Newfoundland and Labrador Carbon Calculator Methodology Report

Office of Climate Change, Energy Efficiency and Emissions Trading
Executive Council
Government of Newfoundland and Labrador
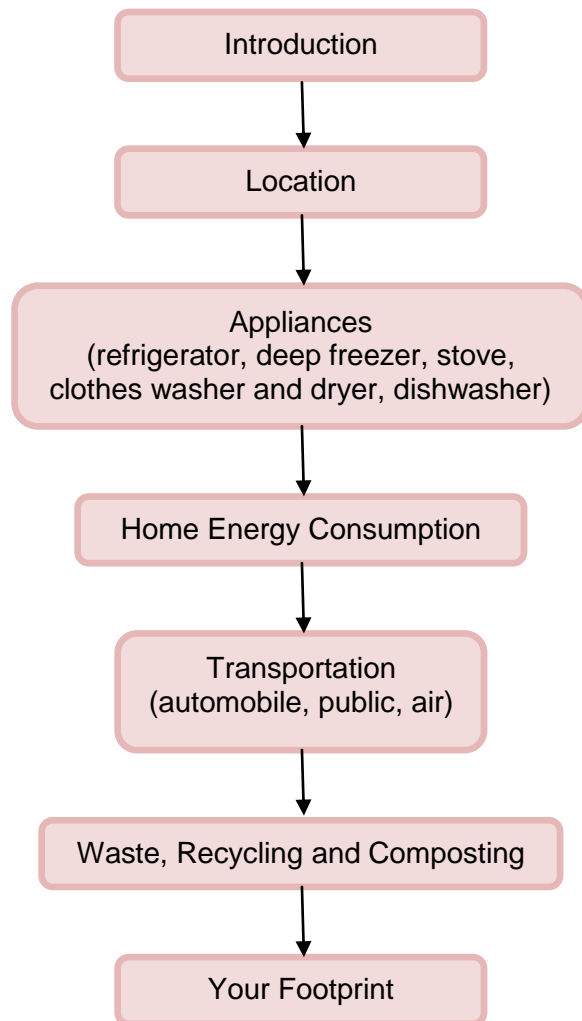September 2012

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1.0   Introduction

This document outlines the data sources and calculation methodology that have been agreed upon for use in this calculator. The calculator data were updated in July 2012 to keep in line with the latest carbon emission factors, energy prices and research.

2.0   Structure

Figure 1 shows a flow chart representation of the route through the calculator.

Figure 1: High-level flow chart of the journey through the Carbon Calculator

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│              Appliances                  │
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The Carbon Calculator addresses greenhouse gas emissions (GHG) from three main sources:

- Home energy use
- Transportation: personal, public and air travel
- Household waste, recycling and composting

One reason for the division is to make each section a manageable size, but it also allows users to get an intermediate result, split into logical segments. This encourages completion of the whole calculator.

3.0 Required User Inputs

The GHG emission estimates produced by the calculator are based on user inputs. In the interests of accessibility and transparency, the calculator has been designed to be as user friendly with as little data inputs as possible. Exact questions from the calculator can be found in Appendix A.

3.1 Location

The calculator estimates home energy consumption based on whether the user lives in a Newfoundland on-grid community, a Newfoundland diesel generator community, a Labrador on-grid community or a Labrador diesel generator community. Therefore, users are asked where they live to determine the emissions factor to be used for electricity GHG emissions from appliances and home energy consumption. A list of diesel generator communities is provided for reference purposes (see Appendix B).

The GHG emission factors and current rates for home energy consumption are listed in the table below.

Table 1. Fuel GHG emission factors and current rates (July 2012)

Location	Electricity[1]		Heating Oil[2]		Propane[3]	
	Emissions factor / kWh	$/kWh	Emissions factor / liter	$/liter[4]	Emissions factor / liter	$/liter[5]
Newfoundland	0.000107	$0.11171	0.0028	1.0247	0.0016	0.8692
Newfoundland (isolated)	0.000845	$0.11171	0.0028	1.0927	0.0016	0.8692
Labrador**	0.00000039	$0.03280	0.0028	1.0539	0.0016	0.8692
Labrador (isolated)	0.000845	$0.03280	0.0028	1.1985	0.0016	0.8692

There has been a note included in the calculator for Labrador residents to let them know why their footprint for electricity is so low. The note is as follows:

Central Labrador electricity comes from the Churchill Falls Hydroelectric Generating Station. This is a clean energy source, which means there are no greenhouse gas emissions associated with using electricity to, for example, power your appliances. However, completing the Carbon Footprint will still help you identify ways to save money by being more energy-efficient, as well as cutting down on emissions that come from other sources, like transportation and waste.

3.2   Data Inputs for Major Appliances

Step three of the calculator focuses on the electric and gas appliances used in the home, including: refrigerators and freezers, cooking, and washing and drying appliances. The calculator estimates energy consumed by appliances based on the average annual energy consumption from 1990 to 2009 provided by Natural Resources Canada, Office of Energy Efficiency[6].

Refrigerator

The first appliance in the calculator is the refrigerator. The user is asked specific questions about their refrigerator. The questions include:

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[1] Office of Climate Change, Energy Efficiency and Emissions Trading, Government of Newfoundland and Labrador. (2012). Internal data.
[2] Environment Canada. (2011). National Inventory Report 1990-2009.
[3] Environment Canada. (2011). National Inventory Report 1990-2009.
[4] Public Utilities Board of Newfoundland and Labrador. (May 2012) Administrative data.
[5] Public Utilities Board of Newfoundland and Labrador. (May 2012) Administrative data.

[6] Natural Resources Canada. Personal communication. May 5, 2012.

- Do you own a refrigerator?
- What is the size refrigerator?
- Is your refrigerator ENERGY STAR certified?
- How old is your refrigerator?
- Do you own a second refrigerator?

If the user owns a second appliance, the same questions are repeated for the second unit.

The GHG emissions and total energy cost results are shown to the user on the side of the screen. This result is dependent on the age, size and type of the appliance and the location of the user.

The cost per year is calculated by taking the selected appliance's annual energy use (AE) and multiplying it by the current rate of electricity in their selected location (EL).

$$\text{Cost}_{\text{fridge}} = \text{AE}_{\text{fridge}} * \text{EL}$$

The GHG emissions per year are calculated by taking the appliance's annual energy use (AE) and multiplying it by the electricity emissions coefficient in their selected location (ECL).

$$\text{GHG}_{\text{fridge}} = \text{AE}_{\text{fridge}} * \text{ECL}$$

The energy usage depending on ENERGY STAR certification, age and size can be found in the tables below.

Table 2. Annual energy use: ENERGY STAR Refrigerator

Size[7]	ENERGY STAR		
	Less than 5 years old (kWh/yr)	5-10 years old[2] (kWh/yr)	More than 10 years old (kWh/yr)
Small (< 12.4 cu ft.)	313.8	283.9	449.3
Medium (12.5-18.4 cu ft.)	394.4	398.8	607.4
Large (>18.5 cu ft.)	482.8	479.4	674.07

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[7] Office of Energy Efficiency, Government of Canada, Retrieved from
http://oee.nrcan.gc.ca/publications/statistics/cama11/appendixa.cfm?attr=0
[2] Only based on 2006 data

Table 3. Annual energy use: Non-ENERGY STAR Refrigerator

Size[8]	Non-ENERGY STAR		
	Less than 5 years old (kWh/yr)	5-10 years old[3] (kWh/yr)	More than 10 years old (kWh/yr)
Small (< 12.4 cu ft.)	388.4	387.7	449.3
Medium (12.5-18.4 cu ft.)	444.1	443.6	607.4
Large (>18.5 cu ft.)	525.9	529.6	674.07

Deep Freezer

The next appliance in the calculator is the deep freezer. The user is asked specific questions about their deep freezer. The questions include:

- Do you own a deep freezer?
- What is the size deep freezer?
- Is your refrigerator ENERGY STAR certified?
- How old is your deep freezer?
- Do you own a second deep freezer?

If the user owns a second appliance, the same questions are repeated for the second unit.

The cost per year for the freezer is calculated by taking the appliance's annual energy use (AE) and multiplying it by the current rate of electricity in their selected location (EL).

$$\text{Cost}_{\text{freezer}} = \text{AE}_{\text{freezer}} * \text{EL}$$

The GHG emissions per year are calculated by taking the appliance's annual energy use (AE) and multiplying it by the electricity emissions coefficient in their selected location (ECL).

$$\text{GHG}_{\text{freezer}} = \text{AE}_{\text{freezer}} * \text{ECL}$$

The GHG emissions and total energy cost results are shown to the user on the side of the screen. This result is cumulative of the energy usage and cost of the refrigerator and deep freezer.

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[8] Office of Energy Efficiency, Government of Canada, Retrieved from
http://oee.nrcan.gc.ca/publications/statistics/cama11/appendixa.cfm?attr=0
[3] Only based on 2006 data

The energy usage depending on age and type can be found in the table below.

Table 4: Annual energy use: Deep Freezer

Size[9]	Age		
	Less than 5 years old (kWh/yr)	5-10 years old (kWh/yr)	More than 10 years old (kWh/yr)
Compact freezer (upright or chest)	257.57	268.24	277.2
Upright freezer (manual defrost)	440.53	418.42	483.66
Upright freezer (automatic defrost)	640.43	649.96	814.36
Chest freezer	340.03	333.24	338.6

Range/Stove

The next appliance in the calculator is the range/stove. The user is asked specific questions about their stove. The questions include:

- Do you own a stove?
- What type of stove do you own? (propane or electric)
- Is your stove self-cleaning?
- How old is your stove?

If the user indicates that they have an electric stove, the cost per year for the stove is calculated by taking the appliance's annual energy use (AE) and multiplying it by the current rate of electricity in their selected location (EL).

$$\text{Cost}_{stove} = AE_{stove} * EL$$

The GHG emissions per year for an electric stove are calculated by taking the appliance's annual energy use (AE) and multiplying it by the electricity emissions coefficient in their selected location (ECL).

$$GHG_{stove} = AE_{stove} * ECL$$

If the user selects a propane stove then the user is not asked anymore questions. The Calculator uses a fixed amount of propane to determine the cost and GHGs. The cost of the propane is based on the finding that a gas range uses on average 4.2 gigajoules a year (NG). This number was then converted in to propane (P) for

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[9] Office of Energy Efficiency, Government of Canada, Retrieved from
http://oee.nrcan.gc.ca/publications/statistics/cama11/appendixa.cfm?attr=0

the use of the calculator and this was multiplied by the current rate of propane in their selected location (PL).

$$\text{Cost}_{\text{propane}} = P * PL$$

The GHG emissions were derived from the amount of propane and the GHG coefficient for propane (PC).

$$\text{GHG}_{\text{propane}} = P * PC$$

The GHG emissions and total energy cost results are shown to the user on the side of the screen. This result is cumulative of the energy usage and cost of the refrigerator, deep freezer and stove.

The energy usage for electric stoves by age and type can be found in the table below

Table 5. Annual energy use: Stove

Type[10]	Age		
	Less than 5 years old (kWh/yr)	5-10 years old (kWh/yr)	More than 10 years old (kWh/yr)
Non-self-cleaning	513.76	672.44	777.08
Self-cleaning	524.26	625.86	749.48
Don't know	521.23	645.56	764.86

Clothes Washer and Dryer

The next component of the calculator covers clothes appliances – washer and dryer. The user is asked specific questions about their washer and dryer. The questions include:

- Do you own a washer/dryer?
- What is the size washer/dryer?
- Is your washer ENERGY STAR certified?
- How old is your washer/dryer?

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[10] Office of Energy Efficiency, Government of Canada, Retrieved from
http://oee.nrcan.gc.ca/publications/statistics/cama11/appendixa.cfm?attr=0

The cost per year for the washer and dryer is calculated by taking the appliance's annual energy use (AE) and multiplying it by the current rate of electricity in their selected location (EL).

$$\text{Cost}_{\text{washer/dryer}} = \text{AE}_{\text{washer/dryer}} * \text{EL}$$

The GHG emissions per year are calculated by taking the appliance's annual energy use (AE) and multiplying it by the electricity emissions coefficient in their selected location (ECL).

$$\text{GHG}_{\text{washer/dryer}} = \text{AE}_{\text{washer/dryer}} * \text{ECL}$$

The GHG emissions and total energy cost results are shown to the user on the side of the screen. This result is cumulative of the energy usage and cost of the refrigerator, deep freezer, stove, washer and dryer. The energy usage for both the washer and dryers can be found in the tables below.

Table 6. Annual energy use: Washer

ENERGY STAR[11]	Age		
	Less than 5 years old (kWh/yr)	5-10 years old (kWh/yr)	More than 10 years old (kWh/yr)
Yes	185.67	259.8	868.34
No	391.33	750.8	868.34
I don't know	260.67	578.8	868.34

Table 7. Annual energy use: Dryer

Age[12]	Annual usage (kWh/yr)
Less than 5 years old	916.5
5-10 years old	910.02
More than 10 years old	904.22
I don't know	909.28

[11] Office of Energy Efficiency, Government of Canada, Retrieved from
http://oee.nrcan.gc.ca/publications/statistics/cama11/appendixa.cfm?attr=0
[12] Office of Energy Efficiency, Government of Canada, Retrieved from
http://oee.nrcan.gc.ca/publications/statistics/cama11/appendixa.cfm?attr=0

Dishwasher

The last appliance in the calculator is the dishwasher. The user is asked specific questions about their dishwasher. The questions include:

- Do you own a dishwasher?
- How old is your dishwasher?

The cost per year for the washer and dryer is calculated by taking the appliance's annual energy use (AE) and multiplying it by the current rate of electricity in their selected location (EL).

$$\text{Cost}_{dishwasher} = AE_{dishwasher} * EL$$

The GHG emissions per year are calculated by taking the appliance's annual energy use (AE) and multiplying it by the electricity emissions coefficient in their selected location (ECL).

$$\text{GHG}_{dishwasher} = AE_{dishwasher} * ECL$$

The GHG emissions and total energy cost results are shown to the user on the side of the screen. This result is cumulative of the energy usage and cost of the all the appliances in the calculator - refrigerator, deep freezer, stove, washer, dryer and dishwasher. The energy usage for dishwashers can be found in the table below.

Table 8. Annual energy use: Dishwasher

ENERGY STAR[13]	Age		
	Less than 5 years old (kWh/yr)	5-10 years old (kWh/yr)	More than 10 years old (kWh/yr)
Yes	336	421.8	604.6
No	367	565.6	641
I don't know	340.7	468.4	641

3.3   Data Inputs for Home Energy Consumption

The most accurate way to generate an estimate of the GHG emissions generated by home energy use is to derive it from records of the fuel (i.e., fuel oil or propane) and electricity purchased by the homeowner(s) over the course of a year. This

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[13] Office of Energy Efficiency, Government of Canada, Retrieved from
http://oee.nrcan.gc.ca/publications/statistics/cama11/appendixa.cfm?attr=0

information is available on utility bills and makes for a precise quantification of the GHG emissions. Fuel consumption totals can be multiplied by GHG emission factors for primary fuels and electricity by the regional electricity grid intensity factor for Newfoundland and Labrador.

The user is asked to input their average monthly electricity (EB), heating oil (HB) and propane (PB) cost. The GHG and energy cost are dependent on location of the user. The emissions factors and current rates can be found earlier in this report in section 3.1.

$$\text{Cost }_{home} = (EB*12) + (HB*12) + (PB*12)$$

$$\text{GHG }_{home} = (EB*12 / EL*ECL) + (HB*12 / HL*HC) + (PB*12 / PL*P)$$

3.4   Data Inputs for Transportation

The Personal Transportation component includes GHG emissions from routine transportation activities. There are three sources of GHG emissions included in the Transportation component of the calculator: GHG emissions associated with the use of a personal automobile, public transportation and air travel.

Automobile

For the use of personal automobiles, the calculator estimates GHG emissions based on the type of vehicle (V), type of fuel (F) and total kilometers travelled (KM) per week, month or year. Then the type of car and fuel is used along with the GHG emissions (TE) based on the average Fuel Consumption Guide ratings for 2010 published by Natural Resources Canada[14].

The user is first asked if they own a vehicle. If so, they are asked series of questions to determine the type of vehicle they drive including:

- What type of fuel does your car use?
- Is your car a hybrid?
- Please select the model of your car
- How many KM do you drive per week/month/year?
- Do you drive a second car?

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[14] Natural Resources Canada. (2010). Retrieved from:
http://publications.gc.ca/collections/collection_2010/nrcan/M141-5-2010-eng.pdf

If the user owns a second vehicle, the questions are repeated. The GHG emissions are dependent on the category of car and number of KMs driven per year.

$$\text{GHG}_{auto} = (\text{KM}_{week}*52) \textit{ or } (\text{KM}_{month}*12) \textit{ or } (\text{KM}_{year}) * \text{TE}_{fuel/type}$$

The average GHG emissions per km driven by type of car can be found in the table below. The GHGs per km used are average GHGs emitted by all cars in their class.

Table 9. Average GHG emissions per km driven by type of car (2010)

Type of Car[15] (H=hybrid, D=diesel)	GHG /km
Compact Car (H)	0.103500
Mid-size Car (H)	0.116725
Full-size Car (H)	0.218500
SUV (H)	0.201538
Truck (H)	0.217350
Smart Car	0.124200
Station Wagon	0.200757
Compact Car	0.213245
Subcompact Car	0.222725
Mid-size Car	0.231903
Minivan	0.235942
SUV	0.251105
Full-size Car	0.269438
Truck	0.279611
Sports Car	0.288186
Large Van	0.325614
Compact Car (D)	0.165240
Station Wagon (D)	0.156600
SUV (D)	0.274050

Public Transportation

The calculator estimates GHGs of public transportation depending on the type of transportation used (PT), the length of the trip (KM) and the number of trips (TR) per week.

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[15] Fuel consumption ratings – 2010. Retrieved from
http://publications.gc.ca/collections/collection_2010/nrcan/M141-5-2010-eng.pdf

Emissions stemming from travel by school bus, public transit and other bus systems use a public transit km per passenger emissions coefficient. This was developed by using GHGs by bus type and the number of passenger kilometers in Newfoundland and Labrador published by Natural Resources Canada[16] the GHGs by bus type and the number of Emissions generated by a taxi are similar to those emitted for the same distance by a full size car. All types of public transportation are based on a 52 week-long year, with the exception of the school bus which is based on a 42 week year.

$$GHG_{public} = (KM_{School Bus} * TR * 2 * 42 * 0.00006547) +$$
$$(KM_{Public} * 2 * TR * 52 * 0.00006547) + (KM_{Other Bus} * 2 * TR * 52 * 0.00006547) +$$
$$(KM_{Taxi} * 2 * TR * 52 * 0.000228)$$

Table 10. Average passenger GHG/km

Type of transportation	Passenger emissions/KM
School Bus	0.00006547
Public Transit/ Metrobus	0.00006547
Other bus systems	0.00006547
Taxi	0.000228

Air Travel

The calculator estimates GHG emissions of air travel depending on the number of return trips per year and the type of the length of the trip in hours. The options include:
- Short flight: 0-2 hours, 2400km (SF)
- Medium flight: 2-5 hours, 5000km (MF)
- Long flight: 5-8 hours, 10,000km (LF)
- Extra Long flight: 8+ hours, 15,000km (EF)

The calculator uses emissions factors based on DEFRA's methodology, with emissions factors of 0.180, 0.126 and 0.11 kgCO2/km travelled for short, medium and long haul flights respectively.[17] The formula used in the calculator is as follows.

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[16]Natural Resources Canada. (2009). Retrieved from:
http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/tablestrends2/tran_nf_23_e_4.cfm?attr=0
[17] http://www.ghgprotocol.org/calculation-tools/all-tools

$$\text{GHG}_{air} = (SF * 2400 * 0.00018) + (MF * 5000 * 0.00013) + (LF * 10000 * 0.00011) + (EF * 15000 * 0.00011)$$

3.5   Data Inputs for Waste, Recycling and Compost

The last component of the user's carbon footprint is the waste, recycling and composting section.

The calculator estimates GHG emissions in this section by determining the amount of methane emitted by household waste production levels, net of emissions mitigated through recycling and composting.

The user is first asked to enter the amount of waste - number of bags (B) - that their household generates each week. The emissions from waste are based on an average weight of garbage as determined by the City of St. John's.

$$\text{GHG}_{waste} = (B * 10 * 52/1000) * (73.35 * 21 / 1000)$$

Once the GHG emissions produced by the user's household waste have been calculated, the user is then asked if they recycle and what specific streams of waste they recycle. The calculator then subtracts the number of GHG emissions mitigated by recycling the selected products.

$$\text{GHG}_{recycling} = B * 2.64 * 12 * RE_{avg}/1000$$

Table 11. Net recycling emissions

Type	Net recycling emissions (RE) (kg C02e/kg of waste)[18]
Newsprint	-2.81
Fine Paper	-3.33
Cardboard	-3.34
Aluminum	-6.49
Glass	-0.1
Plastics	-3.63

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[18] Recycling Council of Alberta. (2005). Determination of the Impact of Waste Management Activities on Greenhouse Gas Emissions 2005 Update. Retrieved from: http://www.recycle.ab.ca/uploads/File/pdf/GHG_Impacts_Summary.pdf

The user is also asked if they compost. If the user responds yes, again the calculator will take the number of GHGs mitigated by composting on average 30% of the waste the household produces.[19]

$$GHG_{compost} = B * 10 * 52 / 0.7 \text{ X } 0.3 \text{ X } -0.24 / 1000$$

The total GHGs from waste is then totaled by adding the three lines of emissions.

$$GHG_{total} = GHG_{waste} + GHG_{recycling} + GHG_{compost}$$

4.0 Your Footprint

Once all components of the calculator are completed, the user is taken to the overall footprint result – which is a simple summation of the home energy consumption, transportation and waste components.

$$Carbon\ Footprint = GHG_{home} + GHG_{transportation} + GHG_{waste}$$

This total footprint can then be explored in a number of ways in order to allow the user to become more familiar with what their footprint means by putting it in context. The user's footprint is first compared to the provincial average in the form of a bar chart. Their footprint is then broken down into its different components (home energy consumption, transportation and waste) through a pie chart so they can compare and contrast the sources of their emissions.

The tips are informed by the answers the user has provided; hence a user should not be confronted with a tip that is not pertinent to their situation. For example, if they have indicated they have an old appliance or a non-ENERGY STAR appliance they will be offered a tip on buying new and/or ENERGY STAR appliances. The tips can be found in Appendix C.

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[19] Multi Materials Stewardship Board (2012). Retrieved from: http://www.mmsb.nl.ca/

Appendix A: Carbon Calculator Questions

Step 1 - Introduction

What's your Carbon footprint?

The Carbon Calculator will help you add up the total impact that your daily activities have on climate change.

Step 2 - Location

Please select which type of community you live in:
       a. Newfoundland
       b. Newfoundland (Diesel generator community)
       c. Labrador
       d. Labrador (Diesel generator community)

*link to list of diesel-powered communities

Step 3 - Major Appliances: Refrigerator

1. Do you own a refrigerator?
       a. Yes
       b. No

2. What size is your fridge?
       a. Small (< 12.4 cu ft.)
       b. Medium (12.5-18.4 cu ft.)
       c. Large (>18.5 cu ft.)

3. Is your fridge ENERGY STAR certified?
       a. Yes
       b. No
       c. Don't know

4. How old is your fridge?
       a. Less than 5 years old
       b. 5-10 years old
       c. More than 10 years old

5. Do you have a second fridge in your home?
   a. Yes (if yes, repeat)
   b. No (if no, continue with next section)

DID YOU KNOW? It's important to place your fridge in the right spot. Keep it out of direct sunlight and about 3 inches away from the wall so air can flow around the motors and compressors. That way the cooling system doesn't have to work as hard.

Step 3 - Major Appliances: Deep freezer

1. Do you own a deep freezer?
   a. Yes
   b. No

2. What type of deep freezer do you have?
   a. Compact (upright or chest)
   b. Upright (automatic defrost)
   c. Upright (manual defrost)
   d. Chest

3. Is your fridge ENERGY STAR certified?
   a. Yes
   b. No
   c. Don't know

4. How old is your deep freezer?
   a. Less than 5 years old
   b. 5-10 years old
   c. More than 10 years old

5. Do you have a second deep freezer in your home?
   a. Yes (if yes, repeat)
   b. No (if no, continue with next section)

DID YOU KNOW? A new ENERGY STAR deep freezer uses less than half of the energy of a 1990 model. To save even more energy, "right-size" your choice to only the size you need.

Step 3 - Major Appliances: Range/Stove

1. Do you own a stove?
    a. Yes
    b. No

2. What type of stove do you own?
    a. Electric
    b. Propane (do not ask any other questions)

3. Is your stove self-cleaning?
    a. Yes
    b. No
    c. Don't know

4. How old is your stove?
    a. Less than 5 years old
    b. 5-10 years old
    c. More than 10 years old

DID YOU KNOW? Every time you open the oven door as much as 20% of the heat escapes, which causes the oven use more energy to replace the lost heat. Open the door as little as possible, and use other energy-saving tips like matching your pots to the same size burner.

Step 3 - Major Appliances: Washer

1. Do you own a clothes washer?
    a. Yes
    b. No

2. Is your washer ENERGY STAR certified?
    a. Yes
    b. No
    c. Don't know

3. How old is your washer?
    a. Less than 5 years old
    b. 5-10 years old
    c. More than 10 years old

DID YOU KNOW? ENERGY STAR front-loading washing machines are the most energy efficient and washing in cold water will save even more energy. You can also get laundry detergent specifically for washing in cold water and for high-efficiency washing machines.

Step 3 - Major Appliances: Dryer

4. Do you own a clothes dryer?
   a. Yes
   b. No

5. How old is your dryer?
   a. Less than 5 years old
   b. 5-10 years old
   c. More than 10 years old

DID YOU KNOW? Many dryers have settings that will use less energy by stopping the load when the clothes are dry, rather than setting a time limit. Of course hanging your clothes to dry will save the most energy.

Step 3 - Major Appliances: Dishwasher

1. Do you own a dishwasher?
   a. Yes
   b. No

2. Is your dishwasher ENERGY STAR certified?
   a. Yes
   b. No
   c. Don't know

3. How old is your dishwasher?
   a. Less than 5 years old
   b. 5-10 years old
   c. More than 10 years old

DID YOU KNOW? Running a dishwasher when it's full can actually be more energy-efficient than washing all your dishes by hand. Skipping the pre-rinse can save even more energy—just scrape off the excess foods and the dishwasher will do the rest.

Step 4 - Home Energy Consumption

1. Please enter your average monthly energy costs.

    a. Electricity $_____
    b. Heating oil $_____
    c. Propane $_____

DID YOU KNOW? Most of the energy we use in our homes is for space heating. Programmable thermostats could save you 5-15% on your power bill because they can automatically turn the heat up or down depending on when you need it. The takeCHARGE program has a $10 rebate on the purchase of these units.

Step 5 - Transportation: Automobile

1. Do you own a vehicle?
    a. Yes
    b. No

2. What type of fuel does your car use?
    a. Gasoline
    b. Diesel

3. Is your car a hybrid?
    a. Yes
    b. No

4. Please select the model of your car:
    a. Two-seater Car (Smart car)
    b. Two-seater Car (sports car)
    c. Compact Car (e.g. Ford Fiesta)
    d. Subcompact Car (e.g. Honda Civic)
    e. Mid-size Car (e.g. Toyota Prius)
    f. Full-size Car (e.g. Hyundai Sonata)
    g. Station wagon
    h. Sport Utility Vehicle (SUV)

        i.   Pickup truck
        j.   Minivan
        k. Large van

5. How many KM do you drive?

            _____km per ☐ week ☐ month ☐year

6. Do you drive a second car?
    a. Yes (continue)
    b. No (skip to next page – do not show other questions)

DID YOU KNOW? Idling for more than 10 seconds uses more fuel than re-starting your engine. Save fuel by turning off the engine when stopped (except in traffic). Driving the speed limit on the highway is another way to save fuel as driving 100 km/hour uses 20% less fuel than 120 km/hour.

Step 5 - Transportation: Public

7. Approximately how far do you travel **(one way)** on public transportation in a normal week or month?
    a. School bus: __km, # of trips: ____ ☐ week ☐ month
    b. Public Transit/Metrobus: __km, # of trips: ____ ☐ week ☐ month
    c. Taxi: __km, # of trips: ____ ☐ week ☐ month
    d. Other bus systems: __km, # of trips: ____ ☐ week ☐ month

DID YOU KNOW? A third of all greenhouse gas emissions in our province come from transportation, much of which is generated by cars and trucks by burning fuel. Leaving the car at home from time to time can tackle climate change and, with rising fuel prices, save you money.

Step 5 - Transportation: Air

8. How many **return** flights did you take in the past year?
    a. Short (0-2 hours): _____
    b. Medium (2-5 hours): _____
    c. Long (5-8 hours): _____
    d. Extra-long (8+ hours): _____

DID YOU KNOW? Greenhouse gas emissions from air travel are particularly harmful because they are emitted so high in the atmosphere. To reduce how much you fly, especially for work, try web conferencing technologies to visually connect with people and share documents.

Step 6 - Waste, recycling and composting

1. Please enter the amount of waste **(number of bags)** that your household generates each week: _____

2. Please indicate which of the following components of the waste stream you recycle.
    a. Newsprint
    b. Fine paper
    c. Cardboard
    d. Aluminum
    e. Glass
    f. Plastics

3. On average, how many bags do you recycle per month? _____

4. Do you compost?
    a. Yes
    b. No

DID YOU KNOW? 30% of the waste we generate in our province is organic material. When this material is buried in a landfill it generates methane, which is 21 times more powerful than carbon dioxide in its ability to trap heat in the atmosphere. Composting is a great solution to cut your waste and tackle climate change.

Step 7 – Your Footprint

Thanks for completing the Carbon Calculator!

Understanding your carbon footprint is a key step to taking action. See below how you measure up against the provincial average. We have also prepared some custom tips to help you do even more for the battle against climate change. Every bit helps, so try doing even one more thing and see the impact it can have on your footprint.

Tips to Help Lower Your Carbon Footprint - See Appendix C

Appendix B: Diesel Generated Communities[20]

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[20] Nalcor Energy and the NL Community Accounts website. (2012) Retrieved from:
http://www.communityaccounts.ca/communityaccounts/onlinedata/getdata.asp

Newfoundland
Francois
Grey River
Little Bay Islands
McCallum
Ramea (Wind Diesel)
St. Brendan's (Dock Cove, Hayward's Cove, Penny's Cove, Shalloway Cove, Shoal Cover)
Labrador[21]
Black Tickle
Buckle's Point
Capstan Island
Cartwright
Charlottetown
Domino
English Point
Forteau
Fox Cover
Hopedale
L'Anse Amour
L'Anse au Clair
L'Anse au Diable
L'Anse au Loup
Lodge Bay
Makkovik
Mary's Harbour
Mud Lake
Mushuau Innu First Nation (Natuashish)
Nain
Norman Bay
Organ's Island, Pinware
Paradise River
Pinsent's Arm
Port Hope Simpson
Postville
Red Bay
Rigolet
St. Lewis
West St. Modeste
William's Harbour

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[21] http://www.aadnc-aandc.gc.ca/eng/1100100034456

Appendix C:

Your Footprint: Individual tips

Indicators for individual tips

Appliances

1. <u>Over 10 years old</u>
   - Refrigerator
   - Deep Freezer
   - Stove
   - Washing Machine
   - Dishwasher

Replace Old Appliances: Lower your carbon footprint by replacing your (*list of any appliance that were triggered)* with new options. Make sure you compare EnerGuide labels to find the energy-efficient option.

2. <u>Not ENERGY STAR</u>
   - Washing Machine
   - Dishwasher
   - Refrigerator
   - Deep Freezer

Go ENERGY STAR: ENERGY STAR certified appliances are among the top 25% in terms energy-efficiency for their category. Upgrading your (*list of any appliances that were triggered)* with ENERGY STAR options will help you save energy.

3. <u>Second appliance</u>
   - Refrigerator
   - Deep Freezer

Remove second appliance: Having more than one (*list of any redundant appliance*) is using a lot of energy in your home. Going to just one model will help you save energy and money.

Home Energy Consumption

4. <u>All Users:</u>

Improve House Envelope: You can save energy and improve the comfort of your home by increasing the quality and quantity of insulation from the attic to the basement, sealing air leaks and using only ENERGY STAR windows and doors.

Transportation

     5. <u>Owns a vehicle</u>

Right-size Your Ride: There may be more fuel-efficient choices available for the vehicle you drive. For your next purchase, check out the EnerGuide label and Canada's Fuel Consumption Guide to find the most efficient choice.

Give the Car a Break: Leave the car at home from time to time and walk, cycle or take public transit where available. Car-pooling with friends or co-workers is another option to lower your mileage.

     6. <u>Over 4 return flights per year</u>

Cut Flying Time: It looks like you may travel quite a bit. Opting for direct flights and locations close to home can cut the impact on the environment. Or, try videoconferencing where possible to avoid travelling for work.

Waste, Recycling and Composting

     7. <u>Not recycling</u>

Start Recycling: Each of us generates 4.5 pounds of garbage every day. You can cut this down by recycling so it never reaches the landfill. This will help clean up the environment and tackle climate change.

     8. <u>Not composting</u>

Start Composting: Starting a compost can help keep organic material out of our landfills, and prevent the generation of methane which is a powerful greenhouse gas. Starting a compost is easy and can be done indoors or in the backyard.

Your Footprint

     9. <u>All Users:</u>

More Simple Actions: There are a number of ways to lower your carbon foot at home, at work and on the move. Check out our Tip Centre for some of the easy things you can do to take action.