

# The Value of Energy – Saskatchewan

Canadians for Affordable Energy:  
Household Research Series

OCTOBER 2018





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 – Saskatchewan Notes**

The energy price and cost data contained in this Saskatchewan Household Research Report are approximate and represent how much residential customers might pay for various energy products, using timely data from credible sources, including SaskPower, Saskatoon Light & Power, SaskEnergy, Statistics Canada, and Natural Resources Canada.

Energy price and cost data do not include the federal government's so-called carbon pricing backstop (aka tax on carbon dioxide emissions) since the government of Saskatchewan is challenging the federal plan in court as unconstitutional.

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This report was developed by Richard Laszlo and his team at Laszlo Energy Services (LES). LES provides customized energy policy, strategy and communications expertise to natural gas, thermal and electric utilities, real estate property managers and developers, technology and service providers, and government clients. [www.lazloenergy.com](http://www.lazloenergy.com)

## Summary

The federal government's carbon dioxide emissions tax (carbon tax) is set to have a major impact on the pocketbook of Saskatchewan energy consumers: families and businesses.

About 80 percent of Saskatchewan homes use natural gas for their heating. If a \$50/tonne federal carbon tax is imposed, those natural gas costs would increase by 31 percent. That is the highest increase of any energy source, electricity would increase 19 percent and gasoline 10 percent.

This increase is of particular concern because natural gas represents 53 percent of energy used by the typical household, but only 21 percent of the total energy cost versus electricity at 39 percent and gasoline 40 percent.

Natural gas remains the most affordable and cleanest form of reliable and abundant energy. Typical Saskatchewan households that rely on electricity for heating pay \$3,641 annually to warm their homes. Those that use heating oil typically pay \$2,866. And households that have access to natural gas—representing over 80 percent of Saskatchewan homes—spend \$848 each year.

It's important that governments recognize the impacts these decisions could have on this energy make up.

Government policymakers have a significant impact on household energy budgets. Changes to Saskatchewan'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 Saskatchewan's ratepayers relying heavily on natural gas for their energy needs it's 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 Saskatchewan 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 SaskPower and SaskEnergy.

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

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

- Electricity provides 19%
- Gasoline provides 28%
- Natural gas provides 53%

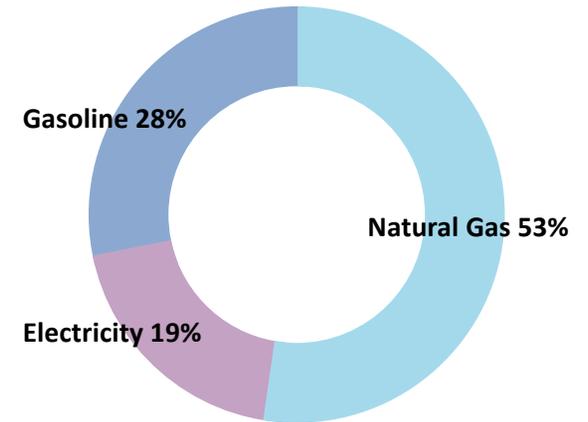
But not every household has this breakdown—this is an estimate based on a household that uses natural gas for heating, drives a car occasionally and uses appliances and electronics.

Approximately 394,400 Saskatchewan households, over 80% of the total, use natural gas for heating. The remaining 84,100 homes rely on electric baseboards, heating oil, heat pumps, propane, coal, wood or some combination for heat.

See page 5 for household figures that heat with electricity or oil.

### We use natural gas in

- Furnaces to warm our homes
- Stovetops to cook our food
- Hot water tanks for laundry and showers
- Industries and a key input fuel



### We use gasoline to fuel

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

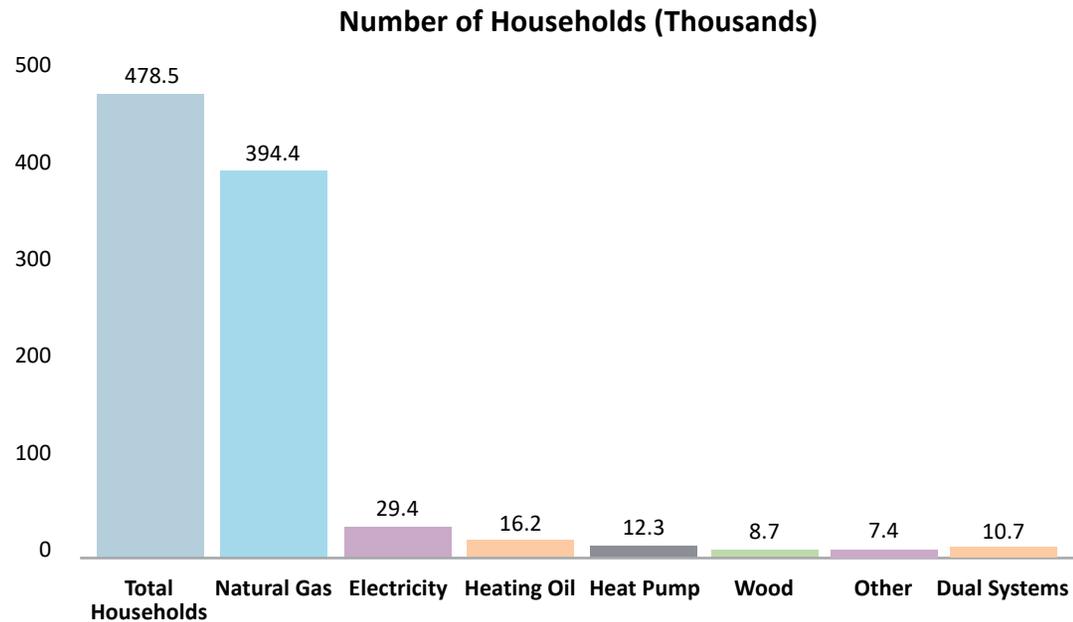
### We use electricity to power

- Illumination to light the night
- Appliances for convenience
- Electronics for education and entertainment
- Smartphones to stay connected
- Electric heating in much of rural Saskatchewan

## 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 394,400 households heat their homes with natural gas, 29,400 heat their homes with electricity and 16,200 use heating oil. Other households use heat pumps, propane and wood for their heating needs.<sup>1</sup>



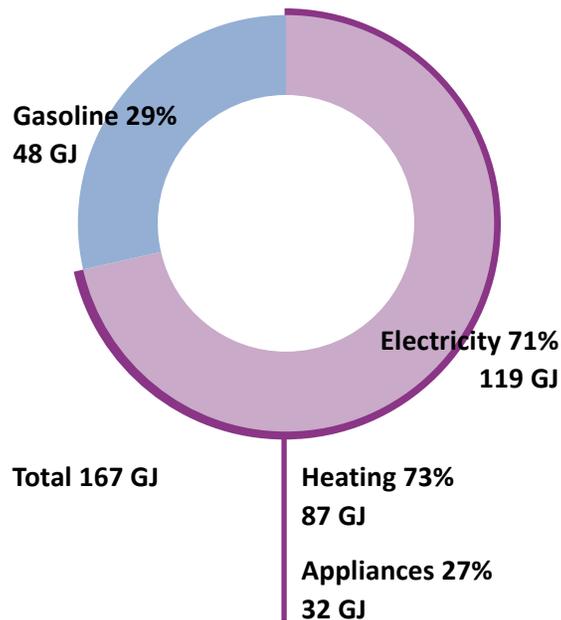
1. NRCan Comprehensive Energy Use Database. Saskatchewan Table 21: Heating System Stock by Building Type and Heating System Type, accessed in July 2018: <http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=res&juris=sk&rn=21&page=0>.

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

The majority of Saskatchewan household energy use is for space and water heating, so how we heat our homes has a big influence on our household energy use profiles and household budgets.

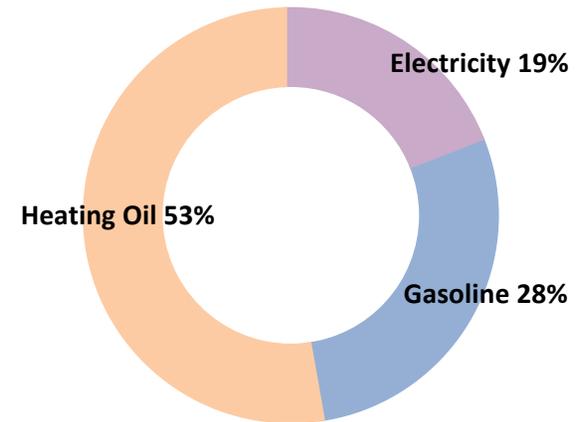
### Heating with Electricity:

29,400 Saskatchewan households rely on electricity for heating as well as for their appliances and electronics. A household with baseboard electric heating might have an energy use profile matching the chart below, with electricity providing 71% and gasoline 29%.



### Heating with Oil:

16,200 Saskatchewan households rely on heating oil to keep their houses warm. A household with an oil furnace might get 53% of energy from heating oil, with electricity providing 19% and gasoline 28%.



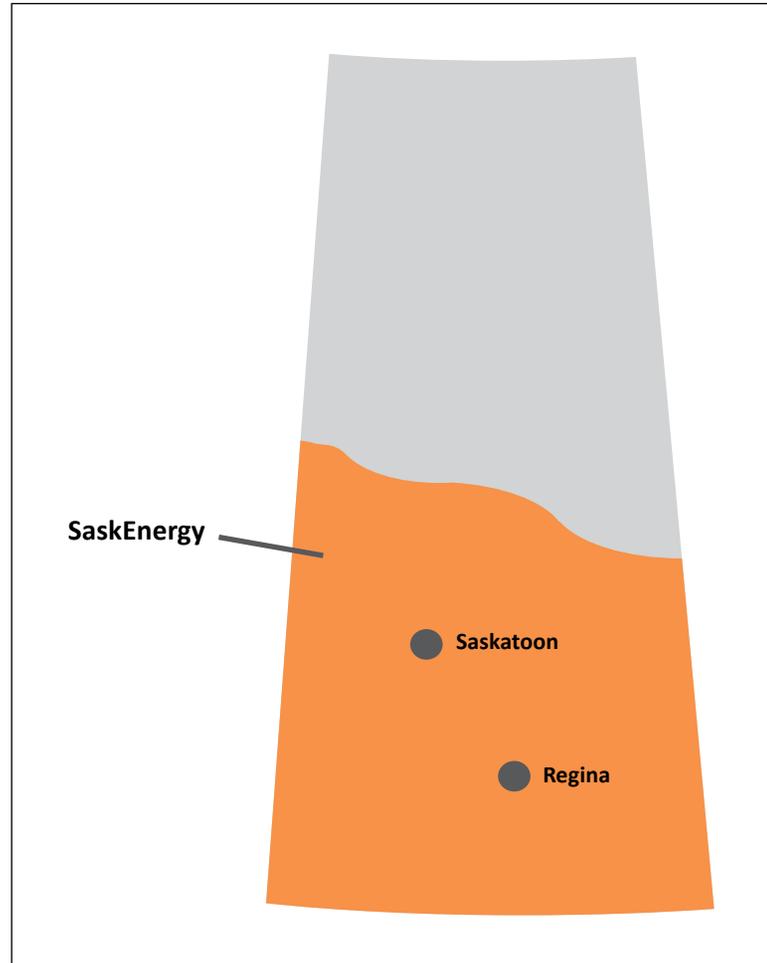
2. NRCan Comprehensive Energy Use Database. Saskatchewan Table 21: Heating System Stock by Building Type and Heating System Type <http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=res&juris=sk&rn=21&page=1>.

## Which households have natural gas service?

Although the majority of Saskatchewan households heat their homes with natural gas, not all households do.

Saskatchewan's natural gas distribution system covers some urban areas and rural communities, but many agricultural, low density and remote communities do not have natural gas service.

The map of Saskatchewan shows areas of the province with and without natural gas service.<sup>3</sup>



3. Canadian Gas Association.

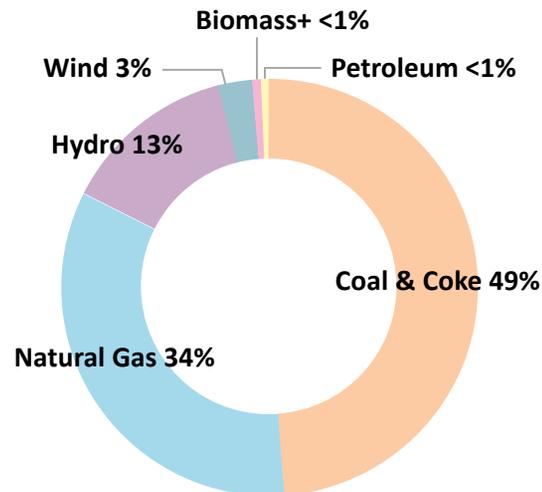
## Where does Saskatchewan's electricity (power) come from?

Saskatchewan households use electricity that is generated mostly from petroleum products (fossil fuels).

The pie chart shows electricity generation by source in Saskatchewan: 49% from coal, 34% from natural gas, with the remaining 17% produced from renewables, primarily hydropower.<sup>4</sup>

In 2016, Saskatchewan generated 24.4 terawatt hours (TWh) of electricity, which is approximately 4% of total Canadian generation. Saskatchewan has a generating capacity of 4,558 megawatts (MW).

Note that the pie chart figures might not total 100% due to rounding.



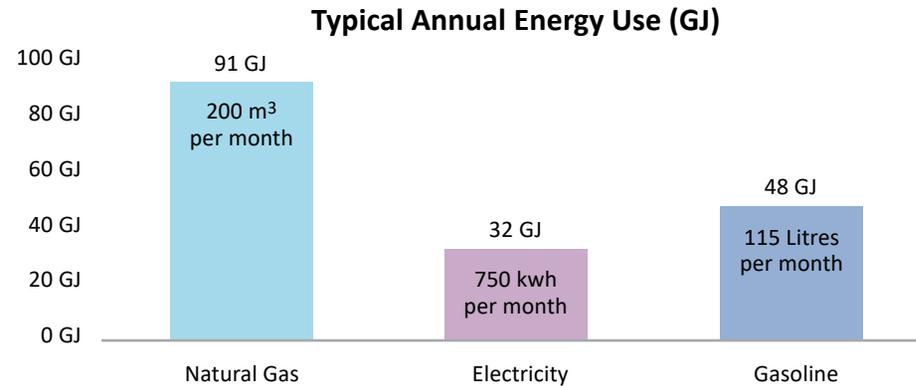
<b>Coal &amp; Coke</b>	12.0 TWh or 49%
<b>Natural Gas</b>	8.3 TWh or 34%
<b>Hydro</b>	3.2 TWh or 13%
<b>Wind</b>	0.7 TWh or 3%
<b>Biomass/ Geothermal/ Solar</b>	0.1 TWh or <1%
<b>Petroleum</b>	.002 TWh or <1%
<b>Total Generation</b>	<b>24.4 TWh</b>

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

# Typical Saskatchewan household bills and energy use

Here's the breakdown of how much energy a typical Saskatchewan household might use every year. This works out to be about 200 cubic meters (m<sup>3</sup>) of natural gas, 750 kilowatt-hours (kWh) of electricity, and 115 litres of gasoline a month.

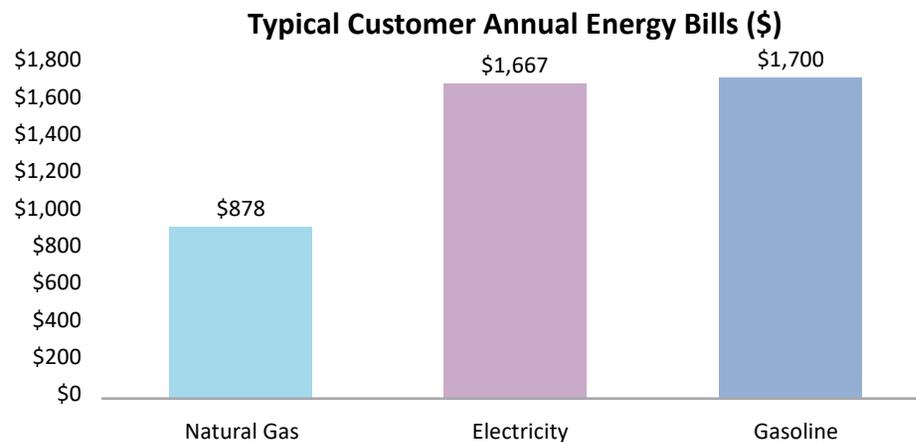
To show them together, we measure the energy used in gigajoules (GJ) per year, a common unit useful for comparing different fuels on an "apples to apples" basis. A gigajoule is equivalent to 1 billion joules, roughly the amount of energy it takes to power a 30 Watt light bulb throughout an entire year.



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

A typical Saskatchewan household spends about the same amount of money on electricity and gasoline, and quite a bit less on natural gas, even though they get more of the energy they use from natural gas.

These bills have been generated using the rate information on SaskPower, Saskatoon Light & Power and Saskenergy websites for a typical Saskatchewan customer. Some households will pay more and some will pay less.<sup>5/6/7/8</sup>



5. Electricity: <https://www.saskpower.com/accounts-and-services/power-rates/www.saskatoon.ca/services-residents/power-water/saskatoon-light-power/electrical-rates>.

6. Natural Gas: [http://www.saskenergy.com/residential/resrates\\_curr.asp](http://www.saskenergy.com/residential/resrates_curr.asp).

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

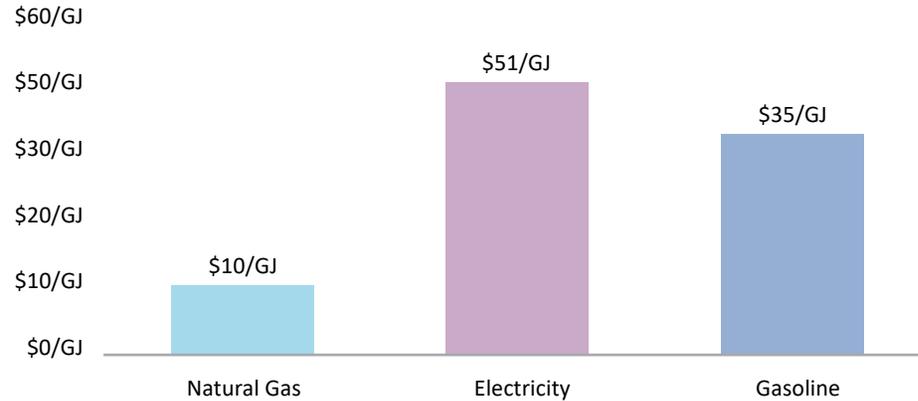
7. Heating Oil Costs: <http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/econ152l-eng.htm>.

# The Value of Energy for Saskatchewan 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.

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

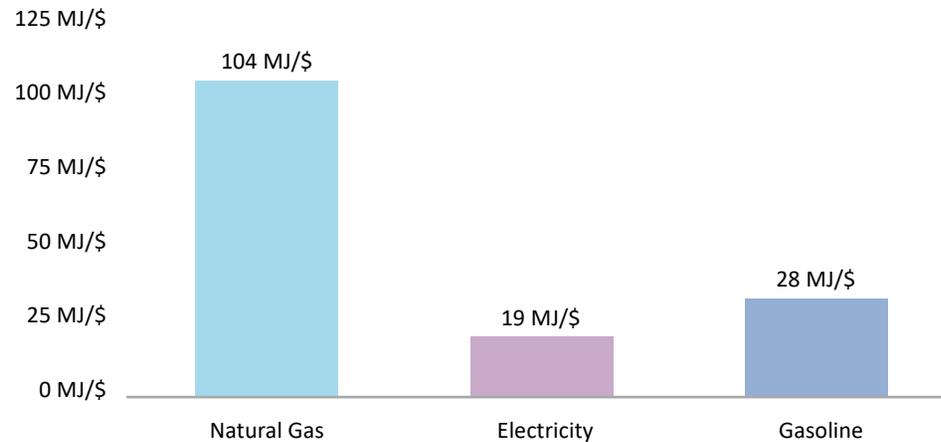


Another way to describe the Value of Energy is to show how much energy a household gets for each dollar spent on their energy bill.

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

1 GJ = 1,000 MJ

Energy per Dollar (MJ/\$)

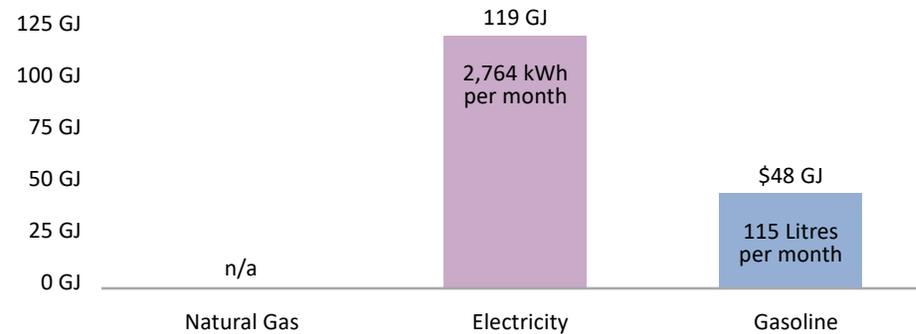


# A typical bill and household value of energy for Saskatchewan's 29,000 families that rely on electricity for heat

Saskatchewan households that rely on baseboard electricity for heating consume a lot of electricity compared to those that heat with natural gas or other fuels. Winter months would be higher but on average a household that heats with electricity might use about 2,764 kWh of electricity 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.

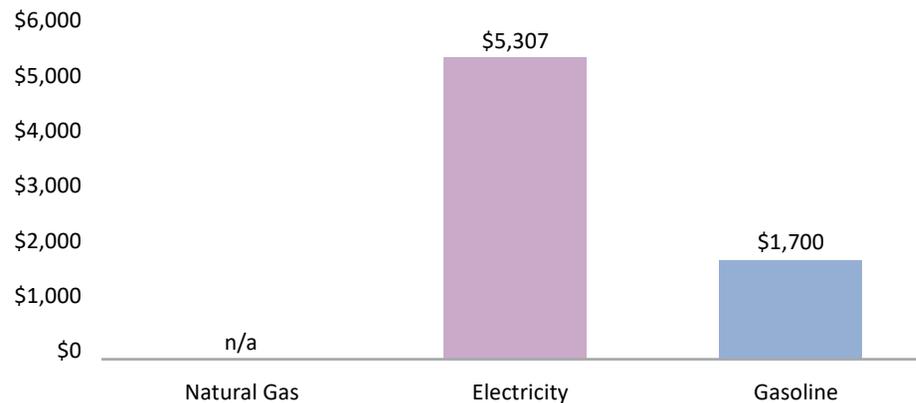
Annual Energy Use (GJ) - with Electric Heat



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

A Saskatchewan household with electric heat would spend a lot on energy bills because heating requires a lot of energy, and because the price of electricity is relatively higher than other fuels.

Annual Energy Bills (\$) - with Electric Heat



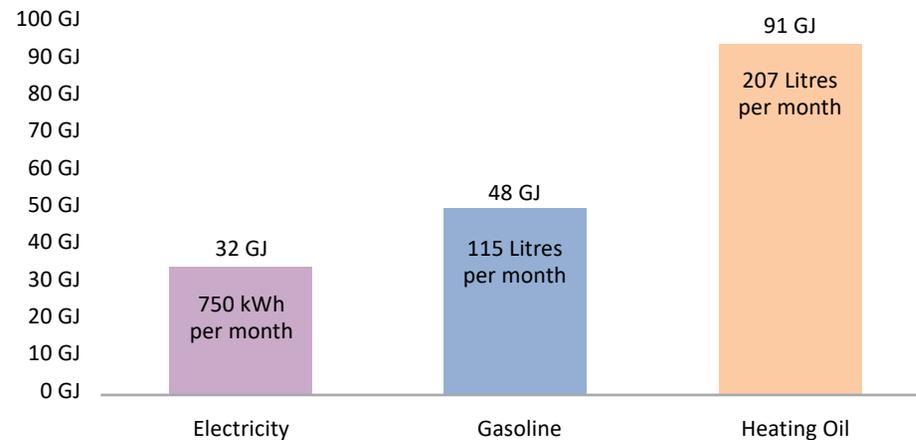
# A typical bill and household value of energy for Saskatchewan's 18,000 families that rely on heating oil for heat

A Saskatchewan household that relies on heating oil would have a similar looking picture to the typical household that relies on natural gas, except their fuels used for heating would be different.

A household that uses heating oil for space and water heating might use an average of about 750 kWh of electricity, 115 litres of gasoline and 207 litres of heating oil a month.

To show them all on the same chart, we've described the energy used in terms of gigajoules (GJ).

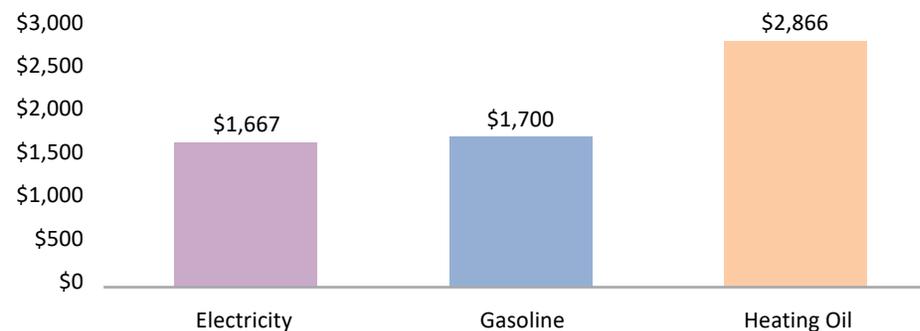
Annual Energy Use (GJ) - with Heating Oil



And here's how much a household that relies on home propane for energy might pay per year.

Heating oil costs about the same per litre as gasoline.

Annual Energy Bills (\$) - with Heating Oil

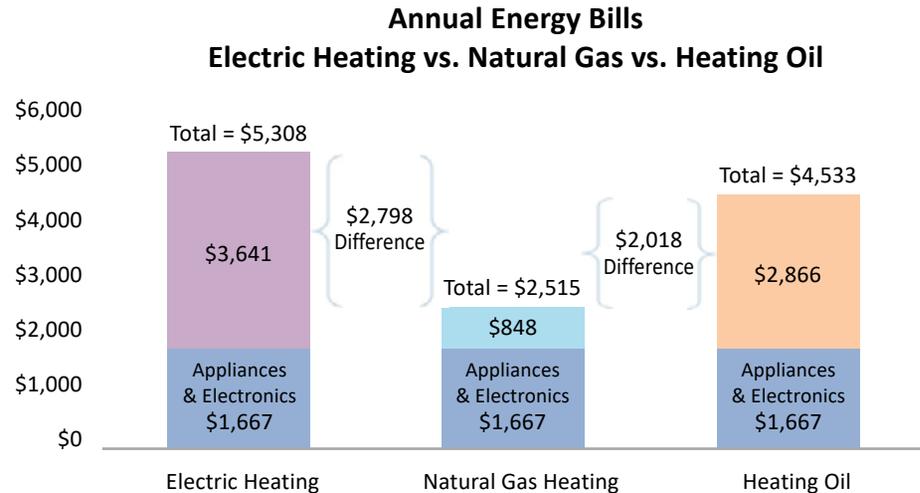


# Comparing the costs of different fuels in Saskatchewan

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 a natural gas furnace, and the third household uses heating oil in a furnace.

The difference in annual bills between the households heated with natural gas and electricity is nearly \$2,800 due to the fact that the price of each unit of energy supplied with electricity is so much higher than natural gas. The difference with heating oil is around \$2,000.



# Value of Energy for different Saskatchewan 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 Saskatchewan customers, representing different demographics and lifestyles, along with a comparison of how much they use and pay for energy.



**Young Urban Single**

Regina

Uses less energy and has lower bills

- Small condo -> less natural gas
- Fewer devices and appliances -> less electricity
- Compact car and occasional driver -> less gasoline



**Suburban Family**

Saskatoon

Uses more energy and has higher bills

- Large house -> more natural gas
- More devices and appliances -> more electricity
- Two car commuters -> more gasoline



**Small Town Retirees**

Lumsden

Moderate energy use and has moderate energy bills

- Medium sized house -> moderate natural gas
- Some devices and appliances -> moderate electricity
- One car or light truck -> moderate gasoline



**Rural Couple**

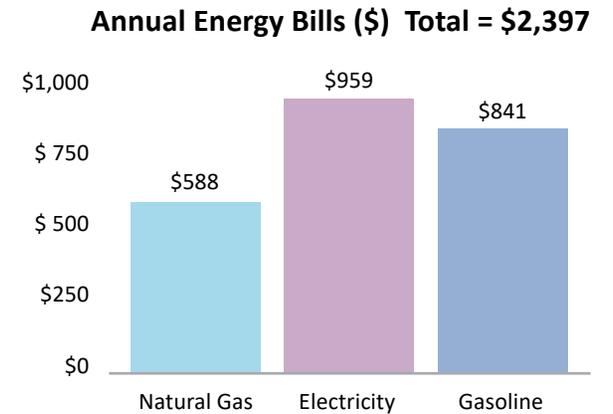
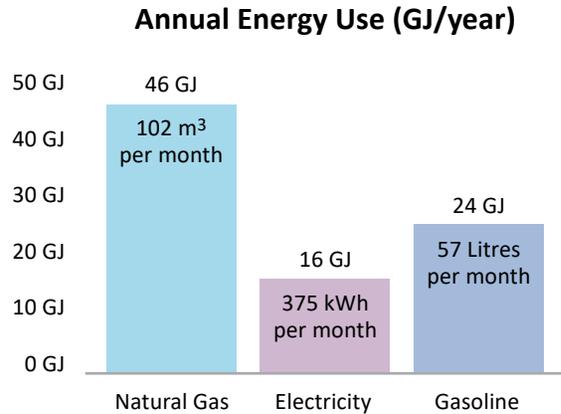
Buffalo

Moderate energy use and has higher energy bills

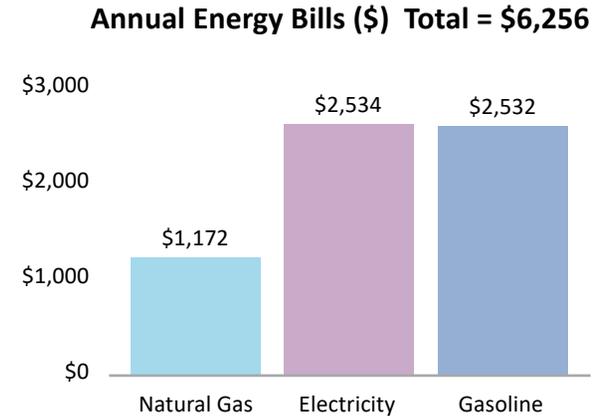
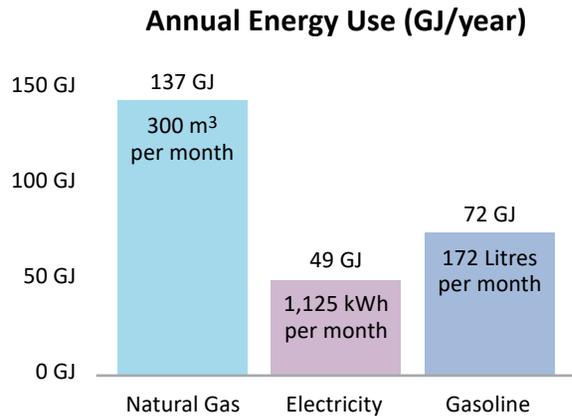
- Natural gas service unavailable -> electric heating
- Electric heating with some devices and appliances -> very high electricity
- One truck -> more gasoline

# Value of Energy Customer Snapshot (Saskatchewan), without a tax on carbon dioxide emissions

## Young Toronto Urban Single



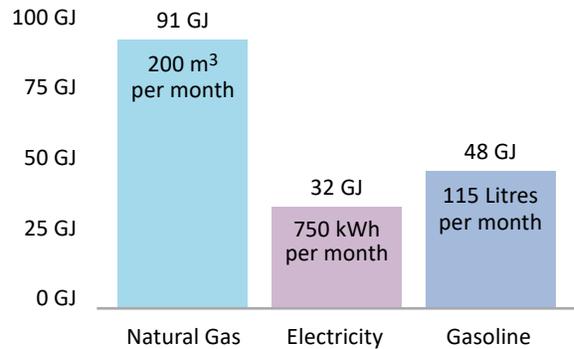
## Suburban Burlington Family



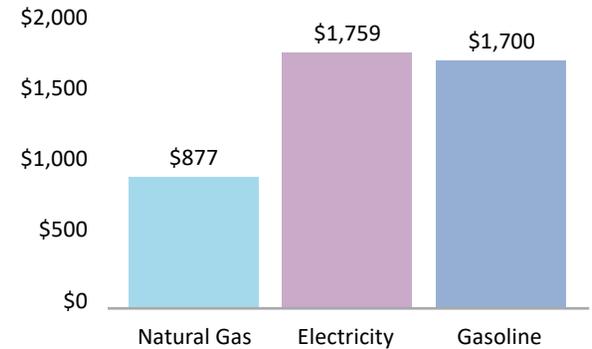
# Value of Energy Customer Snapshot (Saskatchewan)

## Small Town Retirees

Annual Energy Use (GJ/year)

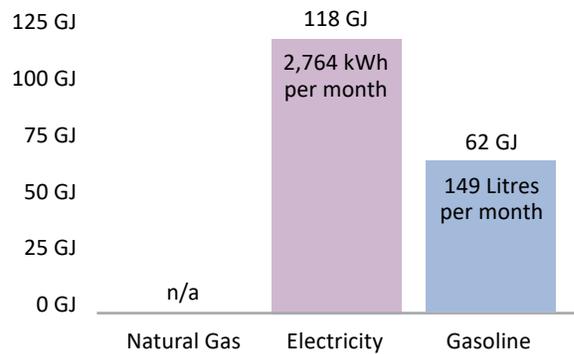


Annual Energy Bills (\$) Total = \$4,366

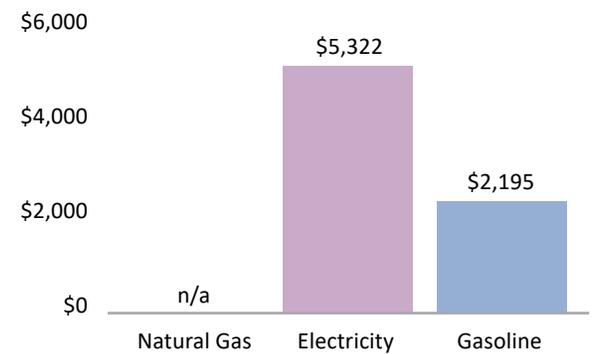


## Rural Couple

Annual Energy Use (GJ/year)



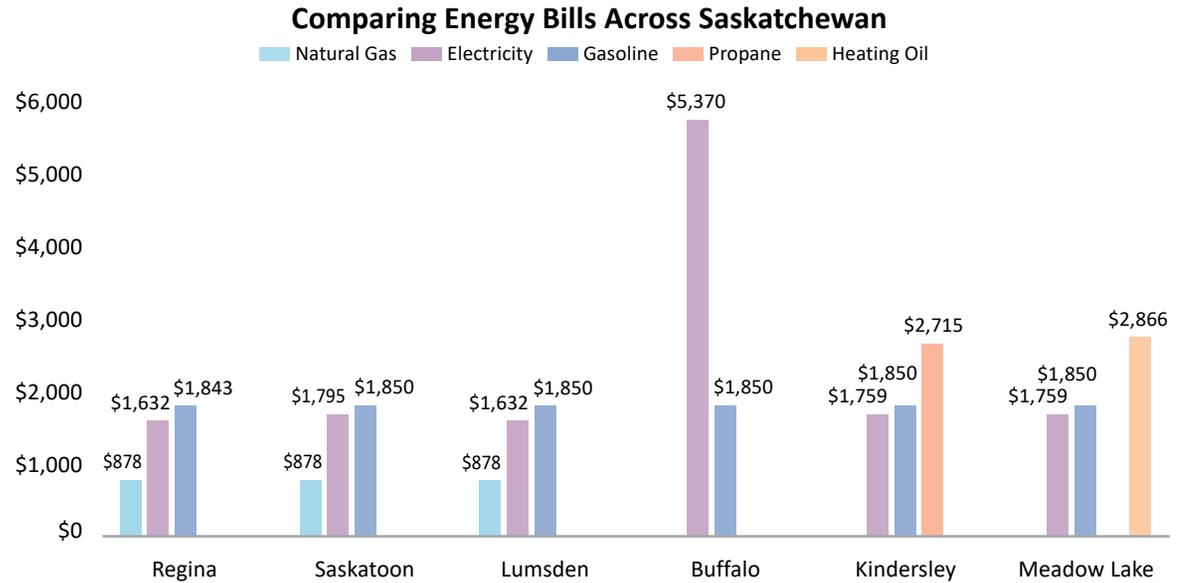
Annual Energy Bills (\$) Total = \$7,518



# Value of Energy – Location impacts costs

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

- Electricity in Regina and Lumsden is served by SaskPower at their standard rate
- Electricity in Kindersley and Meadow Lake is served by SaskPower at their rural rate
- Electricity in all Saskatoon is served by Saskatoon Light and Power
- Natural Gas service is provided by SaskEnergy with one rate



9. Electricity: [www.saskpower.com/accounts-and-services/power-rates/](http://www.saskpower.com/accounts-and-services/power-rates/).  
<https://www.saskatoon.ca/services-residents/power-water/saskatoon-light-power/electrical-rates>.

10. Natural Gas: [http://www.saskenergy.com/residential/resrates\\_curr.asp](http://www.saskenergy.com/residential/resrates_curr.asp).  
 11. Gasoline Costs: <https://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/econ152l-eng.htm>.

12. Propane & heating oil: <http://www2.nrcan.gc.ca/eneene/sources/pripri>.

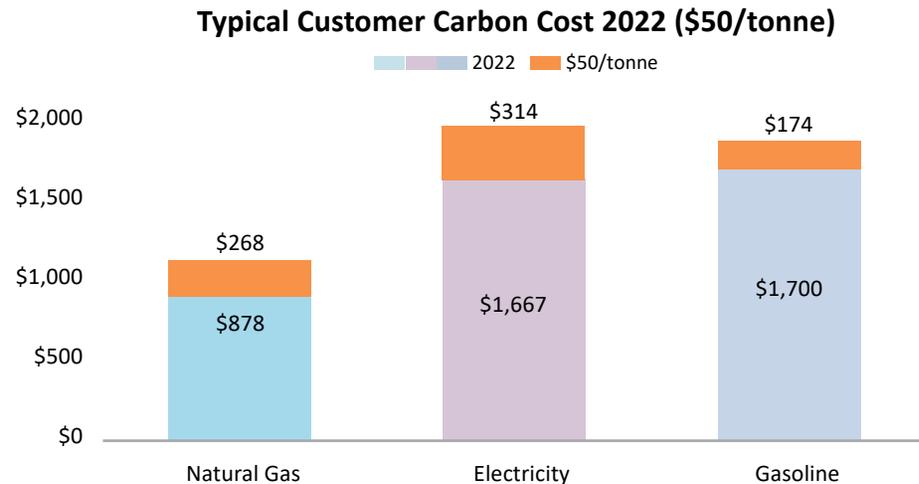
## Impact of a national carbon dioxide emissions tax (aka carbon tax, carbon price)

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 household in Saskatoon.

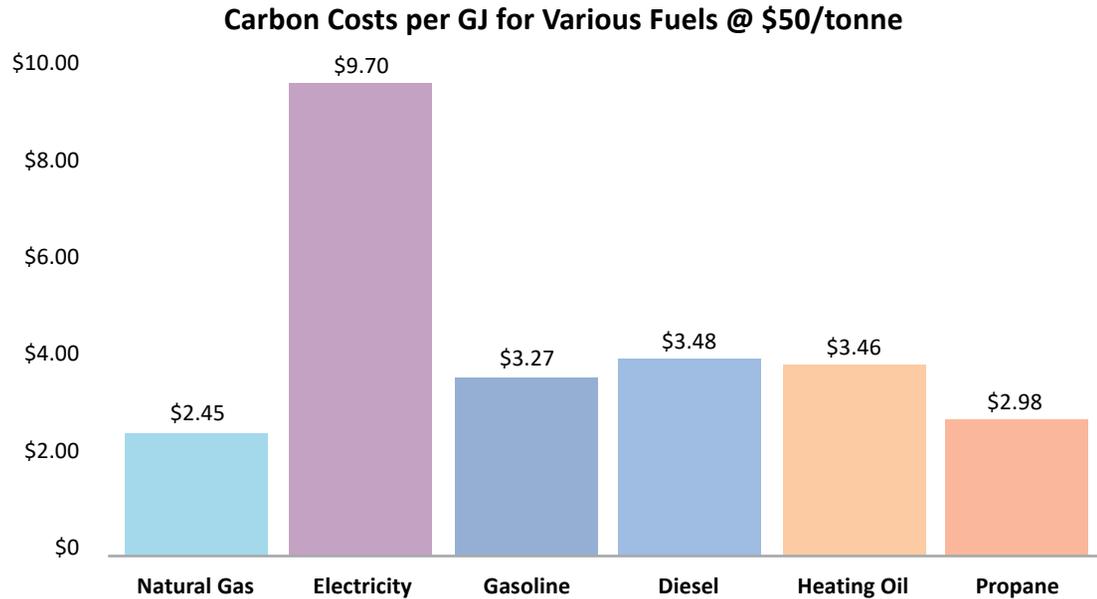
**A \$50 tax on carbon dioxide emissions will increase total natural gas costs by 31%, electricity by 19% and gasoline by 10%.**

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



## 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 their 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: <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 Saskatchewan's 478,500 households, about 394,400 heat their homes with natural gas and 84,100 homes rely on electric baseboards, heating oil, heat pumps, propane, coal, wood or some combination for heat.

Household budgets are affected by their energy use. Saskatchewan families with the lowest energy prices have access to natural gas.

Typical Saskatchewan households that rely on electricity for heating and appliances as well as electronics pay \$5,308 a year for energy. Those that use a combination of heating oil and electricity for appliances typically pay \$4,533. And households that have access to natural gas—representing over 80% of Saskatchewan homes—spend \$2,515 each year.

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

Government energy policymakers have a significant impact on household energy budgets. Changes to Saskatchewan'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 Saskatchewan.



## **Saskatchewan Household Research Report**

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