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Why is learning about energy important?

Indigenous knowledge about the natural world has a deep and long history. Ancestors knew and understood that being in a balance with the natural world was very important. For this reason, the practice of making offerings to Mother Earth is a tradition Indigenous peoples continue to practice to this day. In earlier times, offering tobacco to show respect and gratitude for picking plants for medicine, or animals for food made sense because of the way people lived. Today, we live in a very different environment.

We buy the energy we need for heating and cooling our homes, for lighting, and for using appliances like refrigerators, televisions, and computers. When we use this energy, somewhere Mother Earth has been mined for the coal, the oil or the gas to give us what we use. Most of us aren't aware of how we are taking things from Mother Earth. For example, do you know the answers to these questions?

- How much coal was taken from the earth so I can turn on my lights?
- How does the gasoline I buy for my car affect the earth?
- What effect do my actions have on other peoples around the world?

Today we are disconnected from the ways that resources are taken from the earth to provide us the energy we need to live our daily lives. When Ancestors gathered wood for heat, they knew how much they were taking. Today, you buy your energy from utilities that buy the coal from companies that mine the earth. Often, we do not even realize how much we are taking. But every time you turn on the lights, turn up the thermostat, or buy gasoline for your car you are using the gifts of the earth. If we are wasteful in the way we use this energy, we are needlessly damaging the air, water and all living things.

Indigenous people believe it is important to be in good relation with Mother Earth. But as we have seen, living in today's society makes this very difficult. This Energy Workbook along with CEED's Energy Series curriculum provides you with information you need to make better choices about how you use energy in your home.

What you will learn in this workbook

- The different ways you use energy in your home.
- Effects of energy use on families and communities.
- Effects of energy use on Mother Earth.
- How much you pay for your energy.
- Things you can do to save money on energy.
- Things you can do to reduce the harmful effects on Mother Earth.

Three reasons American Indian families and communities should know about energy systems:

1. American Indian Reservations are places where coal, oil and uranium are mined or drilled; sometimes providing income, but also causing environmental damage.

2. The more energy we use, the more oil, coal and natural gas companies mine and drill to supply us; affecting Mother Earth.

3. The price of energy is constantly increasing. American Indian families should not needlessly pay for wasted energy. This takes income away from more important things.
The Home Energy Burden

The price of energy is constantly increasing, which affects Indian family income. This is called the Home Energy Burden. American Indian families should not needlessly pay for wasted energy. This takes income away from more important things.

The Home Energy Burden is the portion of your family’s income that is spent on energy. Families with lower incomes tend to use a greater portion of their income for energy. In the United States, the average family spends 5 percent of their income on energy, but low income households spend 16 percent of their budget on energy services.

In Minnesota, the severely cold winters and lack of good mass transportation options in certain areas means that what families spend on energy can be even higher. Families that live in older houses sometimes also spend more on energy because these houses are less insulated.

If you live in an older house, this can result in a particularly high Home Energy Burden. In Minnesota, during the 2005-2006 winter heating season, low income households exceeded the affordable level of energy costs by a total of $388 million. A large part of this can be linked to the older, highly inefficient housing stock that is prevalent in low income towns and neighborhoods.

How do we use energy in our homes?

The ways most families use energy at home:

- Heating during the winter.
- Cooling during the summer.
- Lights in the dark.
- Heating water for showers, baths, and washing dishes.
- Refrigerators and freezers to preserve food.
- Appliances (televisions, computers, radios, video games).

Is it different in Minnesota? Yes!

In Minnesota, the average temperature in January is 7 degrees. In Florida, the average is 58 degrees. The winters in Minnesota are much colder than most other states. In fact, Minnesota has one of the lowest average temperatures in the winter months. That means that a greater share of our home energy used is for heating our home.
What is natural gas?

Plants and animals that have decayed for millions of years! The decay from these plants and animals gets trapped beneath rocks. Pressure and heat change the material into coal, oil and natural gas.

Where does it come from?

About 84% of the natural gas we use comes from areas in the United States. The map shows where natural gas production is located. It is difficult to get information on how much natural gas is produced from Indian reservations. But you can get a sense of this by comparing the two maps.
How natural gas is delivered to your home

Natural gas is extracted from the earth and oceans through drilling. The gas is pushed through very large pipelines. This map shows the pipelines that are needed to carry the natural gas from the place where it is extracted to the area where it will be used.

In the Midwest, most of our natural gas comes from Texas, Oklahoma, Kansas, Louisiana and Canada. Once extracted, the natural gas is shipped via pipeline to Minnesota. There, suppliers and local gas distribution companies like Xcel Energy or CenterPoint Energy purchase the natural gas from the producers. You buy your natural gas from one of these private distribution companies:

- CenterPoint Energy
- Greater Minnesota Gas
- Great Plains Natural Gas
- Interstate Power (Alliant)
- Minnesota Energy Resources
- Xcel Energy

In Minnesota, there are also 31 municipal utilities that provide natural gas. You can see our regional natural gas pipelines in the figure to the right.
What you pay for natural gas

When you pay your utility bill and you use natural gas, you are generally paying three different types of costs:

- **Transmission costs**: What it costs to move natural gas from the place it was produced to our area through the large pipelines.
- **Distribution costs**: The cost of bringing the gas from our area to your home.
- **The gas itself**: The cost of the gas which is called the “commodity price.”

The price that you pay for natural gas to heat your home is constantly changing. There are several reasons for this, including changes in supply of natural gas throughout the year. Also, since most natural gas is used for heating, there is high demand in winter, resulting in higher prices. Over time, the cost of energy has also been constantly rising.

The rising cost of natural gas

This is because natural gas fluctuates in price depending on the time of year. In the summer months when the demand for heat is low, the per-unit price you pay increases. This is due to fixed customer charges. Fixed customer charges cover things like gas line maintenance, meter reading, and billing. In the winter months when demand increases, the per-unit cost goes down.

How does the gas company know how much natural gas I use?

A gas meter at your home is used to measure the volume of gas you use. You will find the meter outside your home. It’s very important to make sure you keep the meter free from debris in the summer or ice in the winter. In earlier years, a person came to read your meter. Today, it is common for your gas utility to read your meter remotely.

Your meter measures how much natural gas you use by volume in units called hundred cubic feet or “cc”. Your meter measures how many hundred cubic feet (cc) of natural gas you use every month.

The gas meter in the picture to the right has two dials. Your gas meter may look different and have several dials, but they all do the same thing: measure how much natural gas you use. To read your meter, look at the numbers on the dials. Some meters (like the one in the picture) will show you the meter reading, others only have dials and you need to record the numbers on each dial to get your record of use. After you record the numbers, subtract your last reading from your current reading.

You can keep a log of your meter reading to keep track of how much natural gas you are using on a month-to-month basis. You can compare your reading with the bill the utility sends you to make sure your bill is accurate!
Understanding your natural gas bill

If you live in Minneapolis or Saint Paul, your natural gas utility is either XCEL ENERGY or CENTERPOINT ENERGY. Each utility has its own way of showing you your charges on your monthly bill. Here is an example of the CenterPoint Energy bill:

![CenterPoint Energy Bill Example]
### Current gas charges

<table>
<thead>
<tr>
<th>Billing period</th>
<th>Current reading</th>
<th>Previous reading</th>
<th>Total</th>
<th>Rate Factor</th>
<th>Usage</th>
</tr>
</thead>
</table>

#### Rate
- Residential
- Basic charge: $4.00
- Delivery charge: 94 Therm x $0.7618 = 70.18
- Decoupling adjustment: 94 Therm x $0.00074 = 0.07
- Gas Affordability Program: 94 Therm x $0.0490 = 4.50
- Cost of gas*: 94 Therm x $0.40074 = 37.67
- City franchise fee: 1.52
- Special tax: 25% x 4.50 = 1.13
- County sales tax: 15% x 10 = 1.50
- State sales tax: 6.875% x 10 = 0.70

**Total current gas charges**: $68.61

* Includes estimated Purchased Gas Adjustment amount of $0.2983.

### Home Service Plus charges

- Basic Repair Plan coverage: $18.50
- Pipe Protection Plan: $2.98
- Total Home Service Plus charges: $21.48

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**Details for online, phone, mail and account management tools**

- Starting/stoppage of gas service and more
Home natural gas log

<table>
<thead>
<tr>
<th>DATE</th>
<th>METER READING (in ccf)</th>
<th>CCF USED THIS MONTH</th>
<th>CCF ON YOUR BILL</th>
<th>TOTAL AMOUNT OF YOUR BILL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>This month’s reading minus last month’s reading equals the total ccf used this month</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How to reduce your energy use

There are many ways people try to stay warm in the winter. The heating sources below can be helpful, but it is important to know how to safely use them in your home.

Electric blankets

Some people use an electric blanket to stay warm at night and turn the thermostat down a few degrees. If you are going to use an electric blanket, please follow these safety guidelines:

- Only use an electric blanket that has been safety tested by Underwriters Laboratories.
- Do NOT use electric blankets that are more than 10 years old.
- Read and follow the instruction manual.
- Follow the safety instructions. Sometimes you should not use electric blankets with some kinds of sheets and pillows.
- Keep the temperature setting low.
- Make sure to turn it off in the morning. If you leave it on, you are still wasting energy!
- NEVER dry clean your electric blanket. It is safest to wash electric blankets on a gentle cycle and hang to air dry.
- Make sure the cord is not crimped or pinched.
- Don’t keep stuffed animals on the bed.
- DO NOT use if you have diabetes or insensitivity to heat.
- Store flat.

Space heater

Many people use space heaters to heat only one room in their house. PLEASE BE CAREFUL when using a space heater. They are a leading cause of fire-related deaths in the United States. Space heaters also use A LOT of energy, and may actually increase your energy costs! If you are going to use a space heater, please follow these safety guidelines:

- Only use a space heater that has been tested and certified by Underwriters Laboratories.
- Only use a space heater that has a tip-over safety switch. This safety switch ensures that if the space heater is tipped over, it will immediately turn off. This is VERY IMPORTANT if you have children at home.
- Make sure your space heater has a thermostat that you can control. This allows you to turn the heater higher and lower, depending on preference.
- Use a space heater that is the proper size for the room. If you get a very small space heater for a large room, it will be on constantly.
- Place the space heater on a level surface, and away from busy hallways or foot traffic.
- NEVER use with an extension cord with a space heater.
Other Ways To Reduce

Adopt energy-efficient technologies

Use technologies that use much less energy to deliver the same benefits. Some of these technologies are inexpensive and easy to implement. An example is changing your showerhead to a low-flow showerhead. The price for these are as low as $3.00 on up. The cheaper ones will likely have to be replaced sooner than the more expensive ones so you can make choices based on your budget. The low flow shower head reduces the amount of hot water you use in the shower but with the same comfort. This means you are saving on the amount of energy you are buying to heat the water you have used and you are saving water too.

An example of a more expensive energy efficient technology is an energy efficient hot water heater. Although this will cost you more, in the long run it may very well save you more because you will be paying for less energy.

Energy conservation

You can also change your behaviors to save energy. This is a very low cost option! One example of this is wearing a sweater during the winter and turning the thermostat down a few degrees at night. You can save 1% off your heating bill for each degree you lower the thermostat for 8 hours!

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Weatherizing your home

What is weatherization?
The most effective way for you to reduce your energy bill is to weatherize your home. Weatherization (or weather-proofing) refers to the installation of energy-efficient measures to improve your home, including its heating and cooling systems, its electrical system, and electricity and/or gas consumption.

Sealing leaks in your home
Weatherizing your home includes sealing your house to reduce the amount of outside air that comes into your house. This is especially important in the cold Minnesota winters!

Insulating your home
You can also weatherize your home by stopping the heat inside your home from escaping. This reduces your need to buy more energy to replace the heat that has escaped.

SAFETY ALERT: If you have indoor air problems such as mold or pest issues, it’s important to take care of these before you begin weatherization—otherwise you could trap these health hazards in your home even more.

Getting started weatherizing your home

Find where you are wasting energy. Wasted energy doesn’t help us to improve our comfort or quality of life. In order to fix these problems, we need to figure out where we waste energy.

Eliminate sources of wasted energy. Once we find where the energy is being wasted, we can fix the problems so that we are only purchasing the energy that we want to use. Weatherizing and fixing air leaks is one way to stop energy waste.

Any crack or hole in your house allows warm air to escape. In the winter these cracks let the cold air leak in and the warm air to escape. In the summer it is the opposite. The warm air from the hot summer days leaks in and if you have an air conditioner, the cool air escapes. This increases the amount of energy needed to heat and cool our homes.
This home diagram shows the common air leaks in a typical home. Older homes have many more cracks and holes than newer homes. Chances are if you are living in an older home, there are MANY easy things you can do to begin weatherizing your home.
Common air leaks in your home

Get a home energy audit. The next step in weatherizing your home is to get a home ENERGY AUDIT. An energy audit is a step-by-step assessment of your home so you can find any places where there are air leaks or wasted energy and fix those problems. You can do a basic low-cost energy audit yourself. You can also access resources to get a professional energy audit for your home. Try both!

Do-It-Yourself Energy Audit

# DIY Energy Audit

The DIY Audit is one you and your family can do without any special equipment. All you need are some basic, everyday tools!

## Use this checklist to perform a home energy audit

<table>
<thead>
<tr>
<th>Basement</th>
<th>Heating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Holes in the walls for pipes, ducts, vents and wires</td>
<td>□ Thermostat turned down?</td>
</tr>
<tr>
<td>□ Cracks in foundation</td>
<td>□ Thermostat programmable?</td>
</tr>
<tr>
<td>□ Still plate and band joist</td>
<td>□ Yearly furnace inspection scheduled</td>
</tr>
<tr>
<td>□ Cracks in wall</td>
<td>□ Change filters monthly</td>
</tr>
<tr>
<td>□ Baseboards</td>
<td>□ Clean heat vents</td>
</tr>
<tr>
<td>□ Electrical outlets and switchplates</td>
<td>□ Bleed radiators</td>
</tr>
<tr>
<td>□ Mail slot or pet door</td>
<td>□ Insulation on hot water pipes</td>
</tr>
<tr>
<td>□ Cracks in door</td>
<td>□ Holes where pipes enter</td>
</tr>
<tr>
<td>□ Weatherstripping</td>
<td></td>
</tr>
<tr>
<td>□ Door sweep</td>
<td></td>
</tr>
<tr>
<td>□ Threshold</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Doors</th>
<th>Hot Water Heater</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Frame tightness—all sides, around panes</td>
<td>□ Insulation on hot water pipes</td>
</tr>
<tr>
<td>□ Weatherstripping</td>
<td>□ Insulation on water heater</td>
</tr>
<tr>
<td>□ Storm windows</td>
<td>□ Water heater thermostat at 120˚</td>
</tr>
<tr>
<td>□ Remove window air conditioner</td>
<td>□ Age of water heater</td>
</tr>
<tr>
<td>□ Attic door—Does it: Close tightly? Have weatherstripping &amp; insulation?</td>
<td>□ Low-flow showerheads &amp; sink aerators</td>
</tr>
<tr>
<td>□ Cracks in chimney</td>
<td></td>
</tr>
<tr>
<td>□ Spaces around chimney</td>
<td></td>
</tr>
<tr>
<td>□ Holes from ducts, vents or wires</td>
<td></td>
</tr>
<tr>
<td>□ Attic floor sealed?</td>
<td></td>
</tr>
<tr>
<td>□ Insulation condition</td>
<td></td>
</tr>
</tbody>
</table>