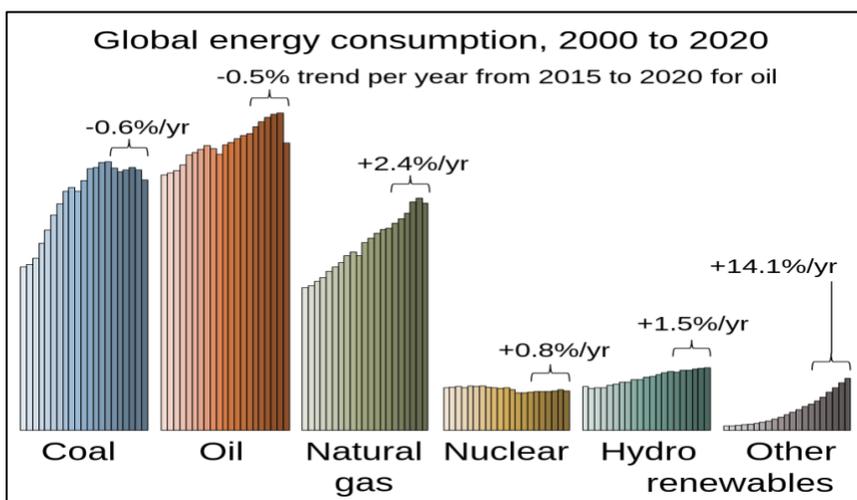


LOCAL ENERGY USE & CLIMATE CHANGE

Context

The majority of greenhouse gas emissions (GHGs) are from fossil fuel energy use. This fact sheet will focus energy use in buildings and embodied energy. Energy used for transportation will be presented in a separate fact sheet. The graph below includes all energy use except that used in agriculture.



Global Emissions from Fossil Fuels

The biggest global increase in CO₂ emissions by sector in 2021 took place in electricity and heat production, which jumped by over 900 Megatons. Emissions per capita is substantially higher in rich countries than the world average.

Canada: In 2020 45% of GHG emissions was from Stationary Combustion Energy Sources, with the largest sources from oil and gas extraction (29%), Public Electricity & heat production (18%), Manufacturing (11%), Commercial & Institutional (10%), and Residential (10.5%).

*Global Proportions of energy ("Other" is solar, wind and biomass)
(from Wikipedia)*

British Columbia: In 2020 the largest emitting energy sectors in B.C. outside of transportation are from the production, processing and use of oil and gas (21%), and manufacturing and heavy industries (including smelting, cement, and chemicals) at 16%.

Gabriola Specific

Energy Use in Buildings

- A greenhouse gas emissions inventory was carried out for Gabriola for 2008 (Island Futures, 2010). At that point the energy used for buildings was from wood stoves, propane, furnace oil and electricity. Greenhouse gas emissions from the latter three sources were:

Electricity: 1279

CO₂e

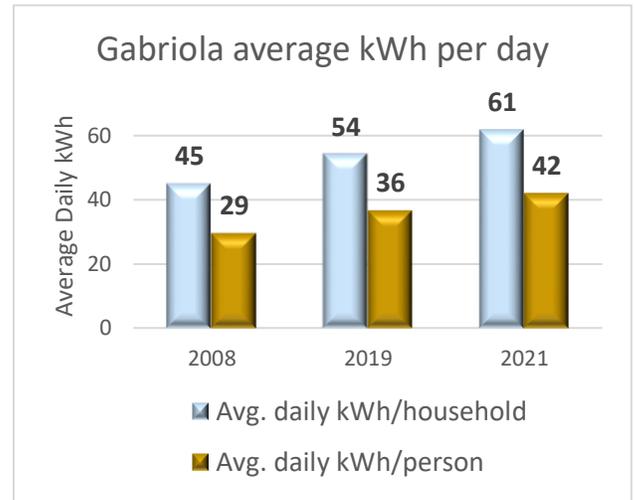
Propane: 1370 CO₂e

Furnace Oil: 258 CO₂e

- Wood heat** creates emissions if the wood is from trees that are alive when they are cut down, whereas heating with dead wood is carbon neutral. However, even if the wood is dead, heating with wood produces particulates which can be harmful to our health.
- Solar and Wind:** Solar has been installed on several community buildings (GIRO, Commons, GAC) and many individual households have installed their own systems. Solar panels on Gabriola can generate 3.5

KWh per 1 KW of installed capacity. Wind generators need height and are ineffective in forested areas. There is no one using wind power on Gabriola on a significant scale.

- **Small Hydro:** A small hydro generator at Hoggan Lake (golf course) can produce up to ~200 MWh/yr.
- **Electrical Use:** Gabriola didn't have electricity until the 1950's. Gabriolans used 43.5 GWh in 2008, 59.1 GWh in 2019, and 68.73 GWh of electricity in 2021 (for daily household use see chart). There was a population increase of approximately 500 from 2008 to 2021. BC's electricity is low in CO₂e (84% hydro), but 9% comes from natural gas.
- **Heat Pumps:** Since 2010 the SG heat pump program has offered wholesale prices to Gabriola residents, resulting in 890 heat pumps installed on Gabriola. The switch to heat pumps from baseboard heaters drops electricity use 2/3; a switch from furnace oil or propane results in substantially less GHG.
- **Other energy uses:** Gabriolans also use energy for cooking, hot water, lights, computers and appliances. Electricity is the primary source for these uses, although propane is also used for cooking and hot water. Gas and diesel are used for generators.



Embodied Energy Use

- Embodied energy is the energy used to produce the products we buy. For example, the global production of clothes and shoes produces GHG emissions equivalent to global marine traffic and international air travel combined.
- Embodied energy attempts to measure the total energy consumed in a product's entire lifecycle. This lifecycle includes raw material extraction, transport, manufacture, assembly, installation, disassembly, deconstruction and/or decomposition.
- Some examples (from Energy Education, University of Calgary):

Item	Embodied energy (MJ/unit)	Kg CO ₂ e (using coal as energy source)
Coffee maker	184	173
Smartphone	1,000	940
Washing machine	3,900	3666
Laptop	4,500	4230
Refrigerator	5,900	5546
Cell tower	100,000	94,000

Emission Factors for 1 Gigajoule of energy produced from various different sources (kg CO₂ equivalent):

Coal: 94	Fuel Oil: 74	Diesel: 74	Gasoline: 71	Propane: 63	Natural gas: 53	BC Electricity: 2.17
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data from the US Energy Information Agency for fossil fuels and Government of Canada for BC Electricity.