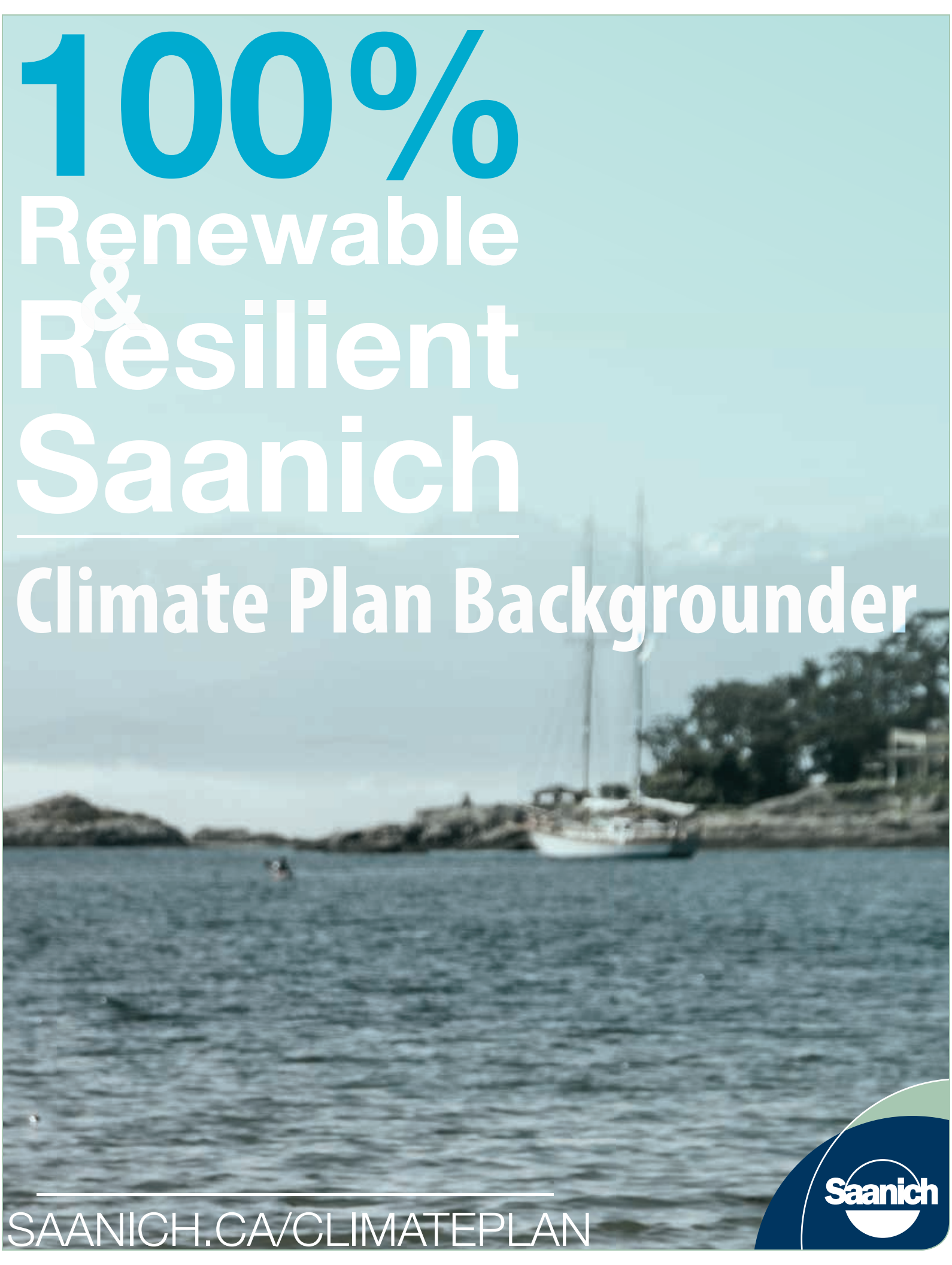
100% Renewable & Resilient Saanich

Climate Plan Backgrounder



SAANICH.CA/CLIMATEPLAN

GET INVOLVED!

We'd like to hear from you! Visit SAANICH.CA/CLIMATEPLAN to sign up for emails, learn about past projects and find ways to get involved in developing the updated Climate Plan.

CONTACT US AT SUSTAINABILITY@SAANICH.CA

OVERVIEW

SAANICH IS DEVELOPING AN UPDATED CLIMATE PLAN TO:

- BECOME A 100% RENEWABLE ENERGY COMMUNITY
- REDUCE OUR GREENHOUSE GAS EMISSIONS BY 80% OF 2007 LEVELS
- PREPARE FOR A CHANGING CLIMATE

THE PLAN WILL BE DEVELOPED IN SIX PHASES:

WHAT IS THIS BACKGROUNDER?

This document provides general background information about climate change and an overview of the project to update our climate plan. It is split into 8 chapters:

1. Overview
2. Climate Projections & Sea Level Rise
3. Renewable Energy
4. Transportation
5. Buildings
6. Consumption & Waste
7. Food & Agriculture
8. Leading by Example

WHY ACT ON CLIMATE CHANGE?

1

IMPROVE QUALITY OF LIFE

Acting on climate change provides us with opportunities to save money, create a diverse economy and lasting jobs, improve air quality, and protect our natural environment.

2

GLOBAL CONSENSUS

195 countries, including Canada, have committed to reducing GHG emissions enough to keep global temperature rise below 2°C. Local communities have an important part to play in meeting these goals.

3

AVOID GRAVE RISKS

Failure to act will drive rising global temperatures, more extreme storms, rising sea levels, droughts, and other impacts that will have devastating outcomes on our health, environment, economy, and future generations.

WHAT WILL THE PLAN INCLUDE?

The Plan will apply to both the District of Saanich's own Corporate operations and the wider Saanich Community and will embed the principles of Environmental Integrity, Social Well-being and Economic Vibrancy. It will include actions under both our control and influence:

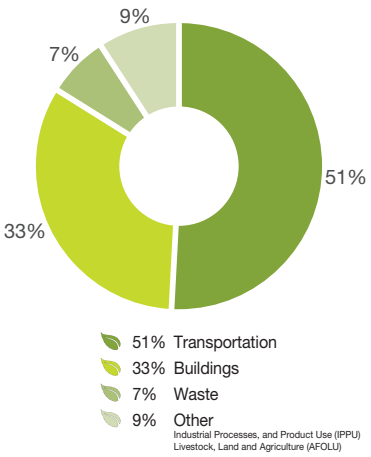
Control	**Direct** – e.g. leading by example through our municipal infrastructure and operations, policy and regulations, etc.
	Indirect – e.g. through land use and transportation planning and policy, building standards, waste diversion and participation on regional decision making boards, etc.
Influence	**Direct** – e.g. policies, programs, incentives and partnerships with stakeholders, institutions, agencies and other levels of government, etc.
	Indirect – e.g. through advocacy, information sharing, municipally supported education programs, etc.

WHAT WILL WE MEASURE?

We measure our climate impact by calculating the greenhouse gases (GHG) we emit as a community within our municipal boundaries – our **Territorial GHG Emissions Inventory**. We measure GHGs in tonnes of carbon equivalent, or tCO2e. The majority of our emissions are from transportation, followed by buildings and then a smaller proportion from waste. However, there are also climate impacts from the products we consume, like our food and clothing, which may have been produced and processed outside of Saanich and imported for our use. This is called our **Consumption Based GHG Emissions Inventory** – and it measures the GHG emissions from all of the goods and services that the Saanich Community consumes, regardless of where those goods and services are produced.

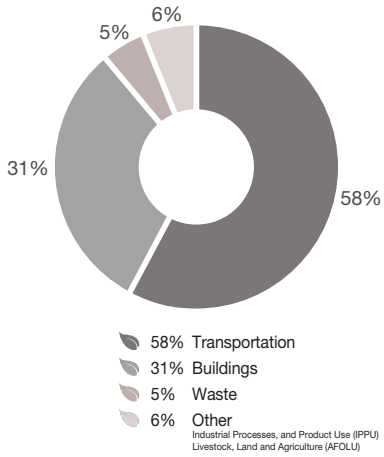
2007 Baseline Territorial GHG Inventory

= 495,384 tonnes carbon
= 4.4 tonnes carbon/person



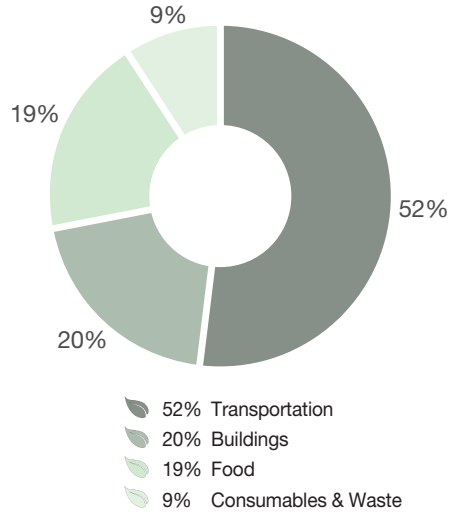
2017 Territorial GHG Inventory

= 512,901 tonnes carbon
= 4.5 tonnes carbon/person



2015 Consumption Based GHG Inventory

= 881,000 tonnes carbon
= 7.7 tonnes carbon/person



While the updated Climate Plan targets apply to territorial emissions, the plan will also address our Consumption Based emissions.

THE ENERGY HIERARCHY

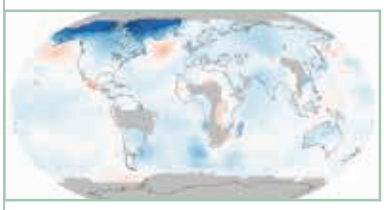
The plan will focus heavily on reducing our energy use before we consider renewable energy supply.

CLIMATE PROJECTIONS & SEA LEVEL RISE

CLIMATE CHANGES ARE HERE – AND WILL CONTINUE

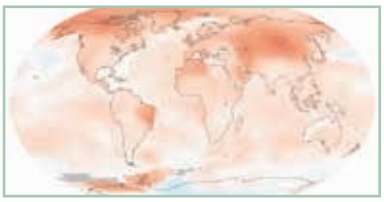
Weather and climate are two different things: weather is what we experience in the moment, while climate describes the broader trends that make certain weather experiences more or less likely.

Globally our climate is warming and changes of this magnitude are now disrupting global air and water circulation systems such as currents and jet streams. This leads to a much wider variation in temperature extremes and weather patterns year to year.

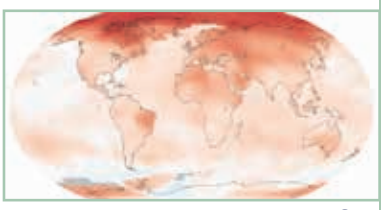


1885-1894

1965-1974



1995-2004



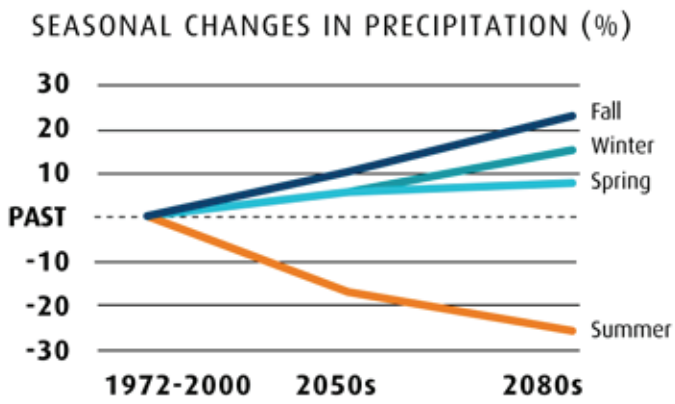
2005-2016 NASA

Locally temperatures are also warming and are projected to increase by 3°C by the 2050s. As a comparison, today's temperatures are only 4-7°C warmer than average temperatures during the ice ages. But the rates of warming over the coming century are predicted to be 20 times faster. (NASA)

As our local climate warms, we will face hotter and drier summers, increased numbers and intensity of winter storms and sea level rise.

For details see Capital Regional District, 2017, "Climate Projections for the Capital Regional District", at crd.bc.ca/data

Selected Climate Projections for the Capital Region



Source: Climate Projections for the Capital Region (2017, CRD)

WHAT ARE THE RISKS?

Human Health

- Hot summers increase the risk of heat exposure (particularly for the elderly and young), can increase the spread of vector borne disease, and can increase the risk of forest fires, which inflame respiratory illnesses.
- Increased storm activity can pose a danger from falling hazards, flooding, power failures, and a greater need for emergency shelter during extreme temperature or storm events.

Hurricane Ike flooding in Chicago
Kate Skegg CC BY-NC-SA 2.0

Infrastructure

- Increased rainfall and storms can increase erosion and slope instability, impact travel, overwhelm the sanitary sewer and storm water systems, compromise septic fields, and increase runoff and flooding in low-lying areas causing property damage.
- Droughts combined with hot summer temperatures and increased wildfires will likely result in increased demand for water when supply is lowest.

Ecosystems and Species

- Climate change can increase invasive species and pathogens, harm native aquatic species such as salmon and trout and disrupt local ecosystems and vulnerable species including cedar and arbutus trees.

Jeremy Levere

Buildings

- Buildings will need to withstand higher and more frequent winds, flooding, higher temperatures, heavier snow loads, and rising sea levels in coastal areas.
- They will need to be designed for natural cooling and ventilation and constructed at levels to address potential flooding due to sea level rise.

Food and Agriculture

- Longer growing season and reduced greenhouse heating costs could bring economic benefit to farmers, but it comes with added challenges of winter flooding, summer drought, heat stress, invasive species, and increased pests and diseases.

Sea Level Rise

- Sea levels are projected to rise a metre or more by the end of the century.
- Buildings, infrastructure, parks and other shoreline land uses will experience more intense coastal flooding events more often.
- Some areas will see permanent inundation.

WHAT CAN RESIDENTS & BUSINESSES DO?


Heat pump. Photo from City Green

Conserve water

- Install high-efficiency water fixtures and appliances.
- Plant drought-tolerant, native species.
- Harvest rainwater.
- Reclaim greywater.

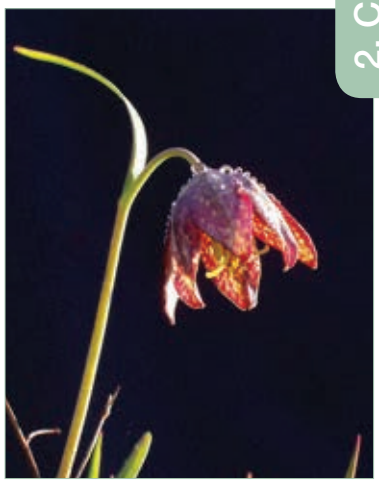

Rain gardens on Cook Street

DID YOU KNOW?

Uptown Centre saves water by harvesting rainwater on the roof to use in a high-efficiency irrigation system. “We’re also looking into planting more drought-tolerant native species so we can save even more water,” says Brian McCandless, Uptown’s Operations Manager.

Consider Building Upgrades

- Improve insulation, windows, and air sealing to keep heat out in summer and keep cozy in the winter.
- Consider installing a heat pump for efficient cooling (air conditioning) in the summer and affordable heating in the winter.
- Visit saanich.ca/rebates



Prepare for Extreme Weather Events

- Get to know your neighbours.
- Make an emergency plan.
- Keep an emergency kit.
- Visit saanich.ca and search for “Emergency Program” to learn more.

Create cool, absorbent landscapes

- Plant trees to keep buildings cool in summer and to slow water flow into storm sewers in winter.
- Install and maintain permeable rather than paved surfaces.
- Consider a green roof, bioswale rain garden, or other green stormwater measures. For more information, visit saanich.ca and search for “Stormwater Management”.


Uptown

WHAT CAN SAANICH DO TO PREPARE?

We must incorporate future climate projections and sea level rise into our decision making, including how we design our buildings and infrastructure, and how we value our ecosystem services and the role they play in helping us to adapt to climate change.

Most decisions are still based on historic weather data and do not consider that the buildings and infrastructure we build today will still exist in 50 years' time in an extremely different climate to what we have seen in the past.

Communities and individuals may be impacted differently depending on many factors, including age, ability, gender, and socioeconomic status. Risk analysis and adaptation actions will need to include an equity lens.

RISING WATERS

Current guidance from the province is to plan for 1 metre of sea level rise by 2100 and 2 metres by 2200. These figures are conservative and likely to be reviewed given emerging science and latest information on the melting ice caps.

What could happen at 1 metre sea level rise?

In the Capital Region, especially during a high tide plus storm surge scenario, we could see permanent inundation and temporary flooding in:

- Gyro Park and neighbouring blocks
- Parts of the Saanich Gorge neighbourhood
- Victoria Inner Harbour marina
- Water and stormwater infrastructure
- And many other areas.

See crd.bc.ca/data for more information.

DID YOU KNOW?

Cooling Degree Days is a measure used to estimate the use of air conditioning to cool buildings – it refers to the number of degrees that a day's average temperature is over 18°C. Historically, there has been little need for air conditioning in our region but it is projected that there will be a 520% increase in cooling degree days by the 2050s and a 1190% increase by the 2080s, meaning a considerable increase in the demand for air conditioning in the future.

Source: Climate Projections for the Capital Region (2017, CRD)

RENEWABLE ENERGY

100% RENEWABLE SAANICH

The District of Saanich has committed to becoming a 100% Renewable Energy Community by 2050 as part of the larger climate targets.

Replacing fossil fuels with renewable energy sources will allow our community to save money on carbon taxes, improve air quality and health, develop new economic opportunities and jobs and help avoid the worst impacts of climate change. Combined with efficiency improvements and compact, complete community design, a renewable energy transition can promote affordability and a high quality of life in our community.

RENEWABLE ENERGY CAN INCLUDE:

Hydro Electricity
Solar
Wind
Geothermal
Bioenergy
Wave & Tidal Power

WHAT IS RENEWABLE ENERGY?

Renewable energy is energy derived from natural processes (e.g. sunlight and wind) that are replenished at a faster rate than they are consumed.

DID YOU KNOW?

Use of solar technologies in Saanich has seen a steady increase, with Claremont Secondary School being one of the first adopters! Saanich is ideally suited for solar energy generation, with more sunlight hours per year than Germany – a world leader in solar!

RENEWABLE ENERGY IS ALREADY POWERING SAANICH

A mix of renewable and non-renewable energy sources are used to power Saanich buildings and vehicles today.

Energy can be sourced through centralized systems (such as our utilities) or through on-site or community-based generation.

Solar thermal system at Gordon Head Recreation Centre

GRID RENEWABLE ENERGY GENERATION

Electricity purchased from BC Hydro is currently 98% renewable It uses hydroelectric generation which harnesses the power of moving or falling water to produce mechanical/electrical energy. This consistent supply of renewable power is complimentary with intermittent forms of renewables such as wind and solar energy. This means that Saanich residents who use electricity for all of their home's energy needs, including space and water heating, are already living in a 98% renewable home!

FortisBC customers can choose to purchase Renewable Natural Gas. This is natural gas that is produced from decomposing organic waste from landfills, agricultural waste and wastewater from treatment facilities. Learn more at fortisbc.com/NaturalGas/RenewableNaturalGas

Hartland Landfill

DID YOU KNOW?

Since 1996, Hartland landfill has been capturing landfill gas and transforming it into enough electricity to power about 1,100 homes every year.

Lake Cowichan Secondary School

DID YOU KNOW?

In 2014 Lake Cowichan Secondary School installed a 150 kW biomass boiler to supply space and water heating for the school. The boiler fuel is sourced from waste wood from a nearby mill. "The biomass boiler has cut GHG emissions by an average of 140 tonnes per year, which is a 77% reduction in GHG emissions, and is saving the school district up to $35,000 per year in heating bills compared to the previous oil boiler," says Brian Branting, Manager of Facilities with Cowichan Valley School District.

DID YOU KNOW?

The T'Sou-ke First Nation's solar project meets the community's needs for energy and more, contributing solar energy provides on-the-job training opportunities, and generates money for the Nation through BC Hydro's net metering program. "The T'Sou-ke Nation works to be autonomous in energy and self-sufficient in food production and economic development. That is rooted in Indigenous values and traditions," says Andrew Moore, Projects Manager with the T'Sou-ke First Nation. "The T'Sou-ke Nation's projects demonstrate the way back to sustainability once more."

T'Sou-ke First Nation

SAANICH ALREADY USES RENEWABLE ENERGY AND OUR GRID ELECTRICITY IS CURRENTLY 98% RENEWABLE

ON-SITE RENEWABLE ENERGY GENERATION

Geothermal energy is the use of heat stored in the Earth to generate electricity, and boost efficiency. A geothermal or ground source heat pump is generally used and reduces operational costs of the central heating and/or cooling system.

Wind energy harnesses the kinetic energy from the wind and converts it into electrical energy through wind turbines. BC has almost 700 MegaWatts of wind energy, supplying nearly 2% of our demand with large onshore wind farms in the Peace Region, Okanagan and Vancouver Island and vast offshore potential. Small scale generation (up to 1 MegaWatt) has been successful in urban settings in Europe.

Wave power is designed to capture the energy found near the surface of the water. The west coast of BC has some of the best wave energy potential in the world with two projects on the west coast of Vancouver Island. Wave energy is highly forecastable. Since it collects wind energy over large areas, it is relatively persistent, also being most intense in winter months when energy needs are highest.

Tidal power is the energy generated from power found in ocean tidal currents and the use of tidal height differences. These two tidal energy sources are referred to as tidal stream and tidal barrage or lagoon and due to the nature of tidal energy, it is highly predictable and forecastable. BC got an early lead in tidal stream development with the Race Rocks Tidal Project in 2006.

Biomass energy is the creation of heat and/or power from biofuel such as wood, agricultural crops, aquatic plants and animal wastes. Biomass technologies are generally considered to be renewable and carbon neutral due to the short processing cycle combined with replanting.

Solar thermal captures the sun's energy as heat, typically for domestic water heating. Currently, at least 39 Saanich households are using solar thermal systems.

Solar photovoltaic (PV) transforms the sun's energy into electricity for local use or selling to the grid. Currently, 55 Saanich residents and six businesses are producing solar electricity and are "net metering" customers with BC Hydro. Learn more at bchydro.com/netmetering

"Negawatt": while not technically a source of energy, a negawatt is energy saved through conservation or an efficiency improvement. Negawatts can power new energy needs without having to generate new energy. Over 4000 Saanich residents in the past 10 years have participated in energy saving programs in their homes, reducing utility bills and improving home comfort and longevity.

Are there other on-site energy generation systems in Saanich we've missed?
Let us know by emailing sustainability@saanich.ca.

RENEWABLE ENERGY AROUND THE WORLD

Saanich is part of a worldwide transition to renewable energy and climate resilience.

- Hundreds of communities around the world have committed to becoming 100% renewable. In Canada, Saanich joins Victoria, Vancouver, Nelson, Slocan, and Oxford County.
- Britain, France, China, India, and Norway are phasing out the sale of fossil-fuelled vehicles in favour of cleaner-energy vehicles.
- China is on track to meet its 2020 climate targets, while the EU met its 2020 carbon reduction target six years early.
- Businesses around the world are investing millions in renewable energy:
    - Apple's data centres
    - Google's global operations
    - Nike's North American operations

*...**are all powered by 100% renewable energy.***

TRANSPORTATION

TRANSPORTATION - OUR BIGGEST EMITTER

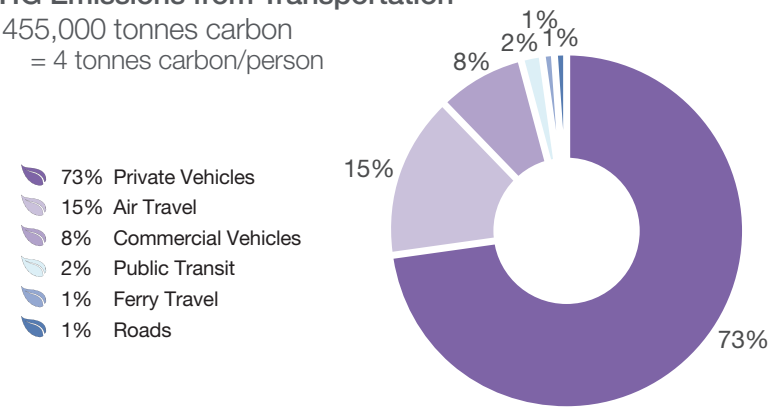
Transportation is the greatest source of GHG emissions in Saanich, responsible for 52% of our total climate impact from our Consumption Based Emissions Inventory. Action to reduce GHG emissions from transportation is critical if we are to become a 100% renewable energy community and reach our 80% GHG emission reduction targets by 2050.

Actions that decrease our transportation GHG emissions not only reduce our climate impact, they also improve our health and equity, minimize noise and air pollution and improve our experience of moving through our community.

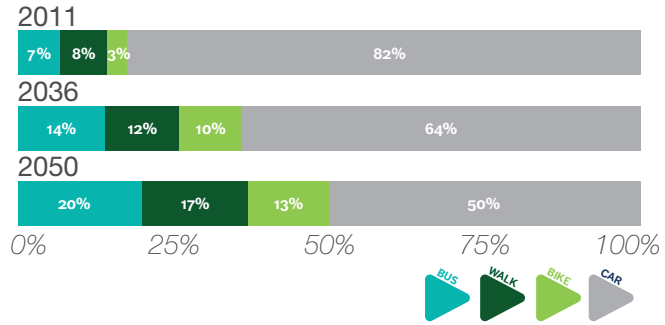
The majority of transportation GHG emissions come from the use of private vehicles with significant contribution also from air travel.

GHG Emissions from Transportation

= 455,000 tonnes carbon
= 4 tonnes carbon/person



Mode Share Targets in Saanich



TRAVELLING THROUGH COMPACT, FRIENDLY, SAFE NEIGHBOURHOODS

Getting from place to place needs to be convenient and affordable and if we are to meet our targets, travel needs to be low-carbon as well. Imagine a future where kids have safe routes to school for walking or biking, or where it's easy and accessible for seniors without cars to get to appointments independently. Will multi-modal solutions such as park-and-rides, bike-and-bus or walking to work with access to a carshare vehicle be better options for some of our future trips? Will emerging technologies such as self-driving shared cars and electric cargo bikes change the way we get around?

Focusing new and more dense development in Saanich "centres" and "villages" helps in the creation of complete and livable communities. Keeping the built environment more compact and avoiding building out into rural and environmentally significant lands reduces the need for and cost of further extending public infrastructure. It supports a mix of different land uses such as housing, businesses, amenities, and parks in a walkable environment, where the cycling network and frequent transit services are more viable.

By building complete, compact and livable communities, we can protect green space, save on infrastructure costs and make it easier for people of all ages and abilities to get around sustainably.


Protected bike lane

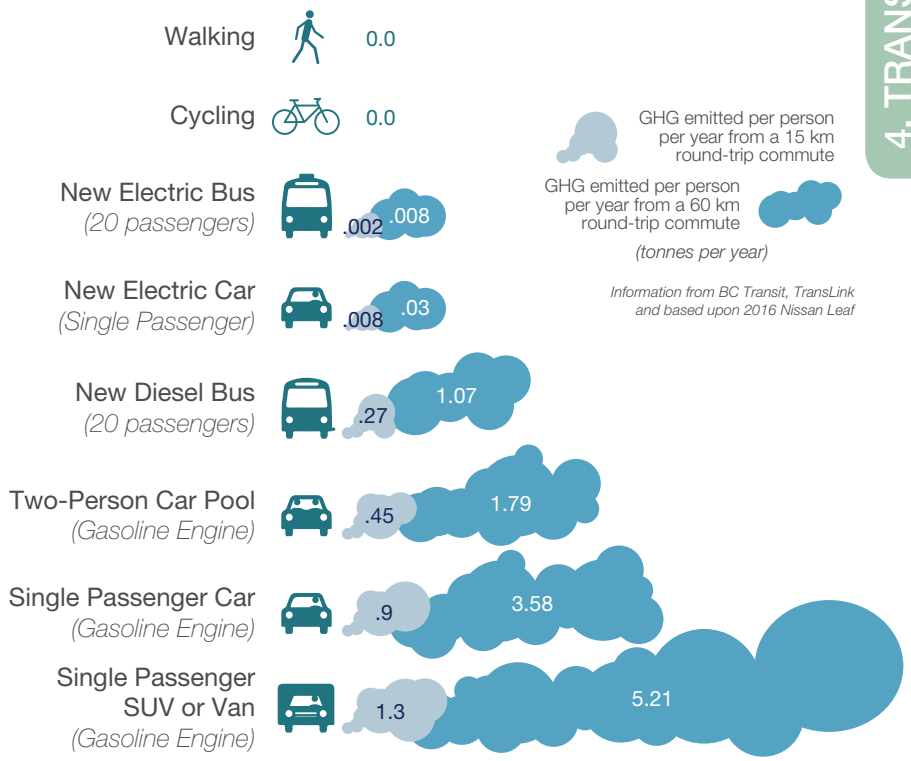
DID YOU KNOW?

Walking and cycling are good for your health because they reduce your risk of heart disease and some cancers, improve your mental health and coordination, as well as many other benefits. Cycling to work is associated with a 45% lower risk of cancer and 46% lower risk of heart disease compared to commuting by car or bus.

GET ACTIVE TO GET THERE

Active transportation choices like walking and biking not only reduce our GHG emissions, they also save us money, help us stay fit and healthy, and allow us to more easily interact with friends, neighbours, and local businesses along the way.

Saanich is improving the active transportation experience in the community by developing more sidewalks and cycling facilities for all ages and abilities as well as improving accessibility for those with mobility challenges. Read the Active Transportation Plan, "Moving Saanich Forward" to learn more: saanich.ca/movingsaanichfwd



TAKE THE BUS!

Public transit can move more people using less space and resources than if everyone uses their own car, and is essential for moving people efficiently in urban areas.

You can plan your trip, check the time of your next bus, receive alerts and chat to fellow passengers via apps such as the Transit App (transitapp.com.) Skip the stress of the commute and instead, sit back, relax, read a book or catch up on the news while transit drives you there. Better still, by-pass the congestion via life in the bus lane!

DID YOU KNOW?

BC Transit is introducing Smart Bus technology, including real-time information starting in 2018. This technology makes transit more convenient by being able to track when the next bus is coming and hear announcements or view information displays to inform you of upcoming stops. It will also help BC Transit better direct buses for schedule reliability and manage on-road accidents and detours.

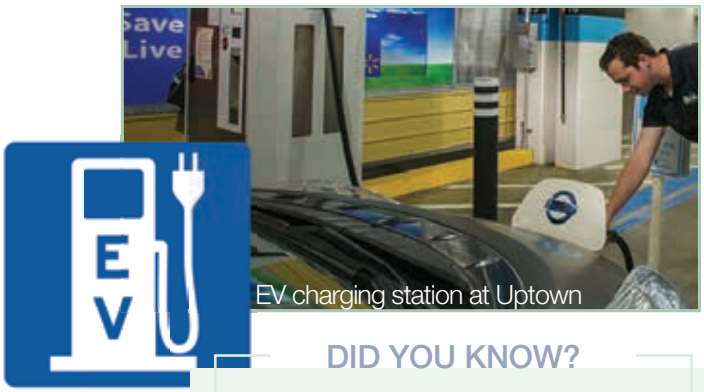
GOING THE DISTANCE

What if instead of travelling around the neighbourhood, you want to travel across the province or around the world? There are many ways to keep your carbon footprint low when travelling, including choosing to vacation closer to home, using web conferencing tools instead of in-person meetings and choosing the lowest carbon way to get where you need to go.

DID YOU KNOW?

In early 2018, the City of Surrey opened North America's first bio-fuel facility, converting curbside organic waste from homes into renewable natural gas, which powers the city's fleet of waste collection trucks. Excess fuel will be transferred to the new district energy system that heats and cools Surrey City Centre. The facility also produces a high-end compost used in local agriculture and landscaping.

City of Surrey



EV charging station at Uptown

DID YOU KNOW?

There are rebates available for both vehicles and charging stations in BC. There is up to $11,000 in rebates available for a full-electric, plug-in hybrid electric or hydrogen fuel cell vehicle and up to $4,000 for a Level 2 charging station. There are also incentives for businesses and fleets.

Visit pluginbc.ca to see what you could be driving!

ELECTRIC VEHICLES AND OTHER RENEWABLE OPTIONS

For individuals - Electric vehicles (EVs) are quiet and inexpensive to operate compared to internal combustion engine vehicles, and can be powered by low-carbon, renewable energy. Thanks to superior fuel efficiency and low maintenance, they also cost less over their lifetimes. Some models today can go over 400km on a single charge. And charging is easy: just plug it in at home, work or any of the increasing charging stations in the region, which you can find at plugshare.com.

For public transit, commercial fleets and freight - In January 2018, BC Transit started piloting electric buses in the region and is exploring a commitment to 100% electric vehicles by 2030. Many private enterprises in BC including tour bus companies and delivery fleets are also going electric.

- BC ferries has committed to hybrid electric – diesel for some vessel replacements due in 2020 and the first fully electric ferry is now being operated in Norway, showing that all types of vehicles can be powered by renewable energy.
- Vehicles can also be powered by other renewable fuels including hydrogen fuel cells (with hydrogen produced from renewable energy), reusable diesel, biogas and Renewable Natural Gas (RNG). FortisBC are actively exploring sources for renewable natural gas on Vancouver Island and a hydrogen fuelling station is coming to the region in 2018/2019.

BC Transit

BUILDINGS

THE IMPACT OF OUR BUILDINGS

Buildings, including homes and businesses, in Saanich are responsible for 20% of our overall greenhouse gas (GHG) emissions (from our 2015 Consumption Based Emissions Inventory). Reducing GHGs from buildings is an important part of becoming a 100% Renewable Energy community and reaching our 80% GHG emission reduction targets by 2050. Improving the energy performance of our buildings also brings opportunity to save costs, improve indoor health and comfort and make our buildings sites of renewable energy production, not just consumption.

The majority of our building GHG emissions come from homes - mainly from their operation rather than the energy used to build them (embodied energy).

The key to reducing these emissions is to build or renovate our homes to high energy efficiency standards and build them to last in a changing climate. Over 330 new buildings are developed in Saanich each year. While this is a small proportion of the existing building stock, most of these buildings will still exist and be contributing to our community wide GHG Inventory in 2050.

BUILDING RIGHT

When shopping for a new car, you can easily compare fuel efficiencies. If you're buying a new home, how do you know how big your energy bills will be or how comfortable you will be living there?

Only a small portion of buildings in Saanich have been built to a certified sustainable standard (such as Passive House) with an energy label that helps us understand its performance. New building code legislation (for BC, the BC Energy Step Code) is moving towards Net Zero Energy ready buildings by 2032 and supports the introduction of building energy labeling to better inform buyers and renters.

Oil to Heat Pump
INCENTIVE PROGRAM

DID YOU KNOW?

Between 2015 and 2017, over 120 homes in Saanich have upgraded from oil heating to an air source heat pump. Each of them shrunk their GHGs from heating by over 90%, which is a similar savings to taking the family car off the road!

DID YOU KNOW?

Greater Victoria Housing Society (GVHS) is developing a 64-unit affordable rental housing project in Saanich for seniors, people with disabilities and families. The houses will be designed using Passive House standards, which can reduce energy use by approximately 70% compared to typical new construction. "Tenants will be more comfortable, it will be more affordable for them, and will be overall better for the environment," said James Munro, Greater Victoria Housing Society.

Greater Victoria Housing Society

RENOVATING FOR ENERGY EFFICIENCY AND RENEWABLES

Do you know how much GHG emissions your home causes? If your home uses electricity for space and water heating, you are already 98% renewable! If you are using oil or natural gas, and your home hasn't been upgraded for energy efficiency, your home may be emitting more GHGs than a typical car every year.

Start with an EnerGuide evaluation which helps you decide which upgrades work best for your home, how to prioritize them and which will save you most on utility bills.

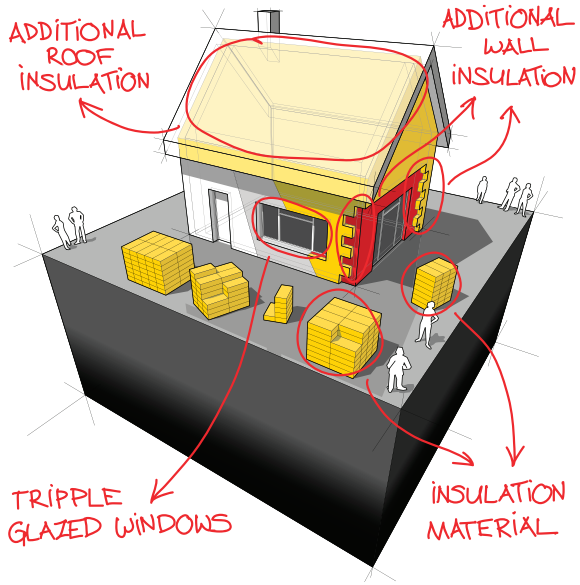
Air sealing or draft proofing sounds simple, but cutting the amount of air that leaks in and out of your home or building is a simple and cost effective way to cut heating and cooling costs. An EnerGuide evaluation can highlight the air leakage rate and uses infrared photography to show areas of the building that need sealing. Ideas for improvement could include caulking windows, weather stripping doors, installing foam gaskets behind outlets and sealing air leaks where plumbing, ducting or electrical wiring comes through the walls, floors and ceilings.

Installing insulation in the roof, attic and particularly in the walls and foundation is one of the most important upgrades for reducing energy use and improving home comfort in all seasons.

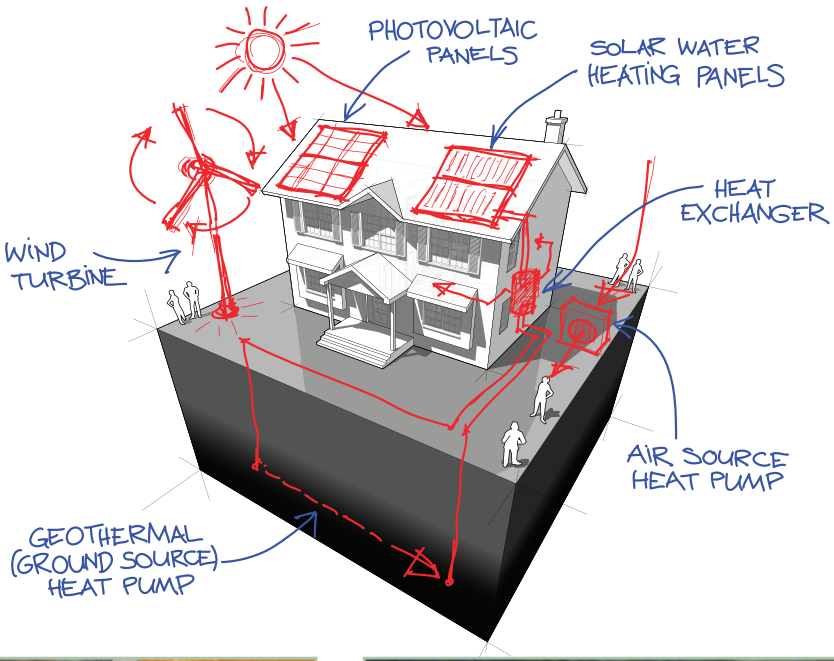
Replacing doors and windows with higher energy efficiency models or installing storm windows can help reduce energy use, improve comfort and increase sound proofing.

Are there other on-site energy generation systems in Saanich we've missed? Let us know by emailing sustainability@saanich.ca

Reduce energy use by improving efficiency, especially the building envelope.



Upgrade mechanical systems to use and/or produce renewable energy.



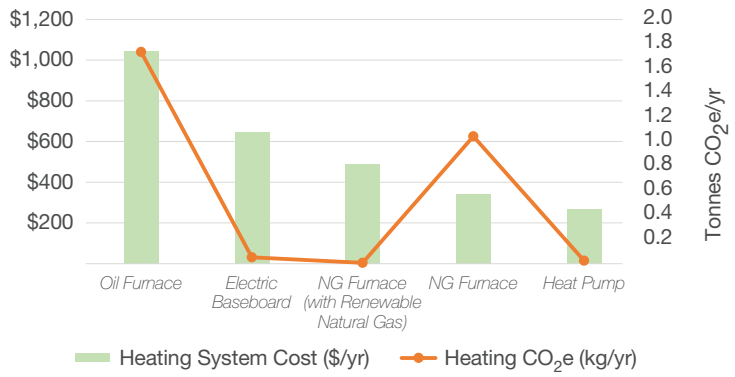
BUILDING ENVELOPE IMPROVEMENTS

FUEL AND HEATING SYSTEM CHOICE

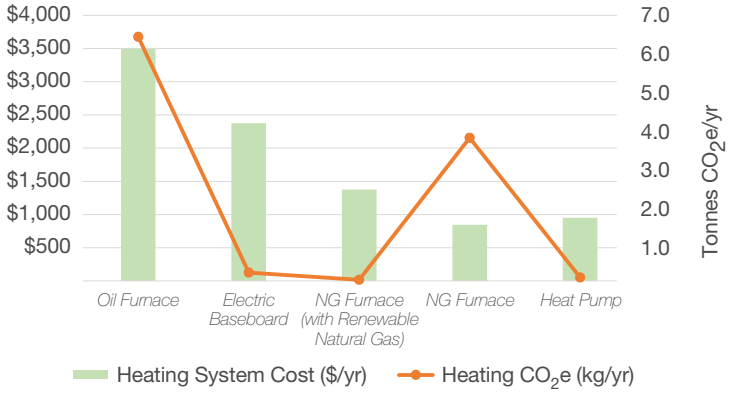
Comparing typical home heating fuels, oil emits the most greenhouse gasses, followed by natural gas and then electricity. (Electricity from BC Hydro is currently 98% renewable.) Renewable natural gas – methane captured from non-fossil fuel sources such as manure and landfill gas – has recently become available, paid at a premium. Electric heat pumps use electricity more efficiently than baseboards, and are a low-cost way to heat and cool your home with low-carbon, renewable energy.

As shown in the graphs below, having an efficient building envelope (insulation, windows and doors, and air sealing) reduces your heating costs and GHG emissions no matter what fuel type you use. But your fuel and heating system choice also make a big difference. Producing your own renewable energy on site (e.g. with solar thermal or photovoltaics) can help to minimize our environmental impact and save on utility bills.

Heating in Upgraded Home



Heating in Non-Upgraded Home



REBATES

Rebates are available for building energy retrofits ranging from insulation and air-sealing to energy evaluations, heat pumps and new windows. Visit efficiencybc.ca or call 844-881-9790 for the latest information.

efficiencyBC

DID YOU KNOW?

Energy Conservation Assistance Program provides income qualified renters or home owners a FREE home energy evaluation, energy saving products and advice through BC Hydro and FortisBC!

Rental Apartment Efficiency Program provides rental apartment building owners and property managers who are FortisBC customers with a FREE energy assessment and installation of energy efficiency measures.

DID YOU KNOW?

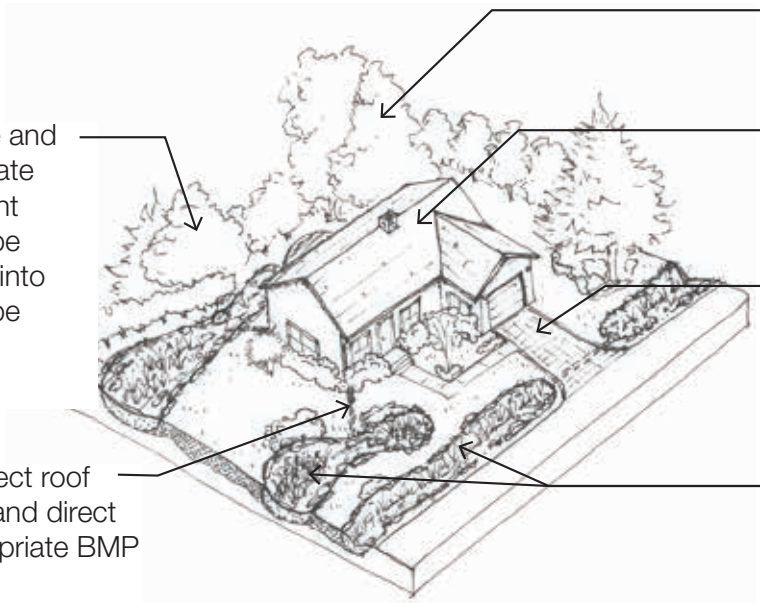
"We would never go back to a gas car," said Silke Sommerfeld. She and her husband Rolf Oetter are Saanich residents who drive electric cars that are powered by solar panels on their roof. "With our annual solar production we can drive our electric cars 50,000km every year," explains Rolf. "No oil changes or tune-ups are needed. We're not just doing it as an investment – we are doing it to do our part in saving the planet for future generations."

BUILDINGS CAN BE RESILIENT TO A CHANGING CLIMATE

It is important that buildings and infrastructure are not only designed or upgraded to minimize energy use, but also to address current risks and future climate changes.

- Consideration of building location and construction levels relative to future **sea level rise and flood risk;**
- Building orientation and passive design to limit solar gain and address **increased summer temperatures;**
- Drought tolerant, native species landscaping, to support sustainable drainage and provide shade and cooling to address **increased summer temperatures;**
- Water efficient fixtures, rainwater harvesting and grey water recycling to minimize potable water demand and address **summer droughts;**
- Integration of green roofs and sustainable drainage features such as bioswales to mitigate increased precipitation and **chances of flooding;**
- Designing for increased load demand from snow damage from **increased winter storms;**
- On-site renewable energy generation and storage to address extreme weather events and potential increased **power outage events;**
- Designing for deconstruction and redesign to maximize the lifetime of the building, allowing it to **adapt to future uses.**

Examples of Low Impact Development techniques incorporated into a single family house.



CONSUMPTION & WASTE

WHAT WE BUY AND THROW AWAY MATTERS

The majority of the GHG emissions from our consumption are from textiles (mainly clothing), followed by plastics and then paper.

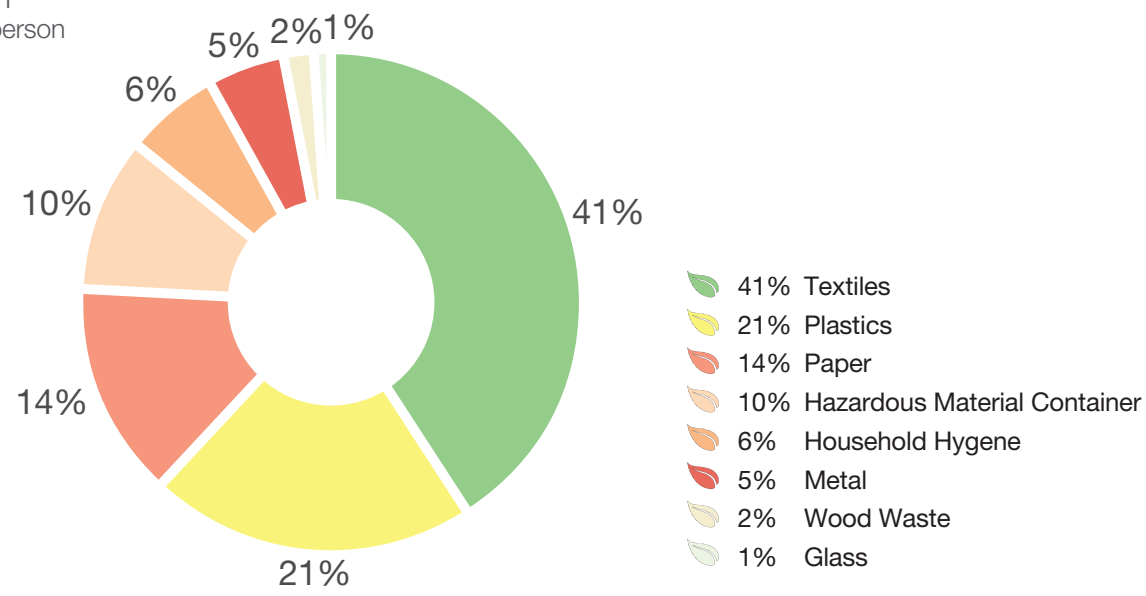
Saanich residents make choices about consumer goods and waste every day. The materials in the products we buy, their packaging, and how we dispose of them when they're no longer of use to us all have implications for our GHG emissions.

GHG emissions from products we buy are not currently counted in Saanich's territorial GHG inventory or our 2050 targets unless the products are made in Saanich. However, if we use a Consumption-Based GHG Emissions Inventory, which considers the emissions that result from the production, transport, and disposal of goods consumed in Saanich regardless of where they are made, our community emissions double, and consumables and waste account for 9% of our GHG emissions.

2015 Consumption Based GHG Emissions from Consumables and Waste in Saanich

= 55,000 tonnes carbon

= .5 tonnes carbon/person



WHAT CAN WE DO?

There are many ways Saanich residents and businesses can shrink their consumption-based GHG impact, including:

- Rent, borrow, or share rather than buy your own (e.g. car sharing, the library, tool libraries, etc.)
- Repair rather than buy new
- Reduce throw-away packaging by bringing your own containers and bags
- When you need to buy, consider the lifecycle of the product, and when it makes sense look for:
  - well-made, long lasting products
  - minimal packaging
  - recycled content and ease of recycling/composting the product
  - third-party certification for eco-friendliness
  - energy efficient and renewable energy design
- Take part in the second-hand economy. Many online tools and local businesses and non-profits make it easy, or you could host your own clothing swap!
- If a product is not useful for someone else when you're done with it, recycle or compost it. Check out myrecylopedia.ca for tips about how to recycle just about everything and how to reduce and reuse, too!

REPAIR CAFÉS

Repair Cafes began in Amsterdam in 2010 and have spread around the world. Run by volunteers, residents can bring items needing fixing and either learn how to fix it or have it done for them – all for a donation! Learn more at repaircafe.org

TOOL LIBRARIES

A tool library works like a book library, except for tools. If you need a special tool for a one-time project, or don't have the space to store all the tools you'd like, you can just borrow from the tool library instead of buying your own. Greater Victoria has a non-profit tool library. Learn more at victoriatoollibrary.org

FOOD & AGRICULTURE

FOOD CHOICES IMPACT CLIMATE

Food is not just a basic human need, but also plays an important role in culture and enjoyment of life. Our food choices can have a big impact on our household's climate impact. Using a consumption based GHG emissions inventory, food represents 19% of our total emissions – this includes all the food purchased by residents and businesses in Saanich, whether it is grown and processed in Saanich or elsewhere in the world.

GHG emissions are generated in every step of the food system:

- **Production**
  - Land use change for crop and pasture land (e.g. deforestation, soil management)
  - Energy used in farm vehicles and buildings (e.g. greenhouses)
  - Production and use of fertilizers, pesticides, and other inputs
  - Animals (methane from manure and from enteric fermentation from cows and other ruminants)
- **Food processing and refrigeration**
- **Transportation**
- **Home and restaurant cooking**
- **Waste**

WHAT CAN YOU DO?

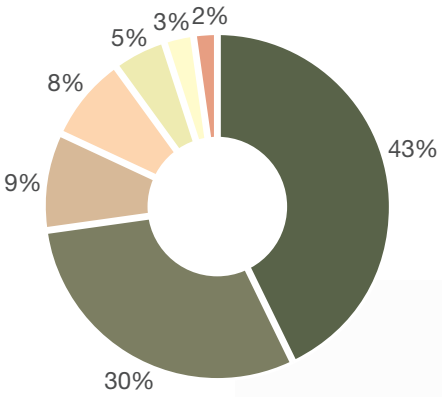
- Choose low carbon foods
- Avoid food waste
- Compost, not landfill
- Support local food and farmers
- Cook with renewable energy (e.g. electricity or renewable natural gas)

CHOOSE LOW CARBON FOOD

In Saanich, the biggest sources of food GHG emissions are fish, meat, and eggs, followed by dairy products. Choosing lower carbon foods can significantly reduce your household's carbon footprint.

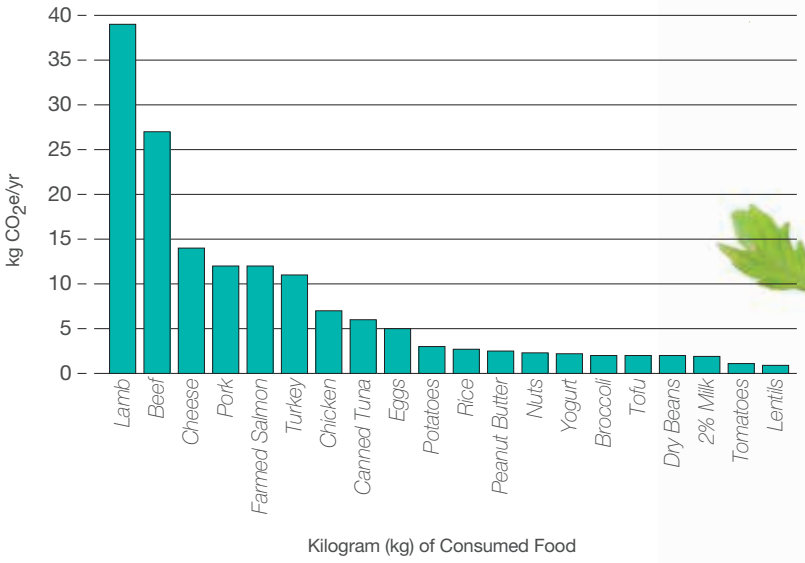
2015 Consumption Based GHG Emissions from Different Food Types in Saanich

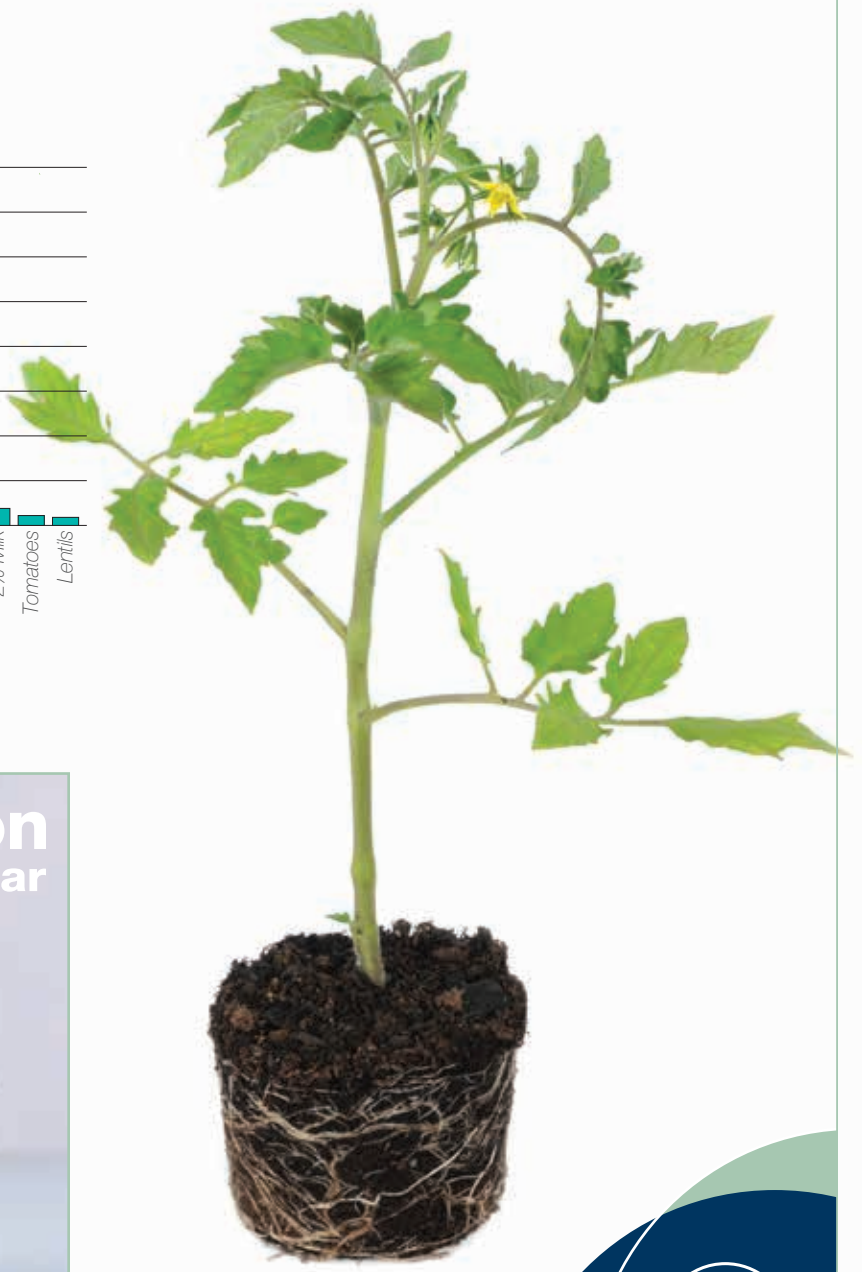
= 171,000 tonnes carbon
= 1.5 tonnes carbon/person



- 43% Fish, Meat, Eggs
- 30% Dairy Products
- 9% Grains
- 8% Fruit and Vegetables
- 5% Stimulants (coffee and tea)
- 3% Oils, Nuts, Legumes
- 2% Beverages

GHG Emissions by Selected Food Types





COMPOST, NOT LANDFILL

Did you know that organics are still the biggest single type of material sent to the Hartland Landfill? If we composted more, we'd have many benefits, including extending the life of the landfill.

In the landfill, organics break down anaerobically (without oxygen), creating methane, which is a powerful greenhouse gas – 28 to 36 times more powerful than carbon dioxide. By composting food waste aerobically (with oxygen), we can avoid the creation of methane and make compost for building healthy soils to grow food again.

21%	Organics
17%	Wood and Wood Products
15%	Paper and Paperboard
14%	Plastics
7%	Construction and Demolition *(non-wood)*
7%	Hazardous Hygene
7%	Tires
6%	Textiles
3%	Other
2%	Electronics
2%	Ferrous Metals
1.5%	Glass
1%	Bulky Objects
1%	Non-ferrous Metals
1%	Hazardous Wastes

SUPPORT LOCAL FOOD AND FARMERS

While the majority of GHG emissions from food are due to the food type, transportation of food for Saanich residents still represents about 7% of food's total GHG emissions. Buying food locally can reduce the GHGs from transportation, and also supports local farmers and provides great tasting, fresh food. Saanich is home to many food producing farms as well as community gardens, community kitchens, a farmers market, and backyard chickens. To learn more about supporting local food production and food security in Saanich, visit saanich.ca/food

SHRINK FOOD WASTE

On average 390 kg of food per year are wasted per Canadian each year. That represents $30 billion dollars wasted and 21 million tonnes of GHG emissions every year from food waste in Canada. Avoid food waste by planning your food shop, storing food properly to keep it fresh, and using it up on time.

DID YOU KNOW?

Launched in 2014, Saanich's Greener Garbage composting program provides food scrap and yard waste pickup for single family homes. The program has diverted over 50% of Saanich's residential waste from landfills. The organics are composted aerobically here on Vancouver Island, producing Grade A compost and reducing our GHGs by over 3,600 tonnes a year.

LEADING BY EXAMPLE

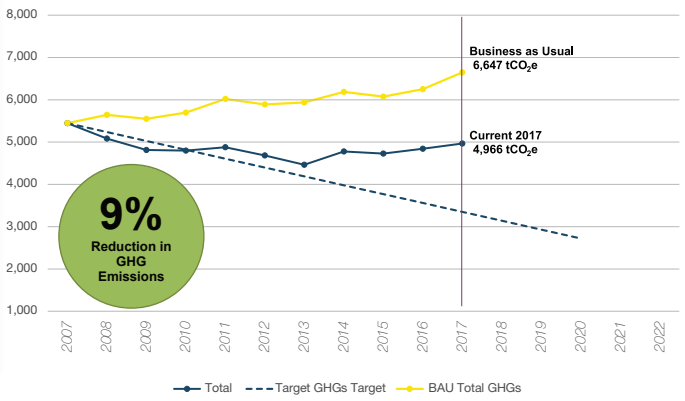
SAANICH'S OPERATIONS EMIT GHG'S

The District of Saanich provides an extensive range of services, infrastructure and key facilities for residents, including everything from greener garbage collection to the provision of recreation programs; from the maintenance of sewer and stormwater drains to front line emergency police and fire services; and from the installation of bike lanes and traffic signals to the conservation of natural areas and management of our valuable parks.

Providing these services requires energy use, primarily in buildings and transportation. These are called corporate GHG emissions.

Saanich has four recreational centres, a golf course, three fire halls, a municipal complex and a public works site, and a fleet of 264 vehicles, including 20 garbage trucks and 4 fire engines.

Saanich GHG Inventory for Municipal Operations 2007-2017



PROGRESS MUST ACCELERATE

Saanich first measured our corporate (GHG) emissions in 2007. We emitted 5,446 tonnes of carbon dioxide equivalent (tCO_2e) per year. A target was established as part of the 2010 Climate Action Plan to reduce our emissions by 50% by 2020.

Saanich has made significant progress in reducing GHGs since that time. However, as services have expanded and facilities aged, this progress has stalled. Although we are not projected to reach our 2020 targets we have a corporate Strategic Energy Management Plan (2018) that includes projects which aim to bring us back on track close to 2020.

In 2017, corporate emissions were approximately 4,966 tonnes of carbon equivalent, which is 9% below 2007 levels. Half of these emissions were from fuel use in vehicles and half from fuel use in buildings.

OUR INNOVATIVE CARBON FUND

Saanich was the first municipality in North America to introduce a Carbon Fund in 2007. Each department contributes to the fund based on their annual GHG emissions and can then apply to the fund for support on projects that help reduce their emissions further. This process keeps departments accountable for their energy use while providing funding support for projects that reduce our corporate GHG emissions and help achieve our targets.

Projects supported by the carbon fund include those that reduce energy use and waste, replace high-carbon energy sources, increase the supply of renewables and ensure we are resilient and adapt to a changing climate.

WE ARE REDUCING ENERGY USE

Electric Vehicles

In 2014, the electric vehicle (EV) pool fleet program was established, replacing older gasoline vehicles with EVs and reducing the total number of vehicles due to car sharing. Saanich now has 9 EVs, including an electric zamboni and aims to electrify all non-police, light-duty cars by 2020. The recent increase in trials of larger EVs and trucks and progress being made on other zero emission fuels will assist with the future replacement plan for our heavy-duty vehicles, which make up the majority of our remaining fleet.

Ice Rink Improvements

In 2016 Saanich purchased a REALice® System for the Gold rink at Pearkes Arena to reduce the hot water required to resurface the ice. Reclaimed heat is already used at Pearkes for showers and as supplementary hot water for the arena's resurfacing machines. The REALice® System further reduced the Arena's energy requirement and saves approximately 45 tonnes of carbon per year, equivalent to taking 10 cars off the road! A REALice® System is planned for the green rink at Pearkes Arena in 2019.

Efficient Streetlights

In 2016, Saanich began a five year program to convert 6,000 of its 9,000 street lights from High Pressure Sodium (HPS) lamps to energy efficient Light Emitting Diodes (LEDs). The program will result in a 51% reduction in overall electricity use, an annual savings of $214,000 and 26 tonnes of carbon once fully complete.

Building Upgrades

As lighting, boilers and mechanical systems reach their end of life, we focus on upgrading to the most energy efficient options available. In 2017, the Saanich Municipal Hall mechanical systems were upgraded, including controls, heating coils and a high efficiency boiler. This upgrade is projected to save 60 tonnes of carbon per year. In 2018, all lighting was upgraded to high efficiency LEDs.

REDUCING WASTE

Compost, Not Landfill

While the introduction of the Greener Garbage kitchen scraps program in 2015 required more fuel use for our garbage vehicles, this was more than offset by the reduction of approximately 3,650 tonnes of community GHG emissions a year from the diversion of organics from landfill, in addition to the production of class A compost.

Stepping Up Recycling

Recycling has been integral to our own facilities for many years, but 2017 saw an upgrade to our recycling program at the Municipal Complex which aims to significantly increase waste diversion with a goal to becoming zero waste by 2050. The program will be rolled out to our other facilities through 2018 and 2019.

CHOOSING RENEWABLE ENERGY

Gordon Head Rec Centre

In 2016, Saanich led a significant carbon reduction project at the Gordon Head Recreation Centre by replacing an existing inefficient heating system with a new high-efficiency air source heat pump and condensing boiler. The heat pump was commissioned into 2018 and is expected to reduce corporate GHG emissions by approximately 400 tonnes of GHGs annually – equivalent to taking 85 cars off the road!

Saanich Commonwealth Place

In 2018, design work will begin on Saanich Commonwealth Place to replace the current fossil fuel boilers with a renewable biomass heating system. The project will be designed to reduce our GHG emissions from the facility by 90%, increasing efficiency, saving money and improving comfort at the same time.

VALUING OUR NATURAL ASSETS AND ECOSYSTEM SERVICES

Generally, municipalities have viewed assets as being capital infrastructure, such as buildings, drains, water treatment plants, roads, fleet vehicles and so on. Yet, Saanich is home to a multitude of natural assets including wetlands, woodlands and aquifers that provide critical ecosystem services to our community and region. These services include water filtration and retention, climate regulation through cooling and shading, carbon sequestration, food provision, cultural heritage value and more.

Saanich has been a leader in identifying and protecting Environmentally Significant Areas which are our natural assets. In recent years there have been multiple studies across North America that have placed a monetary value on ecosystem services, often associated with the costs to install comparable hard infrastructure should that natural asset be removed. Saanich will consider ecosystem services alongside a Biodiversity Conservation Strategy in the coming year.

DID YOU KNOW?

The Urban Forest Strategy (2010) offers a long-term plan to achieve a sustainable urban forest in Saanich - a highly valued natural asset, widely recognized for the contribution it makes to our community. Benefits of the urban forest includes sustainable drainage, water retention, cooling and shading services critical for adapting to our climate projections for hotter summers, more extreme storms, flooding and sea level rise.

PRODUCING SOLAR ENERGY IN SAANICH

In 2010, our first solar hot water system was installed at Gordon Head Recreation Centre. The four panels provide heat to the centre's showers and reduced our carbon footprint by 20 tonnes of GHGs annually. Installing the system provided Camosun College students with valuable training and on-the-job experience. With the upgrade in 2016 and 2017, additional heat recovery is being accessed from the solar thermal system, now enabling the tots pool to be heated via these on-site renewables.

BECOMING RESILIENT

It is critical, given the public and emergency service functions of a municipality, that we are resilient to future changes. Climate projections and increased sea level rise have been incorporated into the recently approved Strategic Facilities Master Plan and are being considered in other plans and projects. This will ensure that our future facilities and infrastructure projects are designed not only to mitigate climate change by reducing our GHG emissions, but are also designed to adapt to a changing climate and rising sea levels. The need to be resilient in a changing climate was a key factor in the decision to move to an air source heat pump at the Gordon Head Recreation Centre. The heat pump will provide cooling in the summer, which will be critical for improving the comfort of the facility given future increased summer temperature projections. More data is needed to better assess our risk and to develop guidance that helps us adapt to a changing climate and sea level rise. This work will commence in late 2018.

GET INVOLVED!

We'd like to hear from you! Visit SAANICH.CA/CLIMATEPLAN to sign up for emails, learn about past projects and find ways to get involved in developing the updated Climate Plan.

CONTACT US AT SUSTAINABILITY@SAANICH.CA