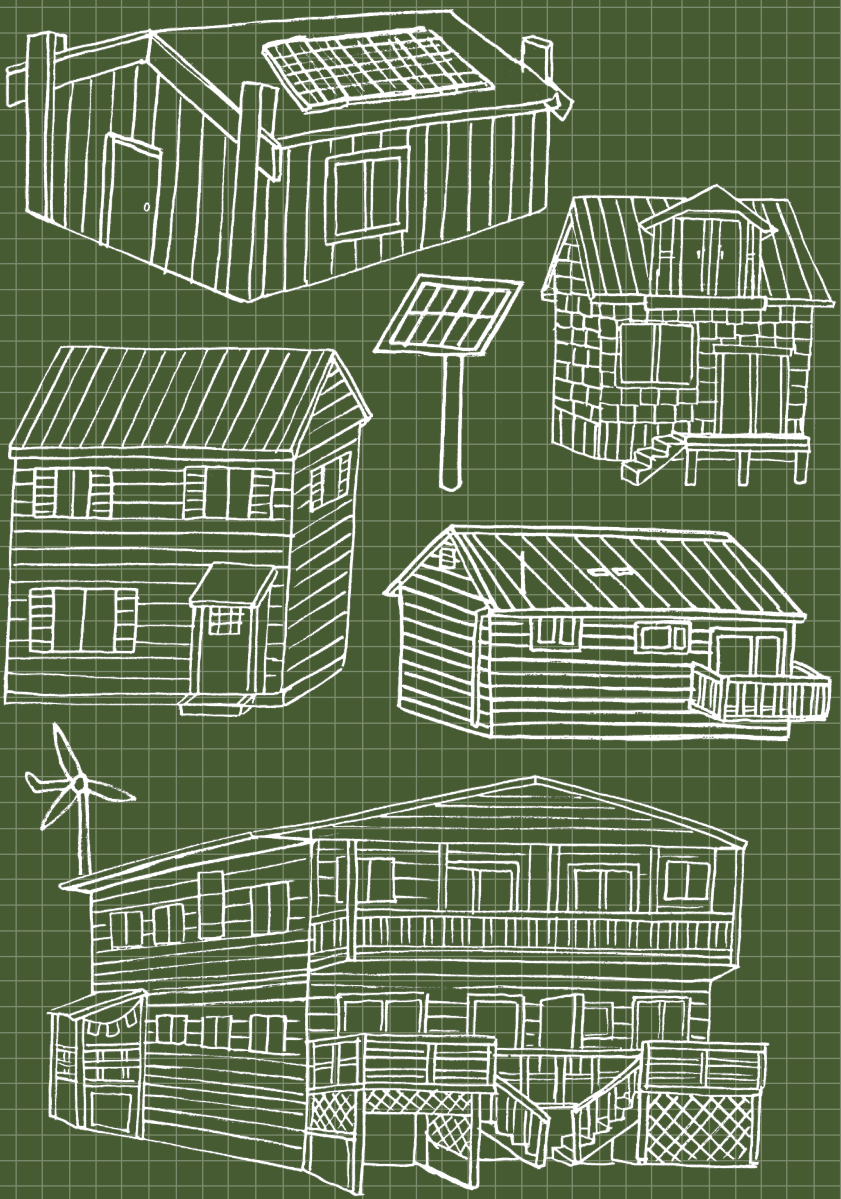
Energy Saving Toolkit

A Guide for Haida Gwaii Homes



Energy Saving Toolkit: A Guide for Haida Gwaii Homes

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Content by Pete Moore, Jacques Morin, and Valine Crist.
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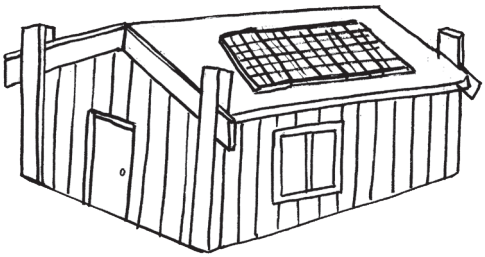
Introduction: An Energy Savings Toolkit for Haida Gwaii

As we carve out **long-term solutions** for the transition to renewable energy on Haida Gwaii, there are a number of things that we can do in our homes to **reduce our energy usage** right away.



Purchasing new appliances or buying solar panels may not be realistic for everyone, but whether you own a home or rent, making small adjustments in your daily life is an important step towards **energy independence** on Haida Gwaii. Reducing electrical demand will help us prepare for **community-scale renewable energy projects**, which are more affordable and more feasible than residential-scale renewable energy.

This toolkit was created to look at ways we can take action and it covers three important steps:

1. Reducing Energy Demand

Look to **pages 6 - 10** to learn more about ways that you can reduce your electrical usage and save money by making a few simple habits part of your daily routine.

2. Household Upgrades

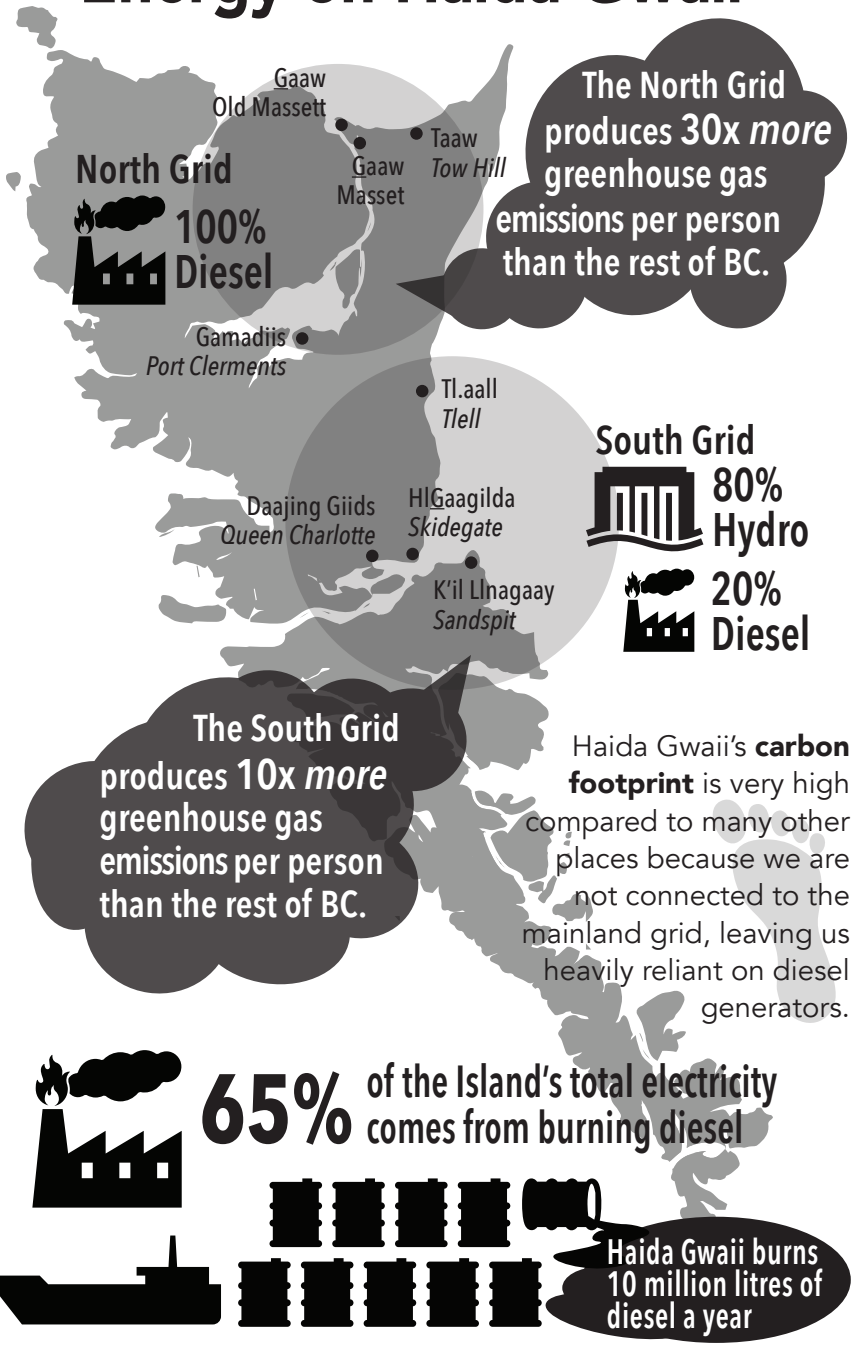
See **pages 11 - 14** to explore ways to get the most bang for your buck with household upgrades that will increase energy efficiency in your home.

3. Investing in Renewables

If you are considering investing in renewable energy for your home, check out **pages 15 - 22**.

This Haida Gwaii-specific resource aims to provide information and inspire. There is a list of additional resources and tools on our website: **swiilawiid.org/toolkit.**

Energy on Haida Gwaii



Energy use in BC

The average household in BC uses 10,240 kWh of energy a year.*

10,240 kWh

How much energy is this?

A 100-watt light bulb operating for ten hours would use one kilowatt-hour.

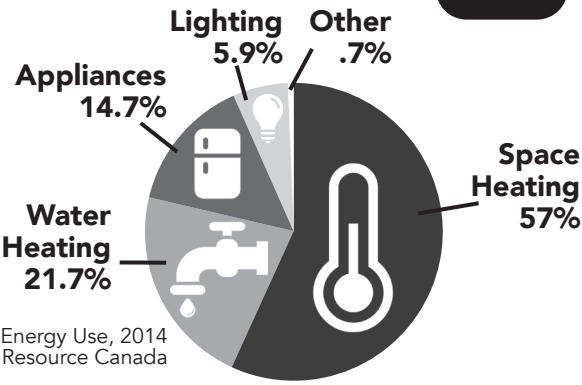
100 W x 10 h = 1 kWh

Therefore...

10,240 kWh = 49 100 W light bulbs

Burning all day for 1 year

Average BC household energy use



BC Residential Energy Use, 2014
Natural Resource Canada

* Average household use varies. This is the most recent average household useage according to BC Hydro Quick Facts 2017.

With **high utility costs** and a **substantial carbon footprint**, we have strong environmental and economic incentives to address our **energy reality**.

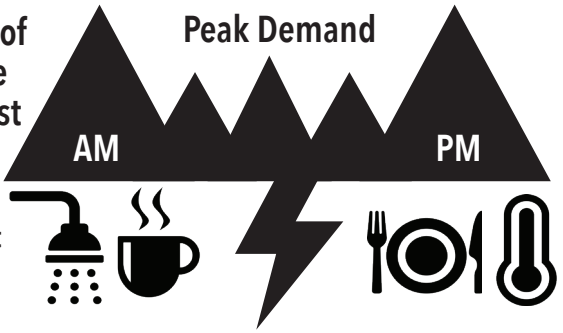
1 Reducing Energy Demand: Take Action to Save Energy

Reduce energy use at peak times

Peak demand refers to times each day at which the amount of energy demand to the grid system is at its highest point.

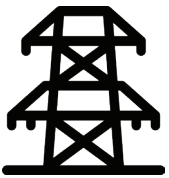
The two windows of peak demand are generally breakfast and dinner time.

Showering, cooking, and turning up the heat are the main culprits in peak energy demand.



Why does peak demand matter?

On Haida Gwaii meeting energy demands during peak hours requires firing up **additional generators** that are specifically designed to meet higher energy demands and are **otherwise unused**.



Peak demand is when we put the most stress on our energy network. It means **these few hours of peak demand determine the scale of facilities that we need**, which includes generating capacity, transmission lines, and other electrical infrastructure. This contributes to our large collective carbon footprint.

What can I do?

Try shifting your major electrical use to lower demand times. So even though energy reductions during "peak hours" does not decrease total energy usage, it can help to lower our overall environmental impact on Haida Gwaii.

Track your electrical usage online

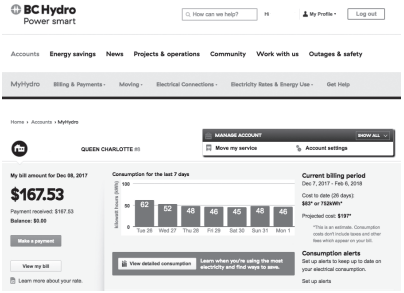
In order to reduce your energy demands, you will need to know what your overall household usage is. BC Hydro allows you to track your electricity consumption online. Keeping track can help you develop a plan to reduce your energy consumption.

1. Set up your BC Hydro Online Account

- If you don't already have an online account, go to **bchydro.com** and click on "**Sign Up**" and fill in the profile information.
- Make sure you have a copy of your most recent bill, and select "**Link my account now**" then follow the instructions.

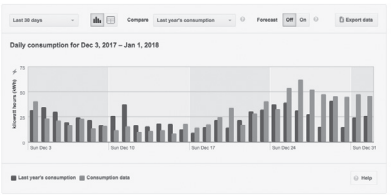
2. Log into your BC Hydro Online Account

In your account, you can see your energy consumption for the **last 7 days**, the **amount of your last bill**, and additional **account information**.



3. Explore your detailed consumption

For more information, click "**View detailed consumption.**" This will take you to a page with an interactive chart where you can look at your **daily and hourly usage**, compare it to **houses nearby**, and even factor in the **average outside temperature**.



Did you know?

BC Hydro pays approximately $0.30/kWh to supply our diesel-generated electricity on Haida Gwaii.

Two step billing

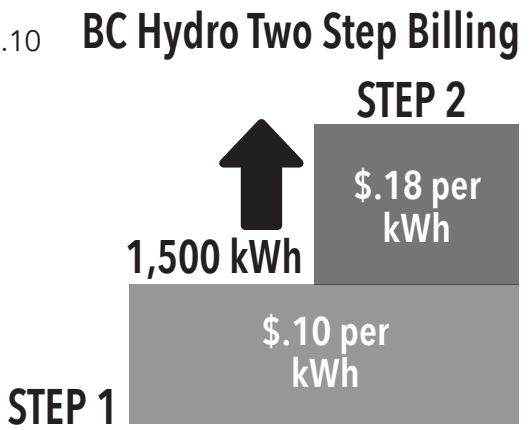
On Haida Gwaii we are under BC Hydro's Zone II Rates. There are two billing rates on your BC Hydro bill.

Step 1

The first rate you pay is $0.10 per kWh up to 1,500 kWh you consume each month.

Step 2

If your home energy consumption passes the **1,500 kWh** of energy per month, you are then billed at **Step 2**, which is **58%** higher!



That means that if you stay under the second step rate scale, your utility bills should be manageable, but if you go over that first step, your bills are going to soar! This is what BC Hydro calls a ***two-step rating system*** and it is meant to encourage utility customers to conserve energy.

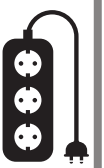
Phantom Energy

Did you know that there are hidden loads consuming energy all around your house?

It's called *phantom energy* and this happens when any electronic device– TVs, toasters, game consoles, and even phone chargers–are plugged in.

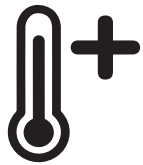
If you're not using it, unplug it!

Try using a power bar that you can switch off when not in use, or explore "smart" powerbars that turn off when devices are sleeping.



14 Simple ways to reduce your Hydro bills for free

Being energy aware is the first step in reducing your energy usage. The next step is adding a few new habits to your daily routine. Put these simple and cost-effective tips into action and start saving!



1. **Reduce hot water usage.** Cutting down demand on your hot water tank can really help to reduce your electrical usage. Shorten your showers and turn the hot water off when washing the dishes.

2. **Fix your faucet.** Repairing a hot water leak can have significant savings and is a simple repair.

3. **Use natural light.** Although Haida Gwaii can be pretty grey at times, during daytime hours it still has a lot of natural light to offer, so open up those blinds!

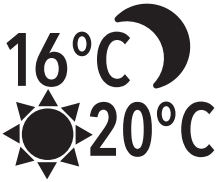
4. **Replace burnt out bulbs with LEDs.** LED lights are energy-efficient and can be long-lasting.

5. **Add task lighting** instead of over-lighting an entire space. If you're working at your desk, use an LED lamp.

6. **Unplug electronics that aren't in use**. Laptops, tablets and smartphones are everyday essentials that need to be charged, but remember to unplug anything not in use.

7. Use a power bar that you can switch off when not in use, or explore "smart" powerbars that turn off when devices are sleeping.

8. Watch that thermostat.
Turning the thermostat down just 2°C can save up to 5% on your annual bill.



9. Set it and save!
Houses should be 16°C (61°F) overnight or when the house is empty and a comfortable 20°C (68°F) during the day.

10. Make sure your refrigerator is performing properly.
Every 6 months, pull your fridge out and clean the dust off the back and coils.

11. Check your secondary fridge or freezer.
Island food is always best, and sometimes we need secondary appliances to keep our food. Filling one freezer is more efficient than having two freezers that are half-full.

12. Read your dishwasher's settings.
Learn what settings are most waterwise and energy efficient on your dishwasher. Skip the heat-dry setting.

13. Wait until your washing machine is full and wash clothes with cold water.

14. Skip the dryer.
Your dryer is one of the biggest energy consumers in your home. Hang your laundry outside when it's warm. In the cooler months, try an indoor clothes rack.

2 Household Upgrades to Increase Energy Efficiency

Beyond the no-cost ways that we can save power, there are improvements that we can make around our homes that can have a large impact on overall energy efficiency.

Why upgrade?

Technology is changing and improving everyday, and there are a number of great ways that you can increase efficiency and decrease your energy usage through maintenance or renovations. Although the initial cost of upgrades can seem pricey, the amount of energy you save will often compensate for that up-front cost over time. That said, you should always consider the trade-off when replacing old appliances. **We recommend waiting until your old machine quits working before replacing it.**

Home improvements that increase energy efficiency are sometimes called ***retrofits***.

Available rebates and incentives

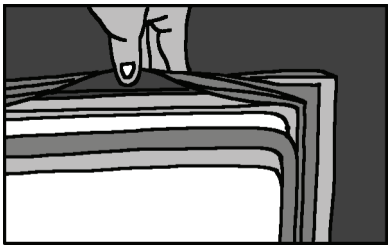
There are often **rebates** available for improvements that increase your home's energy efficiency. These incentives can support renovations such as: increased insulation, draft proofing (ie; air sealing), and even upgrading to more efficient home heating systems.

See **swiilawiid.org** for information on current rebates.

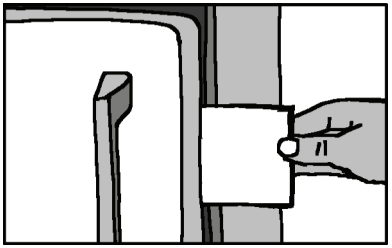
Start with DIY

These simple **do-it-yourself** projects will cost a bit upfront and take some time, but the energy savings will make them worthwhile. See **swiilawiid.org/toolkit** for links and how-to videos.

1. Maintain your fridge and freezer.

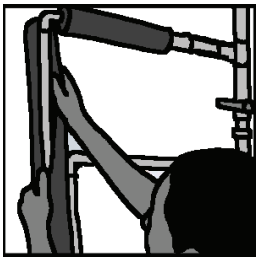


Check the **fridge seal** for cracks and splits.

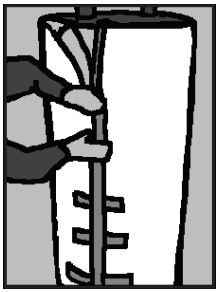


You can also test the seal by closing the door on a piece a paper. If the paper pulls out easily you may need to replace the seal.

2. Insulate your hot water line and tank.

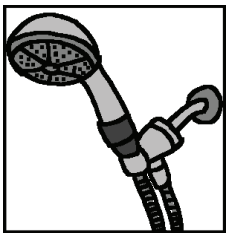


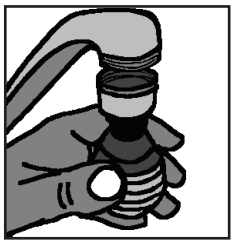
Insulating hot water lines with flexible **foam pipe sleeves** is cheap and easy and especially important in unheated places.



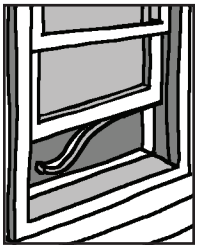
Touch your tank, if it is warm you can insulate it with a **water tank insulator blanket**.

3. Install water-saving showerheads and aerators.

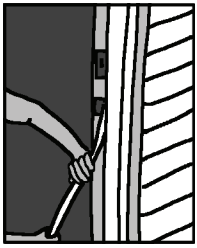




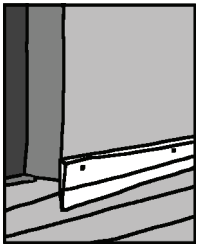
4. Weatherstrip your windows and doors.



Self-stick foam weatherstripping is easy to apply on all types of doors and windows.



Modern doors usually have a **groove** that you can place weatherstripping.

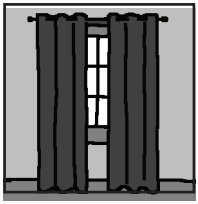


You can also install a **door sweep** to close the gap at the bottom of a door.

5. Improve efficiency of existing windows.

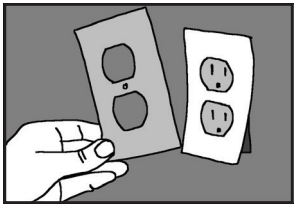
Insulating window kits offer **plastic coverings** that you can apply with heat.

Heavy or thermal **drapes** can also help keep drafts out.

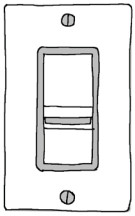


6. Use outlet insulation pads.

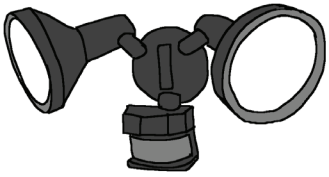
Pre-cut foam pads can be put under the cover plates to help keep out cold air on exterior walls.



7. Invest in lighting solutions.



Light dimmers can enhance your home décor, decrease energy use, and extend light bulb longevity.

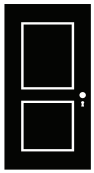


Motion sensor lights outside and **motion sensor switches** inside eliminate the chances of leaving lights on.

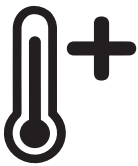
Make the most of your home renos

There are much more substantial renovations that you can do to increase the energy efficiency of your house.

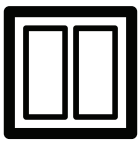
1. **Insulate**.
Investing in insulation is one of the least exciting but most impactful renovations you can do. Focus on crawl spaces, the basement, and the attic.



2. **Exterior doors**.
Insulated doors are a highly efficient option when looking to replace old exterior doors. If replacing your exterior doors entirely isn't necessary, try installing a storm door.



3. **Upgrade to an Energy Star heating system**.
Given our cool and damp climate on Haida Gwaii, our household heating systems can be in use at any time of the year. Look to heat pumps, space heaters, or programmable thermostats.



4. **Replace old windows**.
Today's window designs can be highly efficient. If you're looking to upgrade, invest in new energy-efficient windows.

5. **Buy Energy Star appliances**
Refrigerators, dishwashers, and deep freezers are just a few of the appliances that we use everyday. Although they make our lives easier, these conveniences come at a high cost, both with our carbon footprint and on our utility bills.

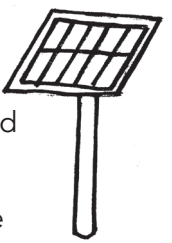
If you are in the market for a new appliance, it is worth looking for the ENERGY STAR symbol. Investing a little more upfront can save you money in the long run.

3 Investing in Renewables

The global transition towards a clean energy and climate-safe future is happening. Here on Haida Gwaii, we are starting to see more and more renewable energy solutions implemented by local governments, schools, and other organizations. Many buildings across the Islands have had solar panels installed to help produce their electricity needs.

Visit **swiilawiid.org** and click on **Renewable Energy Stories** to see the many success stories of clean energy on Island!

Making the switch to small-scale renewables is win-win!



Who doesn't want to lower their utility bills and become more independent? Small-scale renewable energy increases self-sufficiency, decreases our environmental impact on diesel-generated power and it will save money in the long-term.

Household renewables are becoming more affordable and reliable, making energy self-sufficiency a real opportunity for homeowners on Haida Gwaii. However, there are many **considerations** to make when choosing the appropriate renewable system for your home, and for many Island residents, renewable energy may not be an option.

Start-up costs for residential renewable electricity production can be expensive, but **if you cut back on your energy use first, you can size a more affordable system to meet your needs.**

Renewable energy may be best done on a neighbourhood or regional scale rather than on individual buildings. District-wide systems are often more cost-effective and there may be federal and/or provincial incentives available for installations at the community scale.

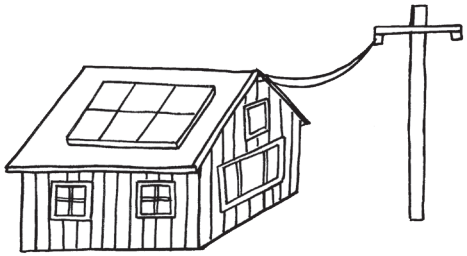
We are going to look at three types of renewable energy systems that can work for households on Haida Gwaii:

- **Solar panels or Photovoltaic systems**
- **Solar hot water**
- **Wind energy**

Grid-tied vs. off-grid

There are a few options for individual household renewable energy systems and there are advantages and disadvantages to each.

Grid-tied



Grid-tied is the most common and simple option for renewable energy systems. It combines your new renewable energy to your home with the utility grid (BC Hydro). This means that if your system cannot deliver as much energy as needed, BC Hydro makes up the difference. If you produce more clean energy than needed, you can get a credit for feeding that surplus green power back into the grid. It's all accomplished silently and effortlessly.

Connecting to BC Hydro's grid is called ***net metering***, this requires a quick and free application that usually takes a few weeks to process.

Off-grid

Off-grid systems operate independently from the utility grid to provide some or all of the household's energy needs. These systems are mainly used in remote areas where the utility grid is not available to service the building. All off-grid applications require a **battery system** to store the energy. Battery banks are expensive and also leave a sizeable carbon footprint during manufacturing.

Hybrid

It's also possible to have a grid-tied system with battery or generator backup. These systems are connected to BC Hydro's main grid, but also have a battery-bank to store power for electrical outages and to maintain critical loads, such as communications equipment during emergencies.

Solar panels

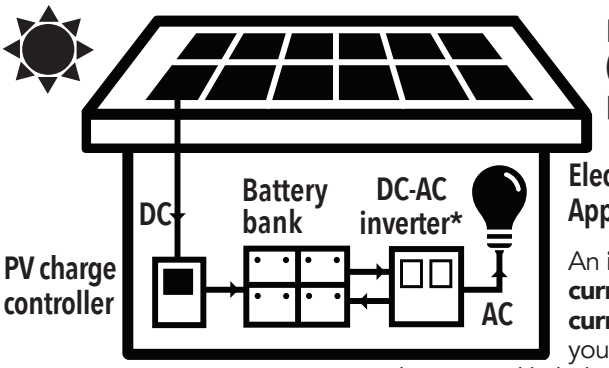
Did you know that solar panels are **more productive in cooler climates**? When solar cells get hot, they produce less power, and that means even though Haida Gwaii isn't the sunniest of places, we do have a climate well-suited for solar power.

You can see daily solar production at the Skidegate and Old Massett Youth Centers on our website: **swiilawiid.org/renewable-energy-stories.**

Solar panels or Photovoltaic systems

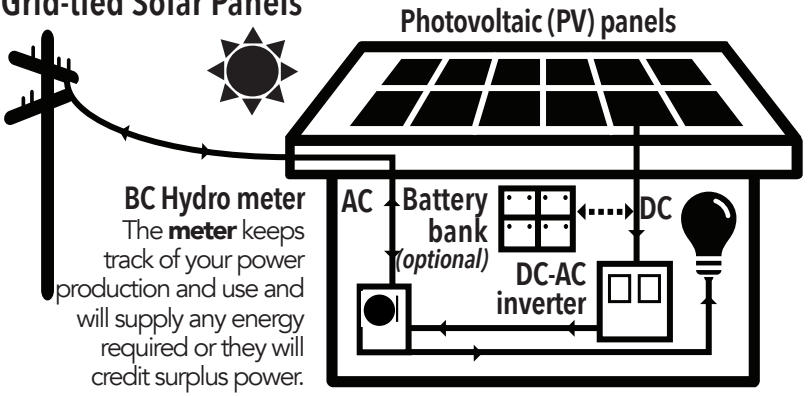
Solar Photovoltaic (PV) panels —often referred to as **solar panels**— absorb sunlight to generate **direct current (DC)** energy.

Off-grid Solar Panels



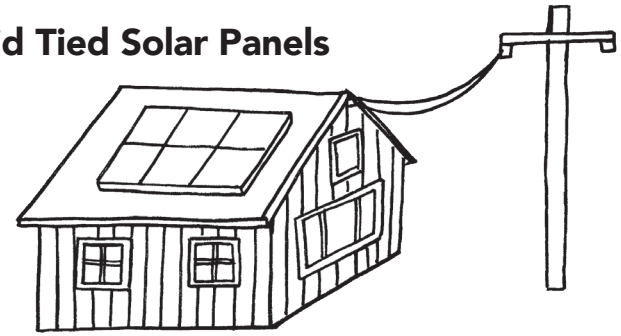
An **inverter** can turn **DC current** into **alternating current (AC)** for use in your home. Although some appliances and light bulbs can run on DC, electronic devices and most appliances require AC.

Grid-tied Solar Panels



How much do solar panels cost?

5 kW Grid Tied Solar Panels



5kW of solar panels = **5,000 kWh/year**

An average BC household uses 10,240 kWh/year

So a 5kW system would supply approximately...

50% **of the energy of an average household.**

5 kW solar system can be installed by a qualified solar contractor on Haida Gwaii for approximately $3-4/Watt[1]

5kW = **$15,000-$20,000**

Solar equipment can produce electricity for 30 years or more.

Therefore based on today's BC Hydro's Step 1 Residential Rate[2], payback on your investment is about 30-40 years.

Solar systems are getting cheaper and we can expect BC Hydro rates to increase over the lifespan of your solar installation, so in the end you may see a return on your investment.

[1] Prices of solar panels are constantly decreasing. The price will be cheaper if you are able to install the system yourself.

[2] Step 1 Residential Rate for Haida Gwaii is currently $.10/kWh.

Are solar panels right for you?

Can you AFFORD the upfront costs of the equipment and installation?

YES

Do you have enough SPACE to install the inverter, metering equipment, breaker, etc?

YES

Is your ROOF:

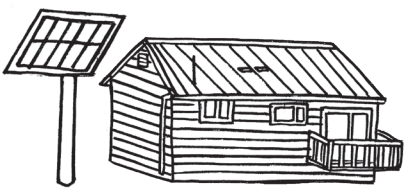
- **In good condition;**
- **Free of shade between 9am and 3pm; and**
- **Does it face South, Southeast, or Southwest?**

NO

YES

Determine if you need to hire a contractor or if you can do the installation yourself.

Do you have enough SPACE on your property for a ground mount installation?



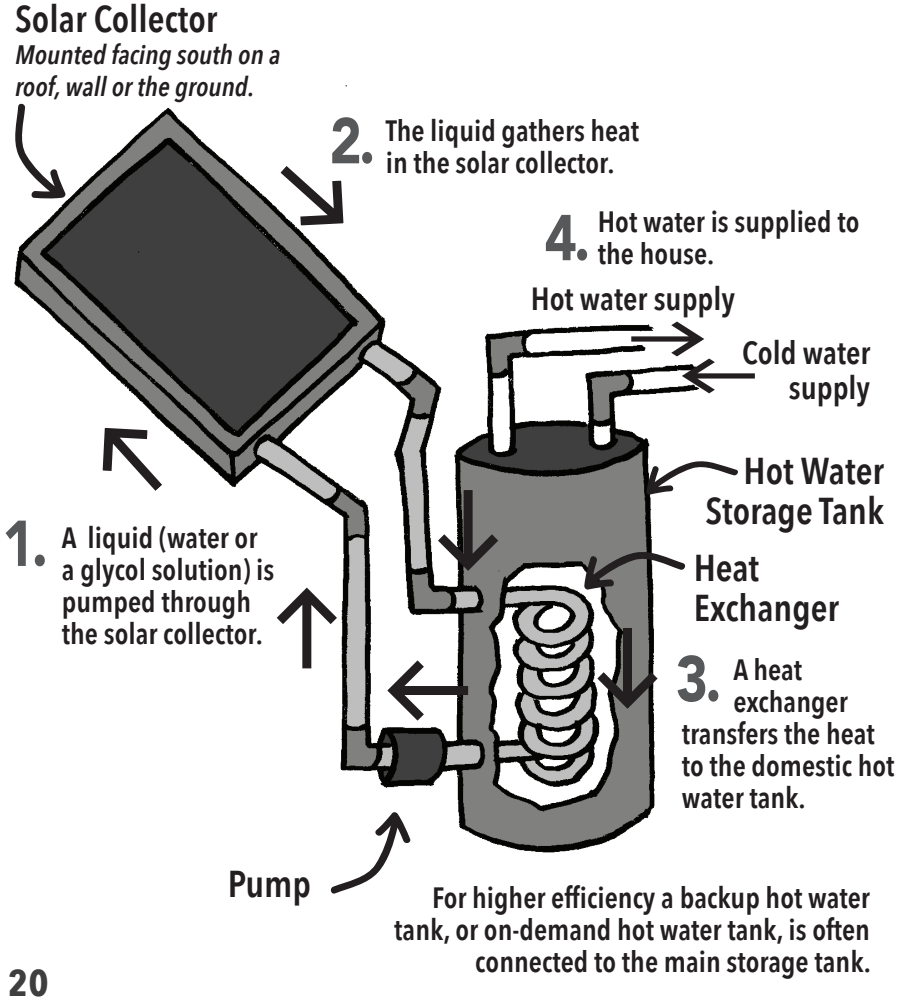
Questions to ask a contractor:

- **What is their education and experience in renewable energy?**
- **Do they have industry training?**
- **Are they a licensed contractor?**
- **Are there testimonials from previous customers?**

Solar hot water system

Solar hot water **converts sunlight into heat** through solar collectors either mounted on the roof, wall, or ground. Similar to solar panels, the hot water solar collectors need to **face south** for best performance. These collectors circulate a fluid that is warmed by the sun's energy to heat water or provide space heating to your home. There are many types of solar hot water designs on the market but for the purpose of our climate—we will focus on the **closed-loop systems**.

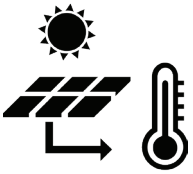
Closed-loop solar hot water system



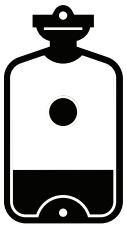
Viability of solar hot water on Haida Gwaii

Installing a solar hot water system offers one of the most cost-effective renewable energy solutions.

When properly sized and installed, a solar hot water system can provide your hot water needs throughout the year.



In summer, it can provide up to 100% of your hot water.



In winter, it can provide up to 25% of your hot water.

The average cost for installing a domestic solar hot water system for a small family is about $7,000-$9,000.

SAVE ≈$233 per year

Based on the Canada Mortgage Housing Corporation, the energy savings possible for a Vancouver family of four using 225L/day of hot water at 54°C (130°F) would be about $233 for electricity per year.

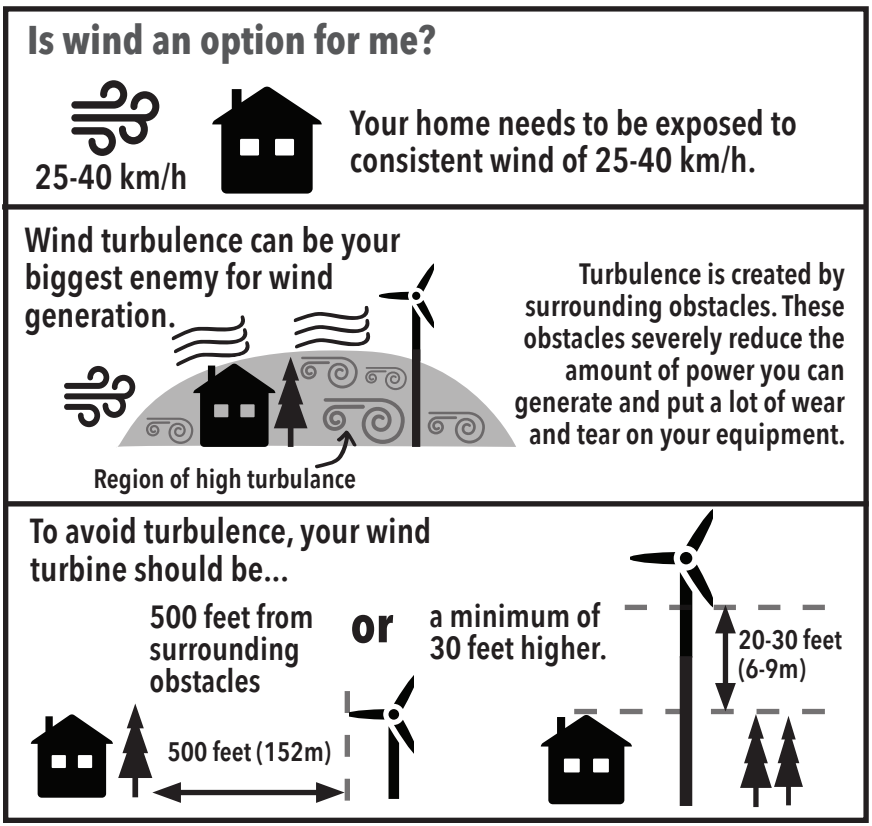
Similar to photovoltaic systems, the financial savings and return on investment of solar domestic hot water systems is marginal. However, many homeowners appreciate other non-monetary values for investing in renewables, such as peace of mind, freedom from future utility rate increases, reducing emissions, and higher property values.

Wind energy

Around the world today, you can see wind energy systems on mountaintops, open fields, offshore, and at remote homesteads. Off-grid or grid-tied wind energy systems are not meant for everyone. They are not cheap and wind technology is a big commitment because with all those moving parts, turbines require ongoing maintenance.

Viability of wind power on Haida Gwaii

Wind energy can be an option for residential applications here on Haida Gwaii but it is best suited for remote areas because it requires **unobstructed exposure** and **clear and consistent winds**. Even here on Haida Gwaii, wind is an intermittent resource, though a renewable system that combined solar and wind could help you to become energy self-sufficient.

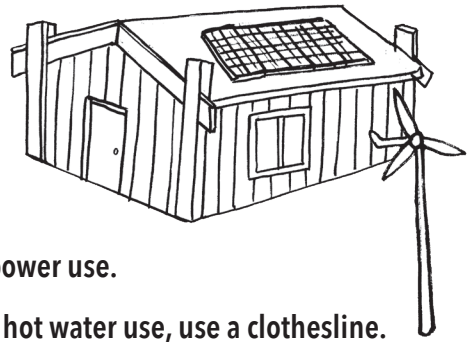


Looking Forward

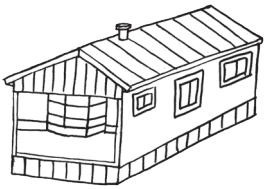
Living together as a small islands community, we can see the impacts of our actions every day. Sometimes these impacts are positive and sometimes negative. One that we often don't see are the **consequences of our electrical systems**, and that's why this toolkit was such an important initiative for us.

There are a lot of ways that we can be taking leadership in our homes and workplaces – some of these actions can be small changes that we turn into **sustainable habits**. Other actions take more effort and investment, and both can have a big impact on our collective footprint here on Haida Gwaii. Together, we can take the necessary steps to start changing our reality and preparing for **community-scale clean energy projects**.

Quick Energy Saving Tips



1. **Reduce energy use at peak times.**
2. **Monitor your energy usage with your online BC Hydro account.**
3. **Watch out for phantom power use.**
4. **Turn off lights, curb your hot water use, use a clothesline.**
5. **Set the thermostat to 16°C at night and 20°C during the day.**
6. **Look to simple DIY energy saving solutions such as weatherstripping and aerators.**
7. **If you are going to upgrade your appliances look to Energy Star appliances.**
8. **Reduce your energy consumption before you invest in renewable energy options.**



Resources

There are plenty of resources available online and in the library. Here are a few useful resources that we used to create this toolkit, and there are many more available at **swiilawiid.org**.

BC Hydro. *Power Smart* (2014). <bchydro.com>

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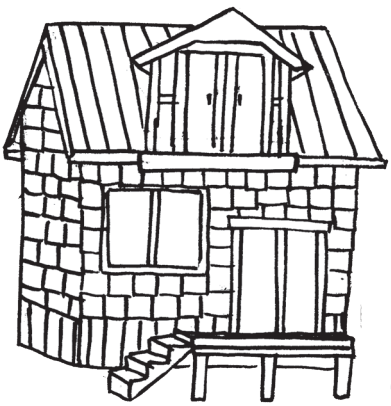


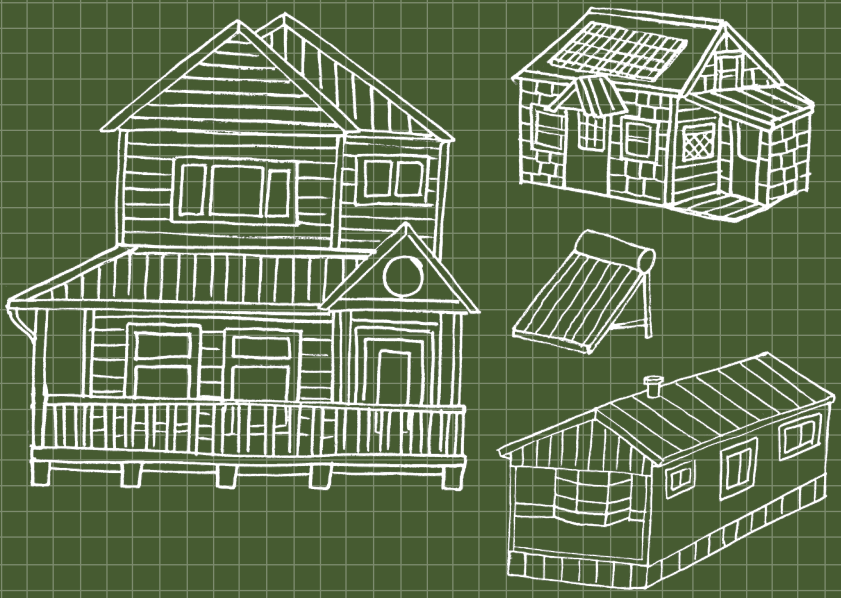
Our Story

Swiilawiid Sustainability Society is a non-profit organization working to inspire local residents to take meaningful action and reduce our collective carbon footprint.

We were founded by a group of like-minded Islanders who saw the need for Haida Gwaii to become more self-reliant. We have a place-based volunteer board, our staff live here, and our contracts always prioritize on-Island expertise. Swiilawiid officially launched with research and local publications in October 2016. Since then, we have been working hard to facilitate the shift from diesel-energy to clean sources of power. So far, we have developed partnerships to install five solar arrays around Haida Gwaii and we're committed to helping the Islands embrace more community-owned renewable energy. We strive to work with Island citizens and local governments to develop a plan to achieve energy sovereignty.

swiilawiid
sustainability society

This toolkit is part of Swiilawiid's Project 0% Diesel. Our vision is to see Haida Gwaii lead in the transition to clean, community-owned power. As a remote Island, we have all of the elements needed to become energy sovereign. We believe that Haida Gwaii can take real action on climate change and create a model of community-owned sustainability. Swiilawiid is committed to showing the world that shifting to small-scale renewable energy is 100% possible.



Connect & Follow us:

Swiilawiid Sustainability Society

info@swiilawiid.org

swiilawiid.org

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