



# The Value of Energy – Newfoundland & Labrador

Canadians for Affordable Energy:  
Household Research Series



# Canadians for Affordable Energy



Canadians for Affordable Energy is a national non-profit organization. We promote the benefits of affordable energy by informing Canadians about it, advancing policies that encourage it, and building a national constituency to support it. Keeping energy services affordable must be an ongoing public policy priority.

## **Household Research Series – Newfoundland & Labrador Notes**

The energy price and cost data contained in this Newfoundland & Labrador Household Research Report are approximate and represent how much residential customers might pay for various energy products, using timely data from credible sources, including the Newfoundland & Labrador Board of Commissioners of Public Utilities, Newfoundland Power and NL Hydro for electricity, Natural Resources Canada for

gasoline prices, Wood Pellet Association of Canada for wood pellet pricing and Statistics Canada for furnace oil prices.

## **Newfoundland & Labrador Introduction Notes:**

Newfoundland Power and Newfoundland & Labrador Hydro are the province's electric utilities. Newfoundland & Labrador does not have a natural gas distributor.

1. See <https://novascotia.ca/sns/access/business/your-energy-rebate/about-the-program.asp>.

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## Summary

The federal government's carbon pricing program (aka carbon dioxide emissions tax or carbon tax) is set to have a minor impact on the pocketbook of Newfoundland & Labrador (N.L.) energy consumers: families and businesses.

Over 60 percent of the province's households use electricity for their heating. With 95 percent of N.L.'s electricity generated from hydropower, electricity prices could increase by less than 1 percent if a \$50/tonne federal carbon tax is imposed. However, typical household gasoline costs could increase by 9% with a carbon price set at \$50/tonne.

Heating with wood pellets remains the lowest operating cost option for N.L. households. A household heating with pellets might spend \$3,037 on energy annually, not including gasoline. The same customer heating with oil might spend \$4,134. Households heating with electric resistive heating – representing over 60 percent of N.L. homes – might spend \$4,569.

Due to N.L.'s mostly carbon-free electricity generation mix, the carbon dioxide content of energy from electricity is low relative to other popular sources.

Government energy policymakers have a significant impact on household energy budgets. Changes to N.L.'s energy infrastructure and mix should be done prudently since decisions made today will have lasting consequences on the supply of energy and its long-term affordability.

With N.L.'s ratepayers relying heavily on heating oil and gasoline for their energy needs it is important that governments recognize this and ensure that the province maintains an affordable and reliable supply of energy for consumers.

# The Value of Energy Research Series illustrates energy bills, energy use and energy value for a typical Newfoundland & Labrador household

Values shown are approximate and represent how much a typical residential customer might pay for various energy products, using timely data from credible sources, including Newfoundland Power, Newfoundland & Labrador Hydro, and The Newfoundland & Labrador Board of Commissioners of Public Utilities.

## To give us an idea of The Value of Energy, let's look at Newfoundland & Labrador's energy uses

The chart shows where a typical customer might get their energy:

- Electricity provides 71%
- Gasoline provides 29%

But not every household has this breakdown – this is an estimate based on a household that uses electricity for heating, appliances, and electronics and drives a car occasionally.

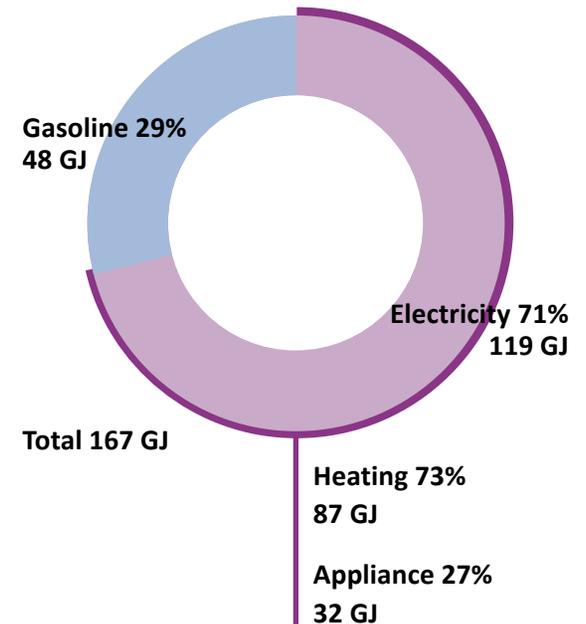
Approximately 147,300 Newfoundland & Labrador households, 60% of the total, use electricity for heating. The remaining homes rely on oil, wood, natural gas or some combination for heat.

### We use gasoline to fuel

- Vehicles (cars and trucks) to get around and deliver goods and services
- Recreational motorbikes, boating and skidoos

### We use heating oil to fuel

- Furnaces to warm our homes
- Hot water tanks for laundry and showers



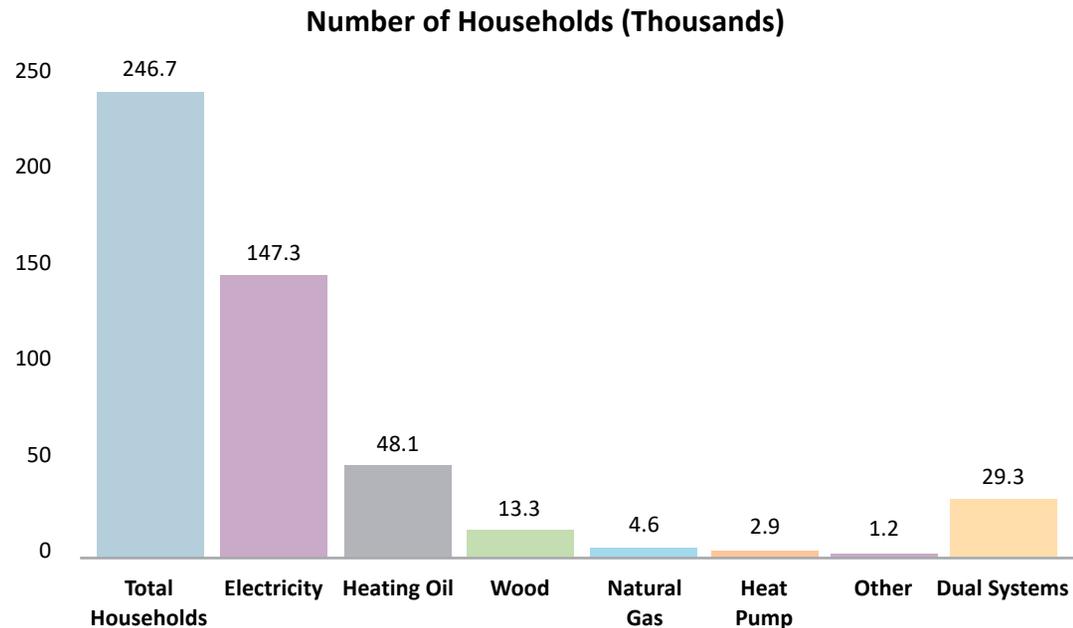
### We use electricity to power

- Illumination to light the night
- Appliances for convenience
- Stovetops to cook our food
- Electronics for entertainment
- Smartphones to stay in touch
- Electric heating in much of Newfoundland & Labrador

## How do households heat their homes?

Virtually every household uses electricity to power their electronics and appliances – televisions only run on electricity. But when it comes to heating, there’s a number of different fuels households put to use.

As shown in the chart, about 147,300 households heat their homes with electric resistive heating (e.g. baseboard heating), 48,000 heat their homes with oil, and 13,000 use wood. Remaining households use natural gas, heat pumps, and other energy sources to heat their homes.<sup>1</sup>



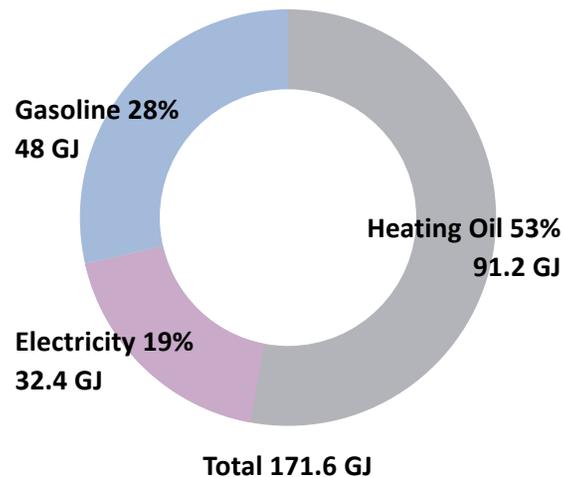
1. NRCAN Comprehensive Energy Use Database, Newfoundland and Labrador, Table 21: Heating System Stock by Building Type and Heating System Type <http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=res&juris=nf&rn=21&page=0>.

## Other Energy Use Profiles for households heated with oil or wood<sup>2</sup>

The majority of Newfoundland & Labrador household energy use provides for space and water heating, so how we heat our homes has a big influence on our household energy use profile.

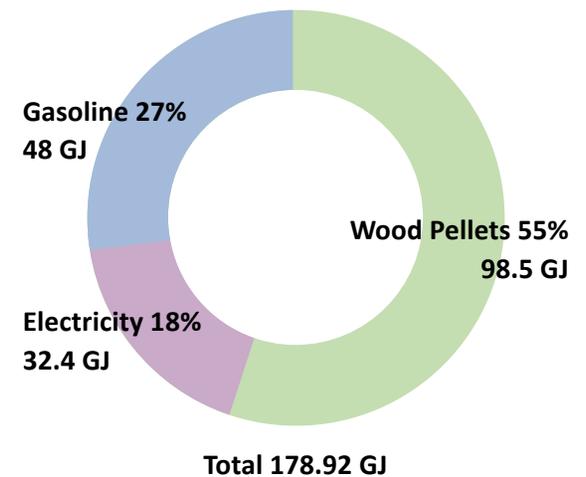
### Heating with Oil:

Over 48,000 Newfoundland & Labrador households rely on oil to heat their homes. A household with an oil heating system might have an energy use profile matching the pie chart below, with oil providing 53%, electricity 19%, and gasoline 28% of a household's energy use.



### Heating with Wood:

Over 13,000 Newfoundland & Labrador households rely on wood to keep their houses warm.<sup>3</sup> A household heating with wood pellets might have an energy use profile matching the pie chart below, with wood pellets providing 55%, electricity 18%, and gasoline 27% of a household's energy.



2. NRCAN Comprehensive Energy Use Database, Newfoundland and Labrador, Table 21: Heating System Stock by Building Type and Heating System Type <http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=res&juris=nf&rn=21&page=0>.

3. Fuel supply for wood heating systems varies widely in terms of energy density and wood quality. To simplify our analysis, we have assumed the use of wood pellets as a fuel stock, operating at 80% efficiency.

## Where does Newfoundland & Labrador's electricity (power) come from?

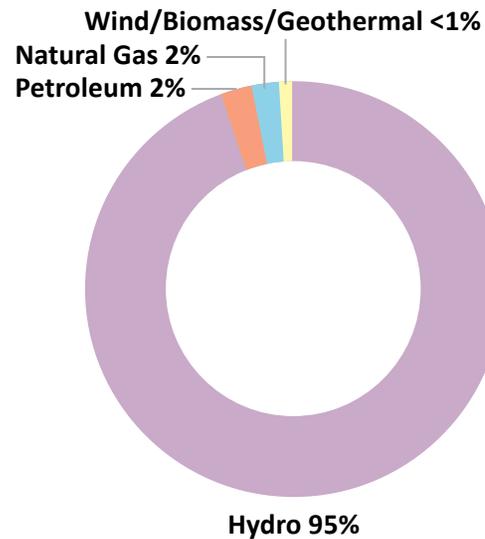
Newfoundland & Labrador households use electricity generated primarily through hydropower.

The pie chart shows electricity generation by source in Newfoundland & Labrador.

A total of 41.8 terawatt hours (TWh) of electricity was generated in 2016, 6% of total Canadian generation. Hydropower represents 95% of Newfoundland & Labrador's electricity generation.<sup>4</sup>

Fossil fuel combustion accounts for 4% of Newfoundland and Labrador's electricity generation.

Other renewable sources such as wind, biomass, and geothermal are a small portion of the province's generation mix.



<b>Hydro</b>	0.87 TWh or 95%
<b>Petroleum</b>	0.84 TWh or 2%
<b>Natural Gas</b>	0.84 TWh or 2%
<b>Wind/Biomass/ Geothermal</b>	0.19 TWh or <1%
<b>Total Generation</b>	41.8 TWh

4. See <https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/nl-eng.html>.

# Typical Newfoundland & Labrador household bills and energy use

The typical Newfoundland & Labrador energy consumer uses electricity to heat their home. Here's the breakdown of how much energy a typical Newfoundland & Labrador household might use every year. This works out to be about 2,014 kilowatt-hour (kWh) of electricity per month for heating, 750 kWh per month for appliances and 115 litres of gasoline a month for gasoline.

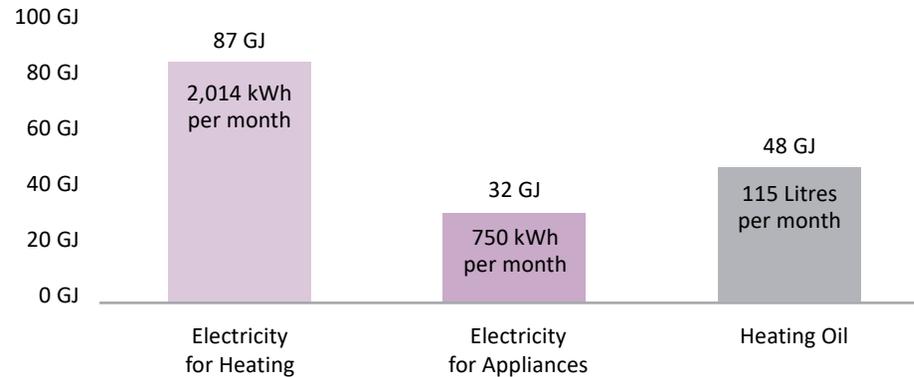
To show them both on the same chart, we measure the energy used in gigajoules (GJ) per year, a common unit useful for comparing fuels on an “apples to apples” basis. A gigajoule is equivalent to 1 billion joules, roughly the amount of energy it takes to power a 30 Watt light bulb throughout an entire year.

And here's how much that same typical household might pay for energy every year.

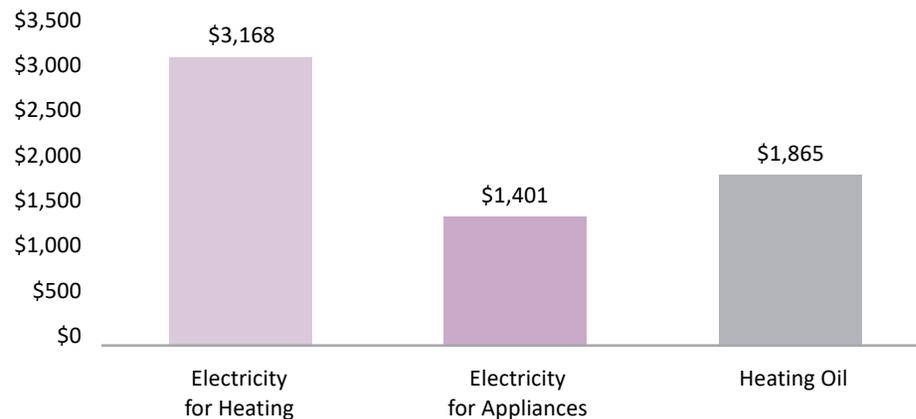
A typical Newfoundland & Labrador household spends significantly more money on electricity than gasoline, which is in line with energy usage.

These bills have been generated using the rate information on the Newfoundland Power website for a typical Newfoundland & Labrador customer. Some households will pay more and some will pay less.<sup>5/6</sup>

Typical Annual Energy Use (GJ)



Typical Customer Annual Energy Bills (\$)



5. Electricity: Newfoundland Power <https://www.newfoundlandpower.com/>.

6. Gasoline Costs: See <https://www.nrcan.gc.ca/energy/fuel-prices/4795>.

# The Value of Energy for Newfoundland & Labrador households

Now that we know how much energy we use and how much we pay for it, we can put together a better picture of the Value of Energy.

The chart shows how much a typical customer pays for each unit of energy – this is the price of energy (in dollars per gigajoule) and helps describe the relative value of different energy sources.

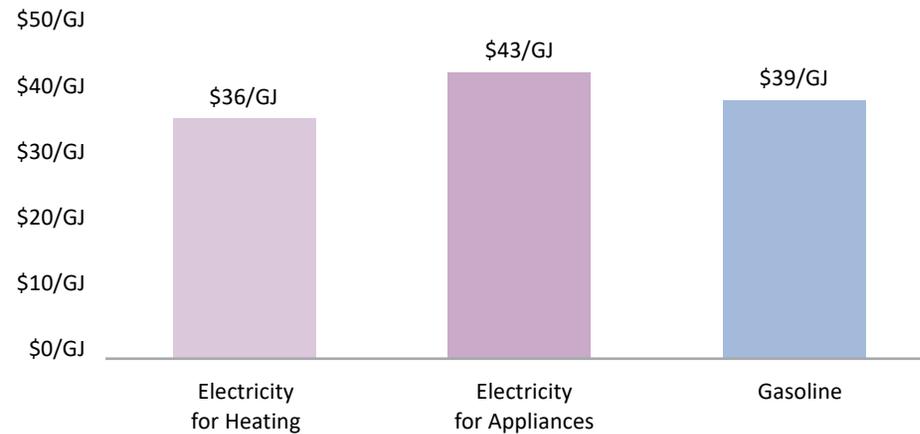
As a Newfoundland & Labrador customer will require electricity to power their appliances and illuminate their homes regardless of whether or not they use electricity for heating, we have included monthly services charges with electricity for appliances. This makes the cost per GJ higher than electricity for heating.

Another way to describe the Value of Energy is to show how much energy a household gets for each dollar spent on their energy bill.

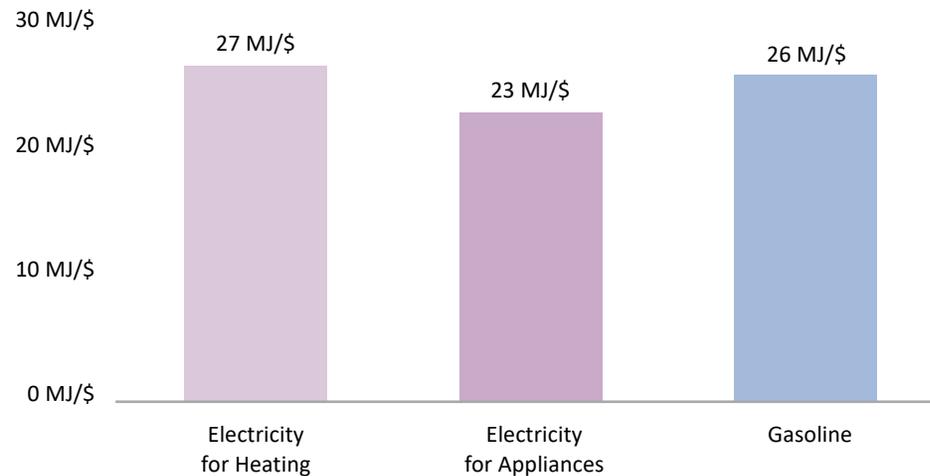
The chart shows the value households get for their energy dollar (in megajoules per dollar).

1 GJ = 1,000 MJ

Price of Each GJ of Energy (\$/GJ)



Energy per Dollar (MJ/\$)

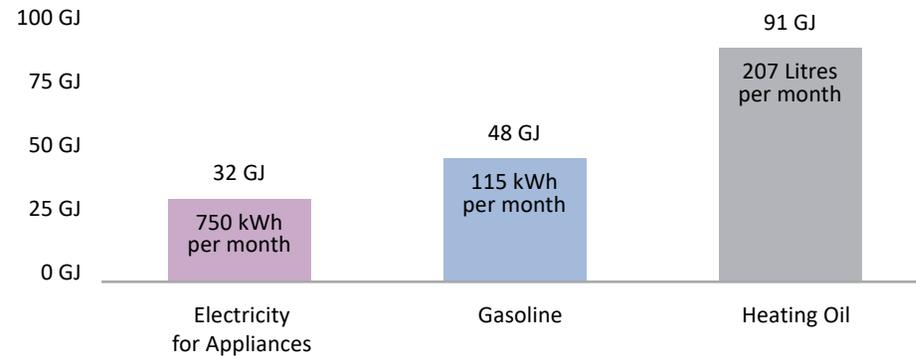


# A typical bill and household Value of Energy for Newfoundland & Labrador's 48,000 families that rely on oil for heat

Newfoundland & Labrador households that rely on oil for heating consume less electricity than those heating with electric baseboards. Winter months would be higher but on average a household that heats with oil might use about 207 litres of heating oil and 115 litres of gasoline a month.

The charts describe the energy used in terms of gigajoules (GJ), a common unit useful for comparing fuels.

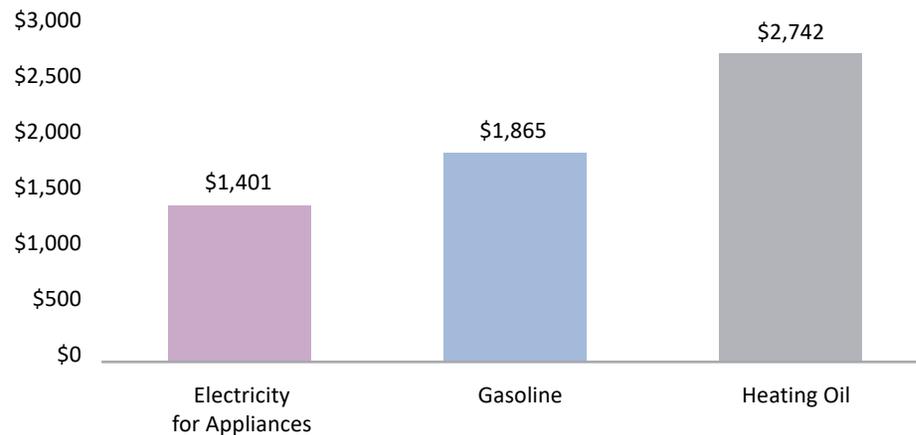
Annual Energy Use (GJ) - with Heating Oil



And here's how much a household heating with oil might pay for energy every year.

A Newfoundland & Labrador household heating with oil would spend a lot on energy bills because heating requires a lot of energy, and because the price of heating oil is relatively higher than other fuels.

Annual Energy Bill (\$) - with Heating Oil

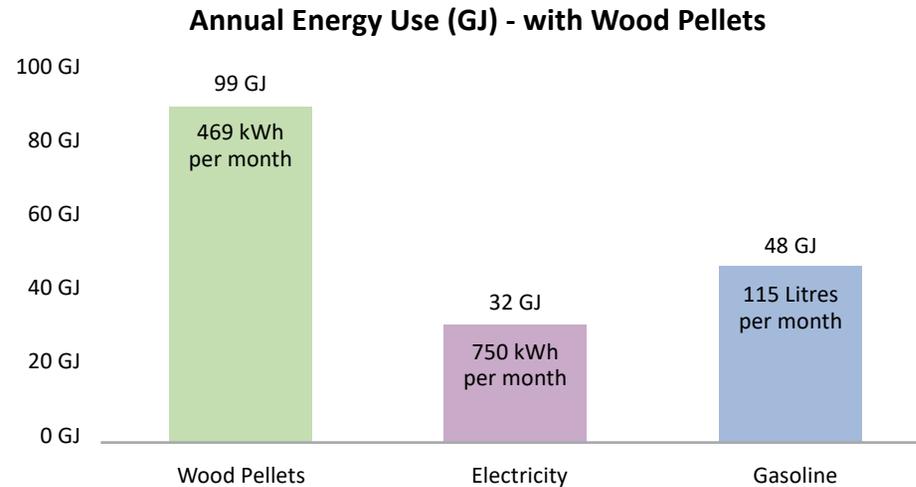


# A typical bill and household Value of Energy for Newfoundland & Labrador's 13,000 families that rely on wood for heat

A Newfoundland & Labrador household that relies on wood pellets for heat would have a similar looking picture to the typical household that relies on heating oil, except their energy consumption would use wood pellets in place of oil.

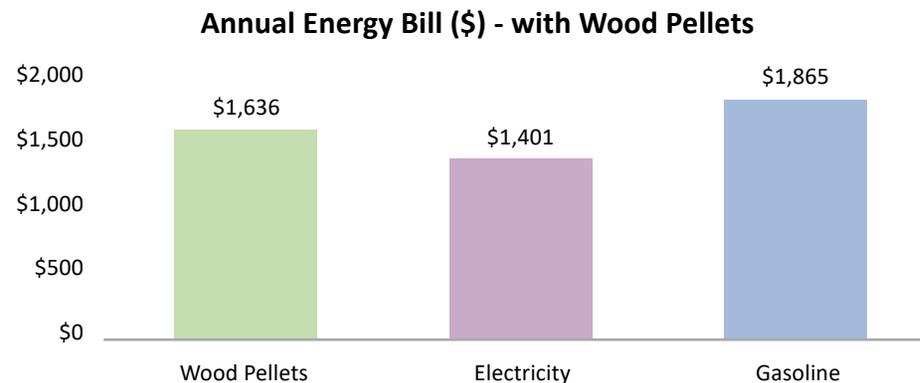
A household that uses wood pellets for space and water heating might use an average of about 469 kg of wood pellets for heating, 115 litres of gasoline, and 750 kWh of electricity for appliances each month.

To show them all on the same chart, we've described the energy used in terms of gigajoules (GJ), a common unit useful for comparing fuels.



And here's how much a household that relies on heating pellets might pay per year.

Wood pellet costs have been calculated using timely pricing data and estimated consumption.<sup>7/8</sup>



7. Canadian Wood Pellet Update, Wood Pellet Association of Canada: [https://www.pellet.org/images/2018-06-08\\_GordonMurray.pdf](https://www.pellet.org/images/2018-06-08_GordonMurray.pdf).

8. Note: As of August 2018, The Wood Pellet Association of Canada had only published pricing data for Ontario. Therefore, we have used Ontario wood pellet pricing in the above calculation.

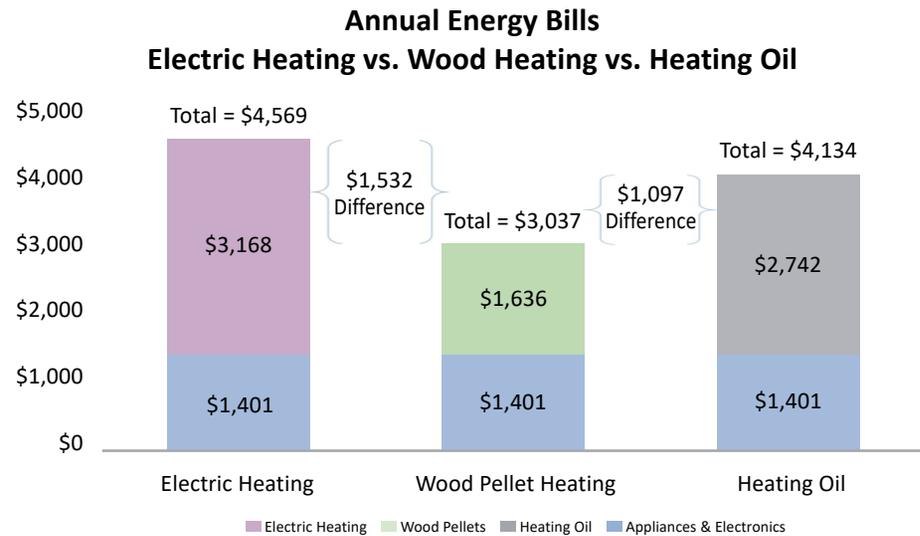
## Comparing the costs of different fuels in Newfoundland & Labrador

Not everyone has the same breakdown in fuel use as the typical customer. In fact, some households don't use these fuels at all.

As an example, the chart compares three households that use a similar amount of energy: all use electricity for appliances and electronics but they heat their houses differently. One house uses electric baseboards, another uses wood pellets, and the third household uses heating oil.

The difference in annual bills between the households heated with electricity and wood pellets is over \$1,500 due to the fact that the price of each unit of energy supplied with electricity is much higher than wood pellets.

As heating oil is a cheaper heating source than electricity, the difference between heating with wood pellets and oil is lower.



# Value of Energy for different Newfoundland & Labrador customers

Looking at a typical customer is interesting but to get an even better picture of The Value of Energy, let's take a closer look at how much energy different households use and pay for each month.

To do this, presented below are four Newfoundland & Labrador customers, representing different demographics and lifestyles, along with a comparison of how much they use and pay for energy.



## Young Urban Single

St. John's

Uses less energy and has lower bills

- Small condo -> less electricity required for heating
- Fewer devices and appliances -> less electricity
- Compact car and occasional driver -> less gasoline



## Suburban Family

Mt. Pearl

Uses more energy and has higher bills

- Large house -> more electricity required for heating
- More devices and appliances -> more electricity
- Two car commuters -> more gasoline



## Small Town Retirees

Avondale

Moderate energy use and has moderate energy bills

- Heating with oil
- Some devices and appliances -> moderate electricity
- One car or light truck -> moderate gasoline



## Rural Couple

Cow Head

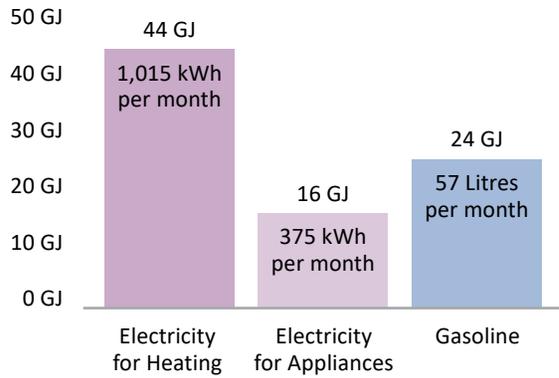
Moderate energy use and higher energy bills

- Heating with wood pellets
- Some devices and appliances -> moderate electricity
- One truck -> more gasoline

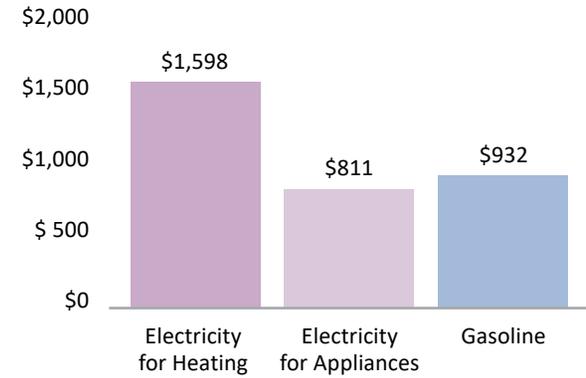
# Value of Energy Customer Snapshot (Newfoundland & Labrador)

## Young Urban Single

Annual Energy Use (GJ/year)

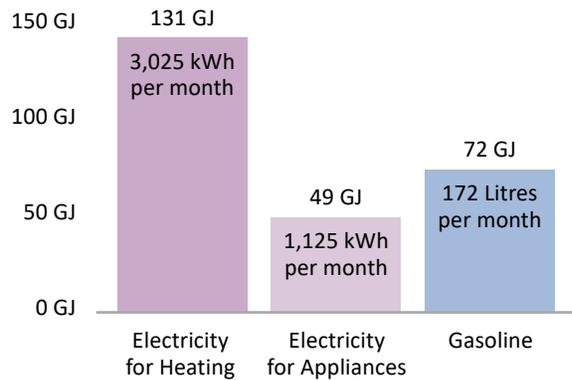


Annual Energy Bill (\$) Total = \$3,341

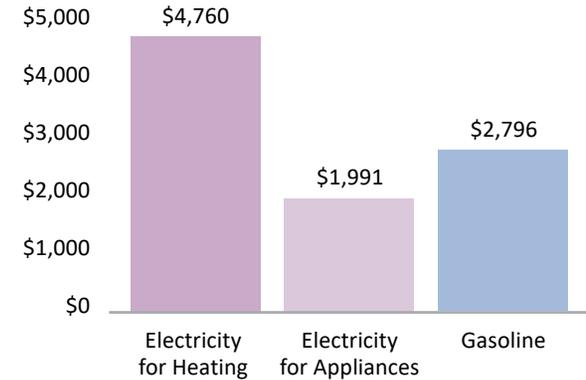


## Suburban Family

Annual Energy Use (GJ/year)



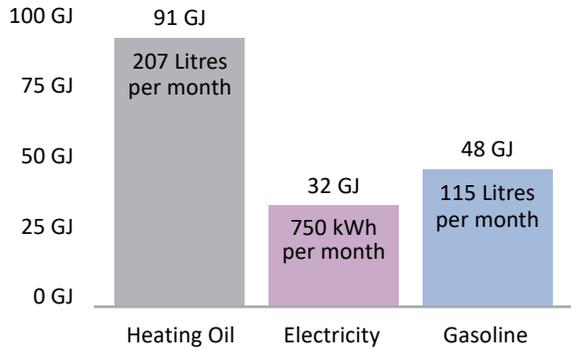
Annual Energy Bill (\$) Total = \$9,546



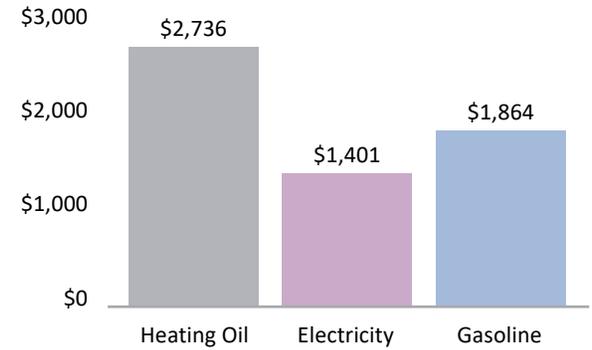
# Value of Energy Customer Snapshot (Newfoundland & Labrador)

## Small Town Retirees

Annual Energy Use (GJ/year)

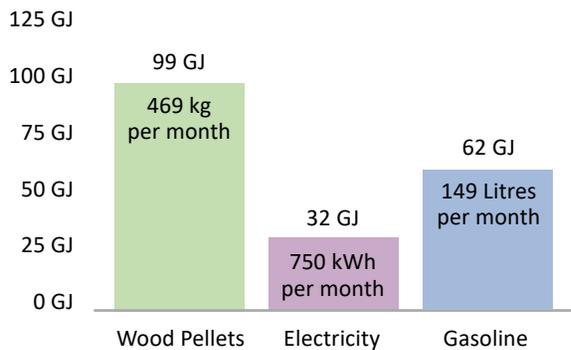


Annual Energy Bill (\$) Total = \$6,001

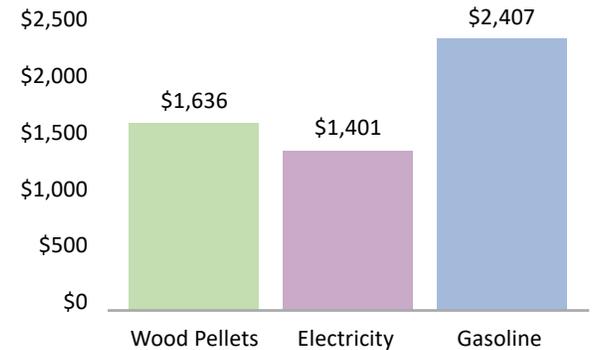


## Rural Couple

Annual Energy Use (GJ/year)



Annual Energy Bill (\$) Total = \$5,295

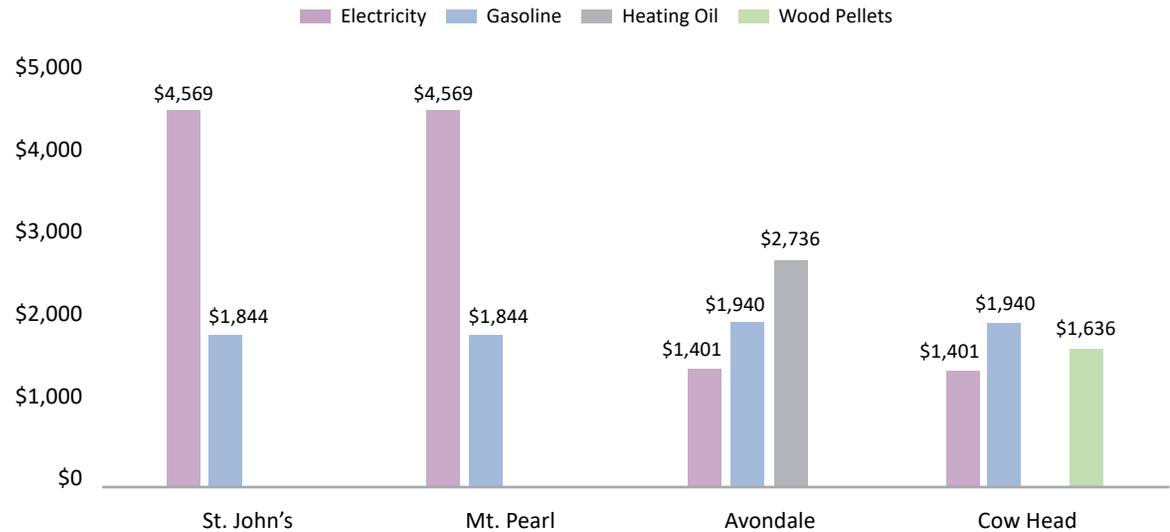


# Value of Energy – Location impact costs

The following chart shows some of the different annual energy costs depending on location.<sup>9/10/11/12</sup>

- Electricity in St. John’s, Mt. Pearl, and Avondale is provided by Newfoundland Power
- Electricity in Cow Head is provided by Newfoundland & Labrador Hydro
- St. John’s and Mt. Pearl residents heat their homes with electricity
- Avondale resident heats their home with oil
- Cow Head resident heats their home with wood pellets.

**Comparing Energy Bills Across Nova Scotia**



9. Electricity: Newfoundland Power: <https://www.newfoundlandpower.com/>  
 Newfoundland and Labrador Hydro: <https://nlhydro.com/>.  
 10. Gasoline: See <https://www.nrcan.gc.ca/energy/fuel-prices/4795>.  
 11. Heating Oil Costs: See <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000101&pickMembers%5B0%5D=2.7>.  
 12. Wood Pellet Costs: Wood Pellet Association of Canada: [https://www.pellet.org/images/2018-06-08\\_GordonMurray.pdf](https://www.pellet.org/images/2018-06-08_GordonMurray.pdf).

## Impact of a national carbon dioxide emissions tax (aka carbon tax, carbon price)

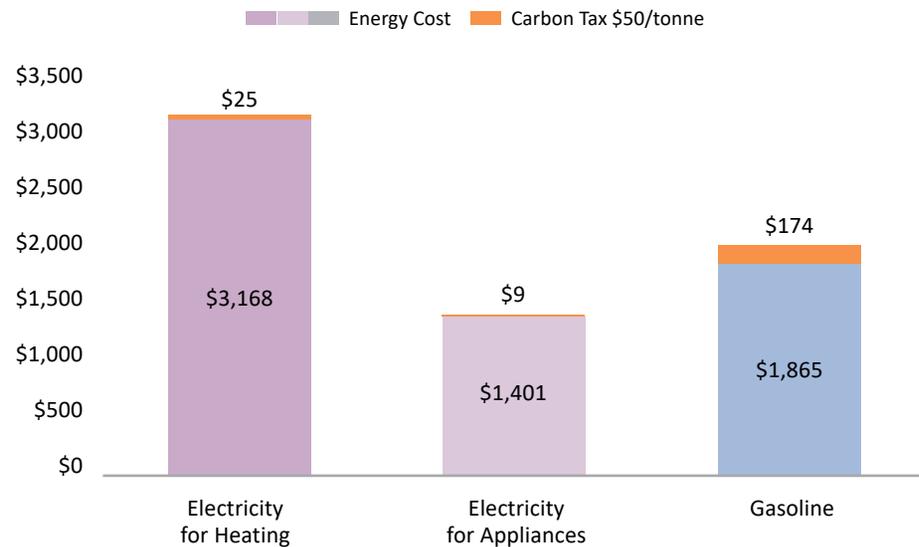
The federal government has announced that they will be introducing a national price on carbon that will gradually reach \$50/tonne of CO<sub>2</sub> in 2022.

The chart shows the impact of a \$50/tonne tax on carbon in the year 2022 for a typical Newfoundland & Labrador household heating with oil.

**A \$50 tax on carbon dioxide emissions will increase total electricity costs by <1% and gasoline by 9%.**

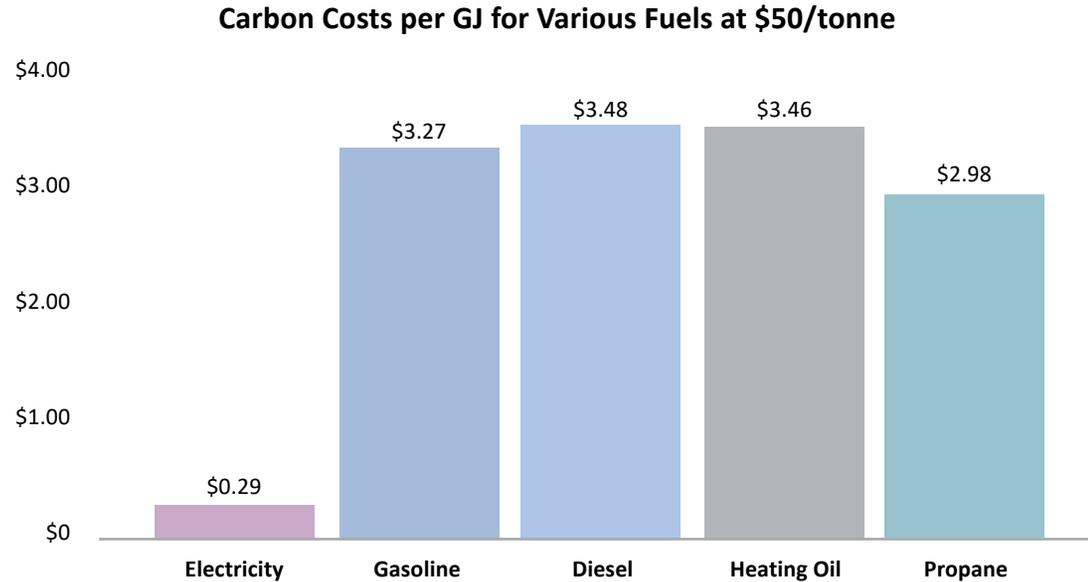
Note: The energy prices in this chart assume constant commodity prices.

Typical Customer Carbon Cost 2022 (\$50/tonne)



## Carbon dioxide emissions costs for different fuels<sup>13</sup>

Fuels vary in their energy and carbon dioxide content. For example, burning a Litre of gasoline will produce a different amount of energy and CO<sub>2</sub> emissions when compared to burning a cubic metre of natural gas. In order to compare carbon costs, the following chart normalizes the most popular fuels on an energy-equivalent basis – that is carbon dioxide content per gigajoule (GJ) and multiplies this by a carbon tax/price of \$50/tonne of CO<sub>2</sub>.



13. Environment and Climate Change Canada, National Inventory Report, Greenhouse Gas Sources and Sinks in Canada: See <http://www.publications.gc.ca/site/eng/9.506002/publication.html>.

## Conclusion

It should now be apparent that energy comes from a variety of sources, and households consume energy from different sources. Energy prices vary based on geography as well as the type of energy that is available or used. Of Newfoundland & Labrador's 246,700 households, about 147,300 rely on electric baseboards to heat their homes, 48,100 use heating oil, and 13,300 burn wood at home. The rest use natural gas, heat pumps or some combination for heat.

Household budgets are affected by their energy use.

Typical Newfoundland & Labrador households that rely on electricity for heating and appliances as well as electronics – representing 60% of N.L. homes – pay \$4,569 a year for energy. Those that use heating oil and electricity for appliances typically pay \$4,134. And households that use wood spend \$3,037 each year.

Not everyone has the same breakdown in fuel use as the typical customer, but these figures demonstrate the variances within Newfoundland & Labrador.

Government energy policymakers have a significant impact on household energy budgets. Changes to N.L.'s energy infrastructure and mix should be done prudently since decisions made today will have lasting consequences on the supply of energy and its long-term affordability.

The public is concerned about climate change and addressing this challenge requires lawmakers to be honest about mitigation costs and the impact of policies on household budgets and businesses. If we hope to maintain our high quality of life, an all electrical or all renewable energy future remains, at best, an aspirational goal in a distant future. Questioning government policies that could negatively impact Canadians does not make the examiner a climate skeptic, merely a responsible and concerned citizen.

The starting point to any discussion on energy policy begins with measurable facts, which this report hopes to provide and give readers an understanding of the energy landscape in Newfoundland & Labrador.



## **Newfoundland & Labrador Household Research Report**

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