in the next column before the multiplication sign. Enter the number of times per month each activity is performed, and write that number in the "Times per Month" column, to the right of the multiplication sign. Multiply and enter your answer in "Monthly Cost." Multiply by 12 to calculate your annual cost.



*Costs estimated at 18.3 cents per kWh and \$1.46 per therm (New York State average, 2009).*

### DAILY ACTIVITIES – STUDENT FILLS IN

ACTIVITY	UNITS	COST PER USE	ACTIVITY UNIT COST	ACTIVITY UNIT COST X NUMBER OF TIMES PER MONTH	MONTHLY COST	YEARLY COST
Shower	min.	x \$.12		x	=	x 12 =
Tub Bath	inches	x \$.12		x	=	x 12 =
Hand/Face Wash	min.	x \$.04		x	=	x 12 =
Blow Dryer	min.	x \$.04		x	=	x 12 =
Brushing Teeth	min.	x \$.12		x	=	x 12 =
Daily Student Subtotal						

### WEEKLY ACTIVITIES – PARENT FILLS IN

Washing Clothes Hot water	loads	x \$1.48		x	=	x 12 =
Warm Wash/ Cold Rinse	loads	x \$.93		x	=	x 12 =
Cold Wash/ Cold Rinse	loads	x \$.07		x	=	x 12 =
Drying Clothes: (Natural gas)	loads	x \$.26		x	=	x 12 =
Drying Clothes: (Electric)	loads	x \$.85		x	=	x 12 =
Weekly Family Total					\$	\$
Weekly Student Subtotal (Divide the "Weekly Family Subtotal" above by the number of persons in the family)					\$	\$
GRAND TOTAL – Add 2 Student Subtotals together					\$	\$

# ENERGY TIPS

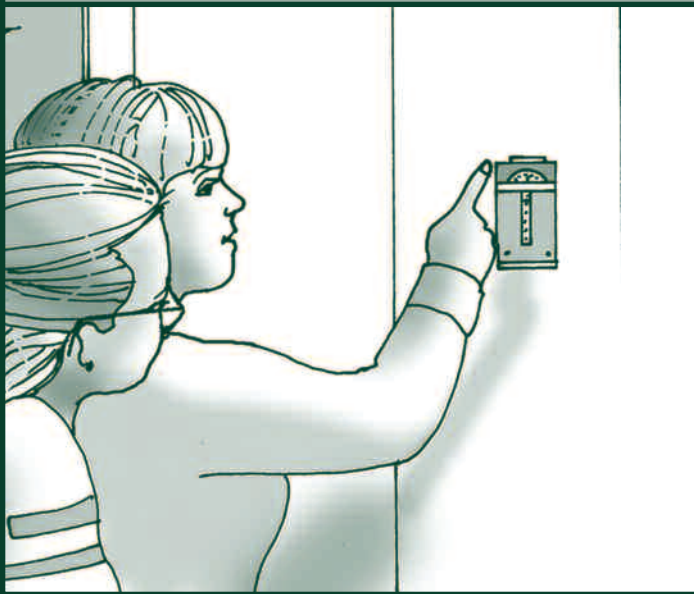
## DO YOU KNOW...

these four common myths about energy that cost families hundreds of dollars each year?

### Myth 1

“Thermostats should not be turned down at night because it takes more energy than it saves to reheat the home.”

*Not true* - It takes less energy to reheat or re-cool your home than it does to leave the heat or air conditioner set to a constant temperature.



### Myth 2

“You should leave your car running at a drive-thru window because it takes more energy than you save to restart the car.”

*Not true* – If you expect to be idle for more than 30 seconds, turn your car off. Every two minutes that a car idles is the same as driving it one mile.

### Myth 3

“Taking a bath uses less water than taking a shower.”

*Not true* – Do you know that taking a bath uses even more water than taking a shower? A typical bath uses 30 to 40 gallons of water as compared to an average shower of five to 10 minutes, using a high efficiency showerhead, which will use 2 ½ gallons per minute.

### Myth 4

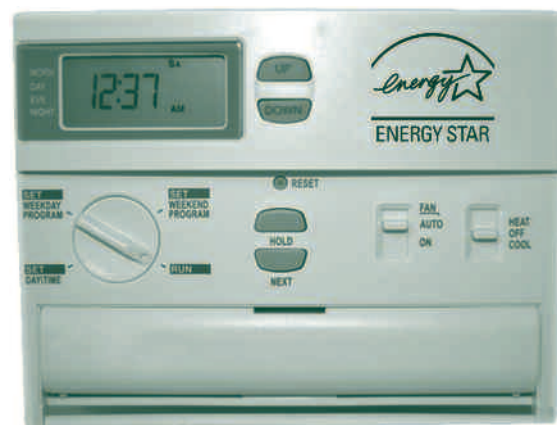
“Turning your computer on and off throughout the day may harm the computer.”

*Not true:* New home electronics are made to turn off and on many times. Any time you can turn it off will save energy.

Using a programmable thermostat is an easy way to save energy and money. An ENERGY STAR® programmable thermostat offers pre-programmed settings to regulate your home’s temperature in both summer and winter. Program your thermostat to automatically reduce heating and cooling in your home when possible.

The recommended setting the the summer for air conditioning is 78°F or higher. Each degree above 75°F saves you 3% of the energy to cool your home.

The recommended setting in the winter is 70°F or lower. Adjusting the temperature 5 to 8 degrees (down in winter, up in summer) can help save energy if you are away from home for several hours.



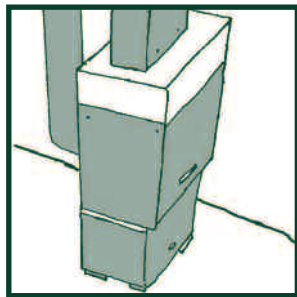
# ENERGY TIPS

## TAKE ACTION TO LOWER YOUR ENERGY USE, SAVE MONEY, AND REDUCE YOUR CARBON FOOTPRINT.

Saving energy happens in two ways. First, you can use less energy through conservation, such as turning off the television when you are not in the room, or second, through energy efficiency. Energy efficiency is using less energy to accomplish the same amount of work. Let's begin in the areas of your house that have the largest carbon footprint.

### Home Heating and Cooling

- Install a programmable thermostat.
- Make sure your house is properly insulated. If you have less than six inches of insulation in your attic, you would benefit from adding more.
- You can save 10% or more on your energy bill by reducing the air leaks in your home with caulking and weather stripping.
- To help your furnace run more efficiently and cost-effectively, keep your air filters clean.
- For windows with direct sunlight, close your blinds in the summer to keep the heat out. Open them on winter days to let the warmth in.
- Small room fans are an energy-efficient alternative to air conditioning.
- For an energy audit of your entire house, consider the Home Performance with ENERGY STAR® program.

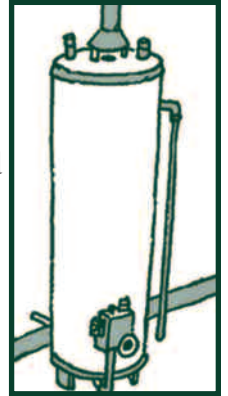


### Water Heating

- Check your faucets for leaks that can cost you hundreds of dollars each year.
- Install a high-efficiency showerhead and save up to \$50 a year.
- Install faucet aerators to decrease water use.

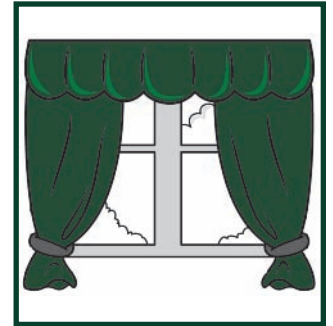


Aerator

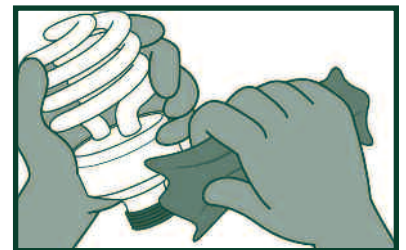


### Lighting

- Let the sun shine in. Use daylight and turn off lights near windows when possible.
- Replace your most used incandescent bulbs with CFLs (compact fluorescent bulbs) and save from \$12 to \$20 per year.
- Use lighting controls such as outside motion detectors and timers.
- Turn off lights when you leave the room.
- Always use the lowest wattage bulb that still gives you the light you need.
- Keep your light bulbs clean. It increases the amount of light from the bulb and reduces the need to turn on more lights.



**Safety note:** Burned out CFLs, which contain a small amount of mercury, should be disposed of properly. To locate a collection site in your area, or to learn what to do if a CFL breaks, visit [www.getenergysmart.org](http://www.getenergysmart.org).



**“What is the use of a house if you haven't got a tolerable planet to put it on?”**

– Henry David Thoreau

# ENERGY TIPS

## Refrigerators and Freezers

- Replace your old refrigerator with an ENERGY STAR® model, which requires 40% less energy than conventional models and provides energy savings without sacrificing the features you want.
- The coils in the back or bottom of your refrigerator and freezer should be kept as clean as possible.
- The freezer should be kept as full as possible. When it is full, it runs more efficiently, stays cooler, and uses less energy.

## Electronics

- Turn off your computer and game consoles when you are finished.
- New home electronics are made to turn on and off many times. Always turn them off to save energy.
- Electronics with the ENERGY STAR® label use up to 60% less energy while providing the same performance at the same price as less efficient models.
- Beware of phantom loads or energy vampires. Electronic games, and DVD players, computers, printers, coffee pots, television sets, and telephone chargers continue to draw electricity when they are plugged in but not in use. Use power strips for household electronics. One button will turn off multiple appliances, which conserves energy and saves you money.

## Dishwashers

- Only run dishwashers when full and use the “air dry” or “no heat dry” settings.
- ENERGY STAR® dishwashers use at least 41% less energy than the federal minimum standard for energy consumption.

## Laundry

- Purchase an ENERGY STAR®, front-loading washer. The clothes come out nearly dry, decreasing the dryer time needed.
- Buy a moisture-sensitive dryer that automatically shuts off when clothes are dry.
- Use a clothes line whenever possible.

## Cooking

- Use the right-sized pan for the burner.
- Cook multiple items at the same time in the oven.

## Reducing

- Buy less. When shopping ask yourself, is this something I really need or is it just something I want?
- Recycle everything you can. Participate in the recycling program offered in your town or city.
- Reduce your carbon footprint by lessening the amount of solid waste that goes into the landfill. Every pound of solid waste generates 1.5 pounds of greenhouse gases.



## PARENTS, WATCH THE ENERGY SAVINGS ADD UP

An individual with a combined electric and heating fuel bill of \$2,500 per year could save 20% or \$42/month by using energy more efficiently. That is like getting a pay raise without having to work longer or harder.

### Think about this:

- \$42 is the monthly payment on a 15-year, 6% interest home equity loan for \$5,000 in improvements to your home.
- If you invest \$42 every month into an IRA that earns 8% interest, you'll have \$7,000 after ten years – nearly \$63,000 after 30 years.



# ENERGY ACTIONS

## IT'S UP TO YOU

By taking the energy challenge, you and your family will have fun learning together and will become energy literate. You will make wise energy choices that will provide measurable energy savings in your home and make positive impacts on the environment. You will also help your state achieve its sustainability goals. Everyone in your family can do their part to conserve energy and protect the environment. What are you committed to do?

Please complete the checklist on page 17, and return it to your teacher or NYSERDA.

Congratulations to you and your family for making a difference!

### Fact:

Did you know that every year over 19 million trees are used to print phone books? If you do not want to receive phone books at your home, go to: [www.yellowpagesgoesgreen.org](http://www.yellowpagesgoesgreen.org)



## RESOURCES

If you would like to learn more about energy, sustainability, and using energy more efficiently, the following resources are recommended.

[www.nyserda.org](http://www.nyserda.org)  
[www.getenergysmart.org](http://www.getenergysmart.org)  
[www.thinkenergy.org](http://www.thinkenergy.org)  
[www.energyforkeeps.org](http://www.energyforkeeps.org)  
[www.nefl.org](http://www.nefl.org)  
[www.eere.energy.gov](http://www.eere.energy.gov)  
[www.energystar.gov](http://www.energystar.gov)

**“Tell me, I’ll forget.  
Show me, I may remember.  
But involve me, and I’ll understand.”**

*- Chinese Proverb*

### ANSWER KEY - For “New York Energy Use Data” on page 6.

- 1)  $\$4.32/\text{month} \times 12 \text{ months} = \$51.84/\text{year}$
- 2) Electric AC:  $\$25.20/\text{month} \times 3 \text{ months} = \$75.60$  for 3 months.  
Window fan:  $\$2.88/\text{month} \times 3 \text{ months} = \$8.64$  for 3 months
- 3) 1 hour in gas dryer @  $\$1.75/\text{therm} = \$0.39$   
1 hour in electric dryer @  $\$.18/\text{kWh} = \$0.89$   
10 loads - gas =  $\$3.90$ , electric =  $\$8.90$   
Clothes line = free

4)

	27-inch TV	42-inch TV
1 Month	\$6.51	\$13.94
1 Year	\$78.12	\$167.28

- 5)  $\$15.55/\text{month} \times 12 \text{ months} = \$186.60$

## About NYSERDA

New York State Energy Research and Development Authority (NYSERDA) is a public benefit corporation created in 1975 under Article 8, Title 9 of the State Public Authorities Law through the reconstitution of the New York State Atomic and Space Development Authority. NYSERDA's earliest efforts focused solely on research and development with the goal of reducing the State's petroleum consumption. Subsequent research and development projects focused on topics including environmental effects of energy consumption, development of renewable resources, and advancement of innovative technologies. NYSERDA manages energy-efficiency programs, research and development initiatives, low-income energy programs, and environmental disclosure activities. For more information on residential programs, visit [www.getenergysmart.org](http://www.getenergysmart.org). For all other programs, visit [www.nyserda.org](http://www.nyserda.org).

## About NEF

National Energy Foundation is a unique non-profit organization dedicated to the development and implementation of high quality instructional materials. The foundation's mission is to cultivate and promote an energy literate society. For more information on NEF, visit [www.nef1.org](http://www.nef1.org)

## Acknowledgments

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For More Information:



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**17 COLUMBIA CIRCLE**  
**ALBANY, NY 12203 • 1-866-NYSERDA**  
**[www.nyserda.org](http://www.nyserda.org)**



Printed on paper containing 100% Post Consumer Waste recycled materials, and was produced with renewable power.

# ENERGY ACTION AT HOME

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