

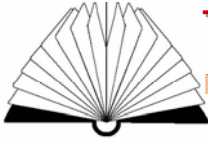
The Northern Edge

Study Guide

Ecology North Energy Saving Quiz

Ecology North Energy Saving Quiz





Ecology North Energy Saving Quiz

Introduction

This story is from **Issue #5 of The Northern Edge**. The Energy Quiz story has seven questions that show how changing the kind of light bulbs you use you can save money, save energy, and the environment.

This story offers an opportunity to encourage learners to explore energy-saving issues and actions.

This section first presents a list of nine learning activities and the written text for the Energy Quiz story. The pages following the written text give instructor notes and handouts for each activity, in the order on the list.

This symbol marks the written text for the Energy Quiz story.



This symbol marks instructor notes.





This symbol marks handouts to copy for learners.

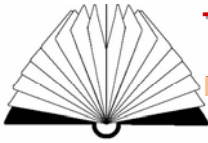




Ecology North Energy Saving Quiz

List of Learning Activities

Instructor Notes 	Handouts 	Page #s
1) Vocabulary	1 handout	8 to 11
2) Language skills	1 handout	12 & 13
3) Questions	2 handouts	15 to 17
4) Writing	1 handout	18
5) How do we use energy?	1 handout	19 to 22
6) Renewable and non-renewable energy	2 handouts	23 to 27
7) How can we use less energy?	2 handouts	28 to 32
8) Person energy-saving plan	2 handouts	33 to 38
9) How much do you pay for energy?	2 handouts	39 to 44

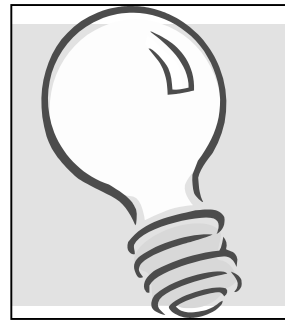


**Text – Ecology North Energy Saving Quiz
Issue #5 The Northern Edge**

Take this seven-question quiz and learn what you can do to save the environment.

Question #1

Which of these bulbs is called a fluorescent bulb? Click on it now.

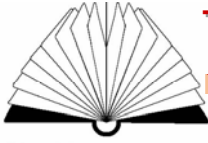


The more modern looking bulb on the left is called a compact fluorescent bulb, while the bulb on the right is called an incandescent bulb.

Question #2

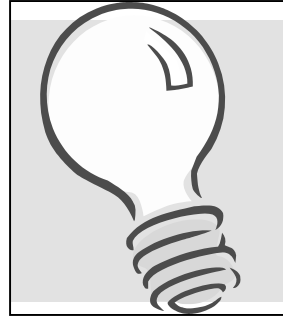
Which of these bulbs is cheaper to run? Click on it now.

Very good. The fluorescent bulb is a lot cheaper to run.



Question #3

Which bulb do you think lasts longer? Click on it now.



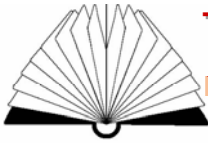
Fluorescent bulbs last for 6,000 to 10,000 hours. Incandescent bulbs last for 1,000 hours.

Question #4

Can you buy compact fluorescent bulbs at most stores? Click on Yes or No.

Canadian Tire, Home Hardware, and the Yellowknife Direct Charge Coop all carry them. You can now purchase compact fluorescent bulbs for use with dimmer switches, and you can even get three-way compact fluorescent bulbs. Wattage of bulbs ranges from a low of 4 up to at least 29 watts.

Watch for these bulbs on sale. There are good sales of compact fluorescent bulbs where packages of three sell for \$15.



Question #5

How much do you think it costs to have one 60-watt incandescent light bulb turned on for four hours a day, 365 days a year, at 2005 Yellowknife residential power rates? Click on a, b, or c.

- a. \$4.20 a year for electricity
- b. \$9.48 a year for electricity
- c. \$14.60 a year for electricity

It costs \$14.60 a year for electricity and that's just for one bulb on four hours a day, every day.

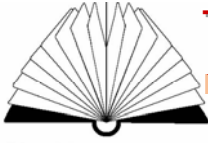
Question #6

How much do you think it costs to have one 15-watt compact fluorescent bulb turned on for four hours a day, 365 days a year, at 2005 Yellowknife residential power rates. Click on a, b, or c.

- a. \$3.65 a year for electricity
- b. \$5.50 a year for electricity
- c. \$8.64 a year for electricity

\$3.65 a year for electricity is a lot cheaper than the \$14.60 a year for electricity for the incandescent bulb and electricity rates will only go up.

The compact fluorescent bulbs cost more but they last between 6,000 and 10,000 hours, or six to 10 times more than the 1,000 hours for the incandescent bulb.



When you do the math and average it over the five years to allow for the life of the bulb, the cost is \$16.06 per year for the incandescent bulb, versus only \$6.13 for the fluorescent bulb. And that's just for one bulb! How many lights do you normally have on for four hours a day?

Question #7

Do you need special lamps for compact fluorescent bulbs? Click on Yes or No

You can screw these fluorescent bulbs into any lamp. Generally you can't use them outside, but that's probably going to change soon.

Conclusions

Do yourself, your pocket book, and your environment a favour. Replace your incandescent bulbs with compact fluorescent bulbs.



**Vocabulary
Learning Activity 1**

One handout

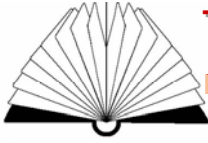
Learners look up words in the dictionary, to find the best meaning. Then they use each word in a sentence.



**Language skills
Learning Activity 2**

One handout

Learners read five statements - each statement is false. Learners rewrite each statement so it is true.



**Vocabulary
Learning Activity 1**

Look up the 9 words below in a dictionary and write down the best meaning. Then use the word in a sentence.

1) **Energy**

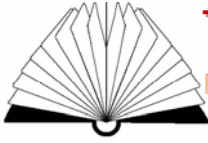
Meaning: _____

Sentence: _____

2) **Electricity**

Meaning: _____

Sentence: _____



3) **Fluorescent**

Meaning: _____

Sentence: _____

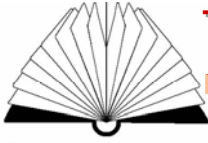
4) **Incandescent**

Meaning: _____

Sentence: _____

5) **Watts**

Meaning: _____



Sentence: _____

6) Environment

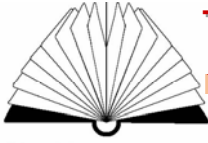
Meaning: _____

Sentence: _____

7) Average

Meaning: _____

Sentence: _____



8) **Residential**

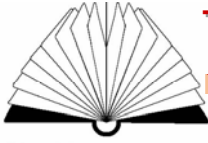
Meaning: _____

Sentence: _____

9) **Power rate**

Meaning: _____

Sentence: _____



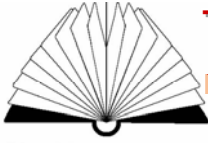
Language skills
Learning Activity 2

Read each of the seven statements below – they are **all false**.
Rewrite each statement so it is true.

- 1) Incandescent bulbs do not produce heat, as well as light.

- 2) Fluorescent bulbs use more energy and cost more than incandescent bulbs.

- 3) Residential power rates will probably stay the same or get cheaper over time.

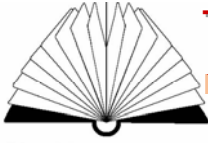


- 4) People have no effect on the environment when they save energy.

- 5) Incandescent bulbs last 10 times longer than fluorescent bulbs.

- 6) Most stores do not have fluorescent bulbs.

- 7) People pay more to turn on three fluorescent bulbs for three hours than to turn on three incandescent bulbs for three hours.



**Questions
Learning Activity 3**

Two handouts

3-1: Story questions

Learners answer questions about the story.

3-2: Journal writing

Learners use the questions on the handout to guide their journal writing.

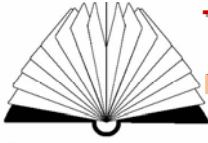


**Writing
Learning Activity 4**

One handout

Learners write a letter to the local Coop store to encourage the store to carry compact fluorescent bulbs.

Ask learners to share their ideas and read their letters out loud to the whole group.



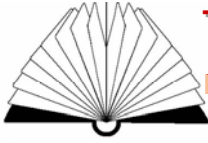
Questions
Learning Activity 3

3-1: Story questions

Answer the following questions about the story with one or more complete sentences. Put a capital letter at the beginning of each sentence and use correct punctuation.

- 1) Compare the amount of energy a fluorescent light bulb uses with the amount of energy an incandescent light bulb uses?

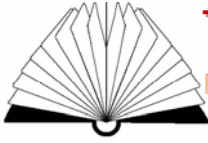
- 2) Compare the cost of using a fluorescent light bulb with the cost of using an incandescent light bulb?



3) Compare the number of hours a fluorescent bulb lasts with the number of hours an incandescent bulb lasts?

4) What are three advantages of using fluorescent light bulbs instead of incandescent light bulbs?

5) What are three disadvantages of using incandescent light bulbs instead of fluorescent light bulbs?

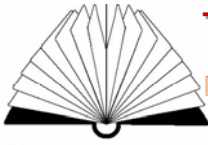


**Questions
Learning Activity 3**

3-2: Journal writing

Use these questions to guide your journal writing.

- ✓ Do you use fluorescent light bulbs in your own house? Why or why not?
- ✓ Do you think that saving money motivates or encourages people to save energy? Why or why not?
- ✓ Do you think that saving the environment motivates or encourages people to save energy? Why or why not?
- ✓ Why do they say in the Energy Quiz story "... electricity rates will only go up"? What does this mean in your home and your community?



Writing Learning Activity 4

Read the scenario below and write a letter. Then take turns to read your letters out loud to the whole group.

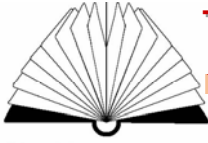
Scenario

You live in a small community with one small store. The store **does not** carry fluorescent bulbs. But they do carry incandescent bulbs.

You want to write a letter to the store manager and ask them to please start carrying fluorescent bulbs. In the letter, you give the store manager three good reasons to carry these bulbs.

To write the letter:

- 1) Pick a name for the store manager and the store.
- 2) At the beginning of the letter, put your name and address.
- 3) Next, put the name and address for the manager and the store.
- 4) Next, put the date.
- 5) Next, put the greeting, such as 'Dear _____
- 6) Next, write the letter. Clearly explain **what** you want and **why** you want it. Use words that you think will encourage the store manager to do what you want. Encourage him to respond to your letter by a certain date.
- 7) Sign off the letter



How do we use energy? Learning Activity 5

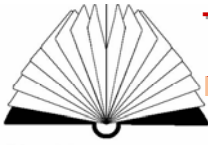
One handout

5-1: Human activity uses energy

Ask learners to brainstorm different human activities that use energy. Write their ideas on a flipchart.

Ask questions to prompt their thinking and make sure they include the following:

- ✓ Washing clothes, dishes, people
- ✓ Driving cars, trucks, ATVs, boats, skidoos – for fun and for services such as garbage and water
- ✓ Cooking food
- ✓ Heating homes and other buildings
- ✓ Using a refrigerator and/or freezer
- ✓ Using a clothes dryer
- ✓ Turning on lights in homes and other buildings
- ✓ Using a computer, TV, radio, CD player, etc.
- ✓ Etc.



5-2: Different kinds of energy

Ask learners to brainstorm different kinds of energy they use at home and in their community. Write their ideas on a flipchart.

Ask questions to prompt their thinking and make sure they include the following:

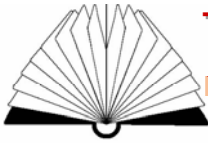
- ✓ Electricity from a diesel generator
- ✓ Wood
- ✓ Electricity from a hydro project
- ✓ Natural gas
- ✓ Diesel fuel
- ✓ Gasoline

5-3: Matching human activity with different kinds of energy

Ask learners to use the ideas from the two brainstorms and fill in the table in the handout. In the left column they write down different human activities that use energy. In the right column they write down the kind of energy that human activity uses. Some activities might use more than one kind of energy.

Ask learners to do this as a whole group, in pairs or small groups, or on their own. When they complete the table, discuss these questions as a whole group:

- ✓ What kind of energy gets used the most in your home and community?
- ✓ What kind of energy gets used the least in your home and community?



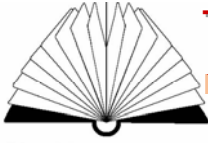
**How do we use energy?
Learning Activity 5**

5-3: Matching human activity with different kinds of energy

From the group brainstorm, write down the list of human activities that use energy in the left column below.

Look at the brainstorm list of different kinds of energy. For each activity, write down the kind of energy it uses in your home or community. Some activities may use more than one kind of energy.

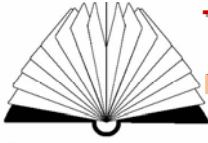
Human activities that use energy	Kind of energy it uses



Human activities that use energy	Kind of energy it uses

When you complete the table, discuss these questions as a group:

- ✓ What kind of energy gets used the most in your home?
In your community?
- ✓ What kind of energy gets used the least in your home?
In your community?



Renewable & non-renewable energy Learning Activity 6

Two handouts

6-1: Defining renewable and non-renewable energy

Learners define renewable and non-renewable energy and list examples of each.

They use the handout to discuss various characteristics of renewable and non-renewable energy.

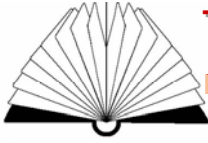
Do this part of the activity as a whole group or in pairs or small groups.

6-2: Renewable energy research project

Learners do research about one kind of renewable energy and create a booklet about it.

Ask learners to work in pairs or on their own for this part of the activity.

When learners complete their booklets, ask them to share the information in the booklet with the whole group.



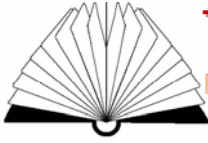
**Renewable & non-renewable energy
Learning Activity 6**

6-1: Defining renewable and non-renewable energy

Write down a definition for renewable energy and for non-renewable energy. Use the dictionary or other resources, such as the internet.

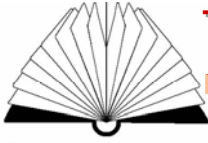
Renewable energy _____

Non-renewable energy _____



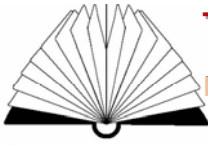
Write down five sources of renewable energy and the kind of energy each source can produce. One source of energy may produce more than one kind of energy.

Sources of renewable energy	What kind of energy does this produce?



Write down five sources of non-renewable energy and the kind of energy each source can produce. One source of energy may produce more than one kind of energy.

Sources of non-renewable energy	What kind of energy does this source produce?



**Renewable & non-renewable energy
Learning Activity 6**

6-2: Renewable energy research project

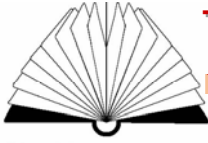
Choose one source of renewable energy for your research project. Use words and pictures or other graphics to answer the questions below.

Use the questions to organize the information you gather. Put it all together in a booklet.

Research questions:

- ✓ What is the source of renewable energy?
- ✓ What kind of energy does it produce?
- ✓ How does it work? What technology is involved, if any?
- ✓ Where in Canada do people use this energy?
- ✓ What are the benefits of using this source of renewable energy?
- ✓ What are the limits of using this source of renewable energy?
- ✓ Is it possible to use this kind of energy in your home or your community? If yes, what would help that happen? If no, why not?

Share the information in your booklet with the whole group.



How can we use less energy? Learning Activity 7

Two handouts

7-1: Different ways to use less energy

Learners use the list from 5-3: Matching human activities and different kinds of energy and find ways to use less energy.

Divide the group into pairs or small groups. Write down each human activity from Activity 5's list on a single piece of paper. Fold each paper and put them all into a hat or other container.

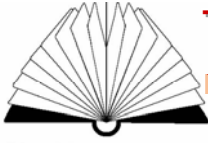
Ask each pair or small group to pick a paper from the hat. Use the handout or a similar format, and ask them to answer these questions for each human activity:

- ✓ Can we change our habits or behaviour to use less energy? If yes, what new habits could we adopt
- ✓ Can we use different materials or equipment to use less energy? If yes, what materials or equipment?

When they finish with one human activity, ask them to pick another – and so on until the papers are all gone.

The Arctic Energy Alliance Energy Efficiency posters have good, basic information about using less energy. See the Resources section.

Ask learners to share their ideas with the whole group. Put all the pages together and save them for Activity 7.

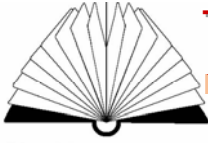


7-2: A community poster

Ask each pair or small group to use the information from the first part of this activity to make a poster for their community. They can work with one or more topics.

Before they start the poster, ask them to decide:

- ✓ Who is the audience for the poster? For example, the whole community, teenagers, or ?
- ✓ What is the purpose of the poster? What exactly do you want people to do when they see the poster?
- ✓ What are the best words and pictures to use for the audience and the purpose?



How can we use less energy? Learning Activity 7

7-1: Different ways to use less energy

The Energy Quiz story says we use less energy if we replace incandescent bulbs with fluorescent bulbs. What other things can we do to do to use less energy?

Write down each human activity from the Activity 5 list on a separate piece of paper. Fold each paper and put them all into a hat or other container.

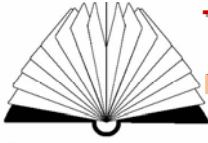
Work in pairs or small groups. Pick a paper from the hat. Write down the human activity as a heading and your answers to these questions:

- ✓ For this activity, can we change our habits or behaviour to use less energy? If yes, what new habits could we adopt?
- ✓ For this activity, what other things can we do to use less energy?

When you finish with one human activity, pick another piece of paper – and so on until the papers are all gone.

Share your ideas with the whole group. Put all the ideas together and save them for Activity 8.

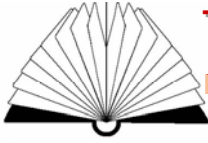
The Arctic Energy Alliance website has a series of energy efficiency posters with good, basic information about using less energy.



Human activity in our community that uses energy:

For this activity, can we change our habits or behaviour to use less energy? If yes, what new habits could we adopt?

For this activity, what other things can we do to use less energy?



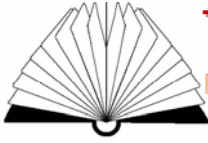
How can we use less energy? Learning Activity 7

7-2: A community poster

Choose a topic from the first part of this activity and use the information to make a poster for your community.

Answer these questions to help you get started:

- ✓ Who is the audience for the poster? For example, the whole community, teenagers, or ?
- ✓ What is the purpose of the poster? What exactly do you want people to do when they see the poster?
- ✓ What are the best words and pictures to use for the audience and the purpose?



A personal energy-saving plan Learning Activity 8

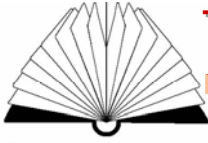
Two handouts

8-1: Master list - community energy saving actions

Learners create a master list of actions people in their community can carry out, to save energy.

Put this list on a flipchart page. Ask learners to review the list and all their ideas from the first part of Activity 7.

- ✓ Replace regular light bulbs with fluorescents light bulbs
- ✓ Idle your vehicle for only 10 seconds or less
- ✓ Wash clothes with cold water
- ✓ Set the hot water tank thermostat at no more than 49° C
- ✓ Use a low-flow showerhead
- ✓ Regularly check vehicle tire pressure and do other maintenance
- ✓ Caulk and weatherstrip all windows and outside doors.
- ✓ Lower the furnace thermostat 5 C at night and when no one is home
- ✓ Replace old appliances with Energy Star appliances
- ✓ Walk to work every day
- ✓ Replace old windows with Energy Star windows
- ✓ Increase the amount of insulation in your home
- ✓ Replace an older vehicle with one that uses 25% less fuel



Ask learners to work in pairs. Each pair chooses actions from the list from Activity 7 or from the list on the flipchart. Encourage learners to include new ideas, if they have them. They write down a master list of actions people in their community can do to use less energy.

Bring the group together to share their ideas. Discuss the ideas and agree on one master list. Be sure that each item on the list describes an action – something a person can do. At this time we're not concerned with whether or not people are willing to take action. We want to identify as many actions as possible, within the context of the community.

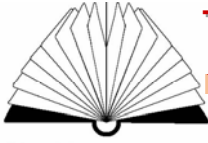
7-2: My plan to save energy

Learners choose actions from the list that they're willing to carry out, in their own life.

Ask each learner to write down the master list in the table on the handout. For each action, ask each learner to check 'Yes' if they're willing to carry out the action and 'No' if they're not.

After they fill out the table, discuss these questions with the whole group:

- ✓ Look at all the actions you checked 'Yes'. Why were you able to agree to do these actions?
- ✓ Look at all the actions you checked 'No'. Why didn't you agree to do these actions?



A personal energy-saving plan Learning Activity 8

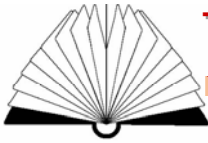
8-1: Master list - community energy saving actions

Work in pairs. Look at all the list of actions from the first part of Activity 7 and the list on the flipchart. Include new ideas if you have them.

Write down a master list of actions people in your community can do to use less energy. Do not worry about if people are willing to take action – only if the action is possible for people in your community to carry out.

Share your ideas with the whole group. Discuss the ideas and agree on one master list. Be sure that each item on the list describes an action – something a person can do.

Together, write down the master list of community energy saving actions for your community.



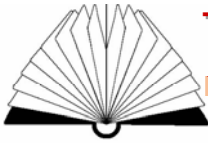
**A personal energy-saving plan
Learning Activity 8**

8-2: My plan to save energy

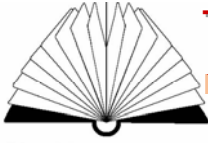
Fill in the table below. First write the name of your community and your own name.

In the left column, write down all the energy saving actions from the master list. Check 'Yes' or 'No' to indicate if you're willing to carry out this action, in your personal life.

Community:	Name:	
Energy saving actions	Yes	No



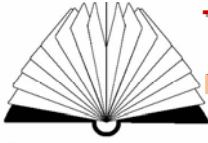
Community:	Name:	
Energy saving actions	Yes	No



Community:	Name:	
Energy saving actions	Yes	No

Discuss these questions as a group:

- ✓ Look at all the actions you checked 'Yes'. Why were you able to agree to do these actions?
- ✓ Look at all the actions you checked 'No'. Why didn't you agree to do these actions?



How much do you pay for energy? Learning Activity 9

Two handouts

9-1: Adding up your home energy costs

Learners fill in two tables to calculate energy costs.

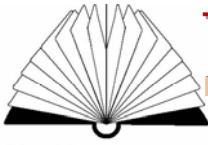
As a whole group, fill in the first table with the information from the scenario. Learners calculate the total amount from a monthly average amount.

Learners bring information about their own energy costs to fill in the second table. They may have different categories than the scenario, so the table is blank. Encourage them to estimate the amounts they spend if they don't know exactly.

9-2: How much can you save?

Learners calculate how much money people save if they use less energy.

The handout lists different actions people can take and the percent of savings on their energy bill. The percent savings are estimates.



How much do you pay for energy? Learning Activity 9

9-1: Adding up your home energy costs

Fill in the two tables below. It lists the bills we pay to provide energy to a home.

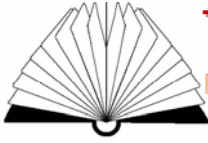
Use information from the scenario to fill in the first table. Use information from your own bills to fill in the second table. You may have different categories – use the blank table. If you don't have the exact amounts for your own costs, give a good guess for the amount.

Scenario:

A family pays these bills every year, to supply energy for their home and lifestyle:

- ✓ Electricity (lights, hot water, stove, refrigerator, freezer, washer, dryer, etc.) – Average \$100 per month
- ✓ Oil (heat) – Average \$150 per month
- ✓ Wood (extra heat) – Average \$50 per month
- ✓ Gasoline (transportation) – Average \$150 per month
- ✓ Town services (garbage, sewer, water) - \$75 per month

The amount of the bill isn't the same each month, but we give the average for one month. Multiply by 12 to find the cost for one year.



Energy costs – the scenario		
Energy	Average cost for one month	Cost for one year
Electricity	\$100 per month	
Oil	\$150 per month	
Gasoline	\$150 per month	
Wood	\$50 per month	
Town services	\$75 per month	
Total energy costs	\$525 per month	

Energy costs – your own bills		
Energy	Average cost for one month	Cost for one year
Total energy costs		

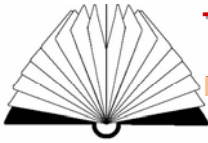


How much do you pay for energy? Learning Activity 9

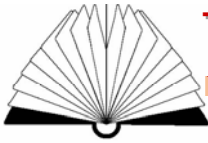
9-2: How much can you save?

Read through the actions below to see how much money you can save.

Action	Estimated Savings
Walk to work don't drive.	Pay 25% less for your gasoline bill.
Replace incandescent bulbs with compact fluorescent bulbs.	Pay 10% less for your electricity bill.
Wash clothes with cold water.	Pay 5% less for your electricity bill.
Turn down the heat at night and when no one is home.	Pay 15% less for your heating bill.
Use a low-flow showerhead.	Pay 5% less for your electricity bill.
Use a fuel-efficient vehicle.	Pay 25% less for your gasoline bill.
Caulk and weatherstrip all doors and outside windows.	Pay 5% less for your heating bill.

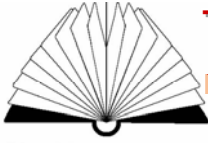


Action	Estimated Savings
Replace one old appliance with an Energy Star appliance.	Pay 10% less for your electricity bill.
Increase the amount of insulation in your home.	Pay 15% less for your heating bill.
Replace old windows with Energy Star windows.	Pay 10% less for your heating bill.
Regularly check the tire pressure and do other vehicle maintenance.	Pay 4% less for your gasoline bill.
Idle your vehicle for only 10 to 30 seconds or less, then turn it off.	Pay 15% less for your gasoline bill.
Turn down thermostat in hot water tank from 60 C to 49 C.	Pay 5% less for your electricity bill.
On the highway, drive 5 km per hour below the maximum speed limit.	Pay 5% less for your gasoline bill.
Replace an old furnace with an Energy Star furnace.	Pay 30% less for your heating bill.



Choose five actions from the list above that you could apply to your own life. Fill in the table below and see how much money you can save in one year!

Energy bill	Total cost	% estimated savings	New total cost
Total savings			



Resources

Arctic Energy Alliance - the NWT's best source of information and expertise about energy.

The AEA's priorities are to promote:

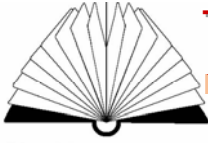
- ✓ Using more renewable energy use
- ✓ Increasing energy efficiency
- ✓ Reducing the causes of climate change

AEA's website has good links to other websites – for energy efficiency, renewable energy, community energy planning, and power production, distribution and rates.

- ✓ <http://www.aea.nt.ca/index.html>

Energy Efficiency and Renewable Energy Posters –the Arctic Energy Alliance created two sets of posters to help raise awareness of energy options that work in the Northwest Territories. Find them in the Pathfinder Energy Library.

- ✓ Energy Efficiency Posters -
<http://www.aea.nt.ca/tips/documents/EnergyEfficiencyWEB.pdf>
- ✓ Renewable Energy Posters -
<http://www.aea.nt.ca/tips/documents/RenewableEnergyWEB.pdf>



Pembina Institute – an independent, non-profit organization. They do policy research and education programs for these topics: sustainable energy, climate change, environmental governance, ecological fiscal reform, sustainability indicators, and the environmental impacts of the energy industry.

✓ <http://www.pembina.org/>

Re-energy.ca – an educational website connected with the Pembina Institute - for teachers, students, and leaders to explore and learn about renewable energy.

✓ <http://www.re-energy.ca/>