



A Comparison of Energy Consumption In 3 Saskatoon Neighbourhoods – Case Study

The City of Saskatoon produced the 2014 Saskatoon Greenhouse Gas Emissions Inventory. Neighbourhood emissions and demographics from page 65 and 66 of this [report](#), include this information:

- *Predominant age of dwelling* refers to when most of the houses in the neighbourhood were built. Older homes, in general, have less insulation and draftier windows.
- *Average household size* refers to how many people, on average, live in each home. In general, if there are more people in a house, the household use more resources like water and electricity.
- *Consumption per household (GJ)* refers to how much energy each household uses (measured in gigajoules).

Here is information from 3 neighbourhoods, or check out your own neighbourhood:

| | Briarwood | Westview | Adelaide/Churchill |
|-----------------------------|------------------|-----------------|---------------------------|
| Predominant age of dwelling | 2001-2005 | 1961-1980 | before 1960 |
| Average household size | 2.9 people | 2.9 people | 2.6 people |
| Consumption per household | 118,601GJ | 69,427GJ | 77,382GJ |

Here is a photo of a home from each of these neighbourhoods.

Briarwood



2206 ft²/205 m²

3 Beds
 4 Baths
 2,206 Sqft
 Residential

Year Built 2005



Westview



864 ft²/80.3 m²

3 Beds 2 Baths 864 Sqft Residential

Year Built 1969

Adelaide Churchill



1044 ft²/97m²

4 Beds 2 Baths 1,044 Sqft 0.194 ac Lot Size Residential

Year Built 1959

Discussion

- Comparing the 3 neighbourhoods, which homes are likely the draffiest and most poorly insulated?
- Does the consumption per household match the age of the homes? If not, what other factors could be associated with higher energy use?
- The equation $Q=A\Delta T/R$ helps us design energy efficient homes:
 - Q = heat flow. The **power** to keep the house warm.
 - A = the size of the house. The **surface area** of all the outside walls, roof, and floor.
 - ΔT = the **temperature difference** from inside to outside. ΔT = is said "delta T". Engineers use the Greek letter Δ to mean "difference".
 - R = the average R value or **insulating value** of the building envelope.In what ways does this equation help to answer why some neighbourhoods might use more energy than others?

Graphing

1. Create a bar graph that compares the energy consumption of the 3 neighbourhoods.
2. What are other interesting things about these houses and neighbourhoods? Choose one and create a graph that represents the comparison.



Going further: Comparing energy use in other neighbourhoods.

Find information on other Saskatoon neighbourhoods on pages 65 and 66 of the [2014 Saskatoon Greenhouse Gas Emissions Inventory](#).

Notes:

1. *There is more information in the chart than has been included above.*
 2. *New neighbourhoods have incomplete data because many buildings are still under construction. The "Total Households" section shows how many buildings are included in each neighbourhood.*
- Find your own neighbourhood. How does energy use in your neighbourhood compare to the 3 included in this case study? What are the differences between your neighbourhood and these 3?
 - Which neighbourhoods should have better insulated homes? Why do you think this? Is energy consumption per household lower? If not, what other factors could increase energy consumption in these neighbourhoods?
 - Which neighbourhoods probably have less well insulated homes? Why do you think this? Is energy consumption per household higher? If not, what other factors could decrease energy consumption in these neighbourhoods?
 - Find a neighbourhood with high energy use, can you suggest a few reasons why these homes are using more energy than other neighbourhoods?
 - Find a neighbourhood with a low average household size, and one with a high average household size. How does the energy consumption per household compare?



Curriculum Connections

Grade 5 English Language Arts [CC5.2](#) Demonstrate a variety of ways to communicate understanding and response including illustrated reports, dramatizations, posters, timelines, multimedia presentations, and summary charts.

Mathematics [P5.1](#) Represent, analyze, and apply patterns using mathematical language and notation. **[SP5.1](#)** Differentiate between first-hand and second-hand data. **[SP5.3](#)** Describe, compare, predict, and test the likelihood of outcomes in probability situations.

Science [WE5.3](#)

Analyze the impact of weather on society and the environment, including technologies that help humans address weather conditions.

Social Studies [RW5.1](#) Explain the importance of sustainable management of the environment to Canada's future. **[RW5.2](#)** Hypothesize about economic changes that Canada may experience in the future.

Grade 6 English Language Arts [CR6.2](#) Select and use appropriate strategies to construct meaning before (e.g., considering what they know and need to know about topic), during (e.g., making connections to prior knowledge and experiences), and after (e.g., drawing conclusions) viewing, listening, and reading. **[CR6.3](#)** Use pragmatic (e.g., function and purpose of texts), textual (e.g., form/genre, sequence of ideas), syntactic (e.g., word order and emphasis on particular words), semantic/lexical/ morphological (e.g., capture particular aspect of intended meaning), graphophonic (e.g., sound-symbol patterns and relationships), and other cues (e.g., the speaker's non-verbal cues) to construct and confirm meaning. **[CR6.7](#)** Read independently and demonstrate comprehension of a variety of information texts with some specialized language including grade level instructional materials, non-fiction books, reports and articles from magazines and journals, reference materials, and written instructions.

Mathematics [P6.1](#) Extend understanding of patterns and relationships in tables of values and graphs. **[SP6.1](#)** Extend understanding of data analysis to include: line graphs, graphs of discrete data, data collection through questionnaires, experiments, databases, and electronic media, interpolation and extrapolation.

Science [EL6.1](#) Assess personal, societal, economic, and environmental impacts of electricity use in Saskatchewan and propose actions to reduce those impacts.

Social Studies [RW6.2](#) Contribute to initiating and guiding change in local and global communities regarding environmental, social, and economic sustainability.

Grade 7 English Language Arts [CR7.2](#) Select and use appropriate strategies to construct meaning before (e.g., formulating questions), during (e.g., recognizing organizational structure), and after (e.g., making judgements supported by evidence) viewing, listening, and reading. **[CR7.3](#)** Use pragmatic (e.g., author's purpose and point of view), textual (e.g., how author organized text), syntactic (e.g., main and subordinate ideas), semantic/lexical/morphological (e.g., figurative language and specific word meanings by their context, common affixes, and allusions), graphophonic (e.g., word patterns), and other cues (e.g., non-verbal cues, headings, charts, and diagrams) to construct and confirm meaning when viewing, listening, and reading. **[CR7.7](#)** Read independently and demonstrate comprehension of a variety of specialized information texts including non-fiction books, grade-level instructional materials, articles, reports, reference materials, instructions, advertising and promotional materials, and websites.

Mathematics [P7.1](#) Demonstrate an understanding of the relationships between oral and written patterns, graphs and linear relations. **[SP7.1](#)** Demonstrate an understanding of the measures of central tendency and range for sets of data. **[SP7.3](#)** Demonstrate an understanding of theoretical and experimental probabilities for two independent events where the combined sample space has 36 or fewer elements.



Science [HT7.1](#) Assess the impact of past and current heating and cooling technologies related to food, clothing, and shelter on self, society, and the environment. [HT7.3](#) Investigate principles and applications of heat transfer via the processes of conduction, convection, and radiation.

Social Studies [RW7.2](#) Investigate the influence of resources upon economic conditions of peoples in circumpolar and Pacific Rim countries. [RW7.3](#) Assess the ecological stewardship of economies of Canada and the circumpolar and Pacific Rim countries.

Grade 8 English Language Arts [CR8.2](#) Select and use appropriate strategies to construct meaning before (e.g., previewing and anticipating message), during (e.g., making inferences based on text and prior knowledge), and after (e.g., paraphrasing and summarizing) viewing, listening, and reading. [CR8.6](#) Read and demonstrate comprehension and interpretation of grade-appropriate texts including traditional and contemporary prose fiction, poetry, and plays from First Nations, Métis, and other cultures to evaluate the purpose, message, point of view, craft, values, and biases, stereotypes, or prejudices. [CC8.8](#) Write to describe a landscape scene; to narrate a personal story or anecdote and a historical narrative; to explain and inform in a presentation of findings, a biography, a documented research report, and a résumé and covering letter; and to persuade in a mini-debate and a review.

Health Education [USC8.6](#) Examine and assess the concept of sustainability from many perspectives, and develop an understanding of its implications for the well-being of self, others, and the environment.

Mathematics [P8.1](#) Demonstrate understanding of linear relations concretely, pictorially (including graphs), physically, and symbolically. [SP8.1](#) Analyze the modes of displaying data and the reasonableness of conclusions. [SP8.2](#) Demonstrate understanding of the probability of independent events concretely, pictorially, orally, and symbolically.

Social Studies [RW8.1](#) Analyze the social and environmental consequences of living in the Canadian mixed market economy based on consumerism. [RW8.3](#) Critique the approaches of Canada and Canadians to environmental stewardship and sustainability.

Grade 9 Science [CE9.3](#) Assess operating principles, costs, and efficiencies of devices that produce or use electrical energy. [CE9.4](#) Critique impacts of past, current, and possible future methods of small and large scale electrical energy production and distribution in Saskatchewan.

Social Studies [IN9.2](#) Compare the factors that shape worldviews in a society, including time and place, culture, language, religion, gender identity, socio-economic situation, and education. [RW9.1](#) Compare differing perspectives regarding the acquisition and distribution of resources and wealth in the societies studied.

Grade 10 [SCI10-CD1](#) Assess the implications of human actions on the local and global climate and the sustainability of ecosystems.

Environmental Science 20 [ES20-AH1](#) Assess the impact of human activities on indoor and outdoor air quality and the need for regulations and mitigating technologies to minimize risks to human health.

[ES20-HP1](#) Investigate technologies and processes used for mitigating and managing resource use, waste generation and pollution associated with a growing human population.