

Cold comfort:

The rising use (and cost)
of air conditioning in B.C.



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 **BC Hydro**
Power smart

Cold comfort: The rising use (and cost) of air conditioning in B.C.

With another hot summer upon us, British Columbians are increasingly turning to air conditioning and driving up their monthly energy bills as they try to cope with warmer weather.

Highlights

- With North America in a period of climate warming that began in the early 2000s, hot and dry summers are becoming the new normal for British Columbia.
- As the summers get warmer, the use of air conditioning in B.C. has more than tripled to 34 per cent since 2001.
- This upward trend is continuing as 25 per cent of British Columbians said they are considering purchasing an air conditioner this summer, according to a recent survey commissioned by BC Hydro.
- While A/C has been popular in the Southern Interior for many years, residents in relatively moderate climates like south coastal B.C. are also turning to A/C. In the past three years, the use of portable or room A/C in the Lower Mainland has increased by 23 per cent.
- A/C can significantly add to summer electricity bills. Running a central air conditioner for nine hours a day can cost British Columbians around \$300 in electricity costs over the summer, compared to just \$6 to run a fan for the same amount of time.
- Every degree lower an air conditioner is set, cooling costs can increase by 3%. The survey found 93% of British Columbians using A/C are setting them much lower than the recommended temperature of 25 degrees Celsius, significantly increasing in their electricity use – and costs.
 - 20% of residents on Vancouver Island and in the Lower Mainland set their thermostats between 17 and 19 degrees Celsius.
 - 32% of residents in the North set it between 17 and 19 degrees Celsius.
- Adding to their costs, more than 40% of British Columbians always or sometimes leave the A/C running when they are not at home.
- The survey showed many could be doing a better job of limiting heat buildup in their homes before turning to electrical devices for cooling.
 - Only 50% surveyed said they close the windows or doors.
 - About 25% of those surveyed do not shade windows.
 - 37% of respondents leave fans on when they are not at home.

Solutions

- BC Hydro recommends first trying a variety of no-cost solutions to limit heat like the strategic use of window coverings or shutting windows and doors when it is hot outside.
- Floor or ceiling fans are the efficient way of helping people feel cooler on hot days.
- For those who feel they need an air conditioner, BC Hydro recommends using an ENERGY STAR-rated portable or room air conditioner.
- Recognizing that homes in certain areas require central air conditioning, BC Hydro recommends carefully sizing, operating, and maintaining central units to ensure home comfort and cost savings.
- Air source heat pumps are very efficient electric heating systems that also provide cooling or air conditioning during the warmer months.
- Cooling costs increase dramatically when air conditioners are set to 22 degrees Celsius or lower. BC Hydro recommends setting thermostats to 25 degrees Celsius or warmer.

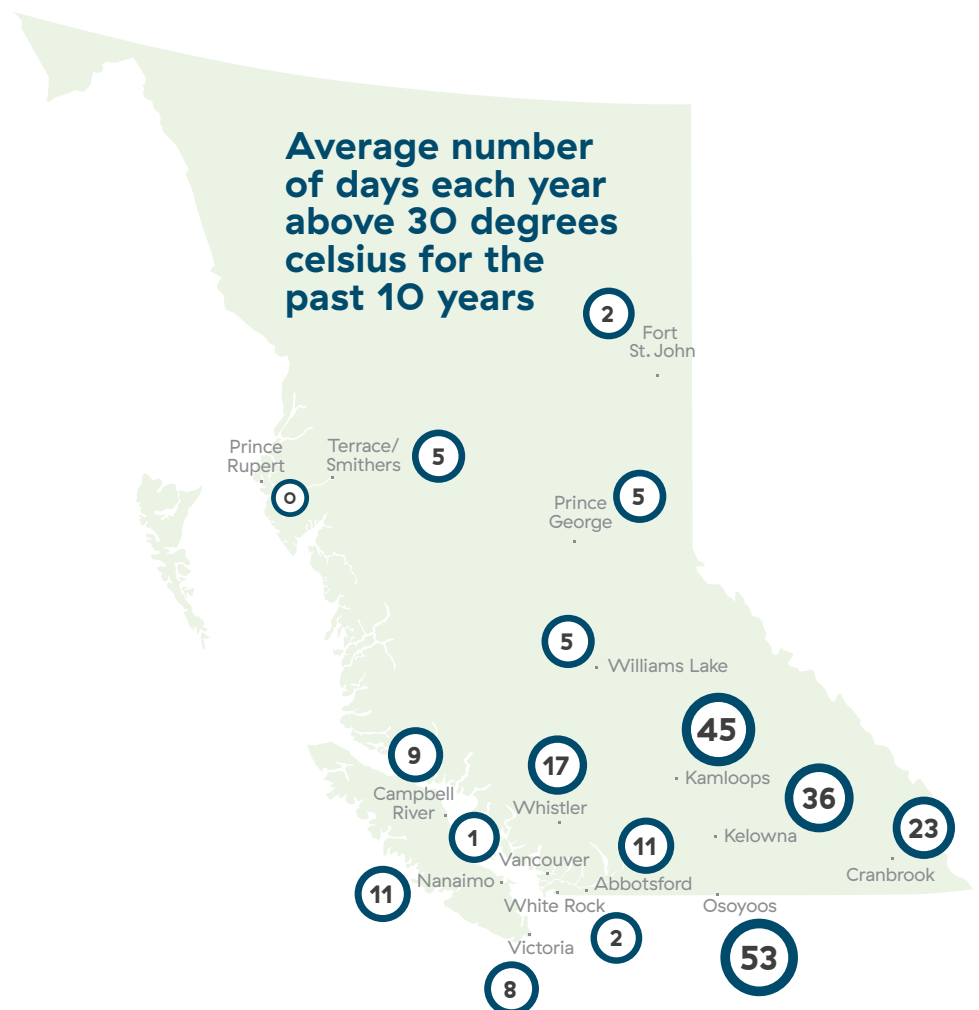
B.C. is turning to air conditioning

With North America in a period of climate warming that began in the early 2000s, hot and dry summers are becoming the new norm for British Columbians. Last summer, July and August were the driest ever recorded at the Vancouver airport. The area saw just seven millimetres of rain during that two month period – a far cry from the average of 72 millimetres that typically falls at that time. The Central and Southern Interior also felt the devastating effects of the dry, hot weather that resulted in the worst wildfire season on record in the province.

BC Hydro's meteorologists are predicting another hot summer this year, and more and more British Columbians are turning to A/C as a way to keep cool and comfortable when the mercury starts to rise. BC Hydro data shows the number of B.C. households using air conditioning has more than tripled in the last 16 years, from just 10% of homes in 2001, to 34% in 2017. BC Hydro is predicting this trend will continue to grow as dry, hot summers become the new norm for B.C. – leading to higher electricity costs and record-breaking power demand in the summer months.

Homes in the Southern Interior use air conditioning more than in any other region of B.C. This is not surprising given places such as Osoyoos, Lytton and Penticton are often among Canada's summer hotspots. But air conditioner use is growing across the province, even in the relatively moderate climate of south coastal B.C., where a trend towards high-rise apartments – often glass-walled with little air flow – is helping drive A/C adoption.

This report looks at how air conditioning is on the rise in B.C., how much it is costing homeowners, and how the use of air conditioning can be avoided – or high energy bills can be reduced – with a series of no-cost actions.



Source: <https://www.weatherstats.ca/>

Impact of A/C on environment

The International Energy Agency (IEA) predicts that as the number of air conditioners grows from 1.6 billion units today to an expected 5.6 billion units worldwide by 2050, the electricity use would be equivalent to all of China's electricity use today.

The IEA report on air conditioners estimates that greenhouse gas emissions released by coal and natural gas plants when generating electricity to power those air conditioners would nearly double, from 1.25 billion tons in 2016, to 2.28 billion tons in 2050.

Because 98 per cent of BC Hydro's electricity generation is clean, the greenhouse gas impacts of air conditioning in B.C. are minimal compared to jurisdictions where electricity is largely generated from fossil-fuels.

The cost of air conditioning in B.C.

Air conditioners can be a household's single biggest energy user in the summer— costing around \$0.69 per day (or \$20 per month) if kept at the BC Hydro-recommended temperature of 25 degrees Celsius.

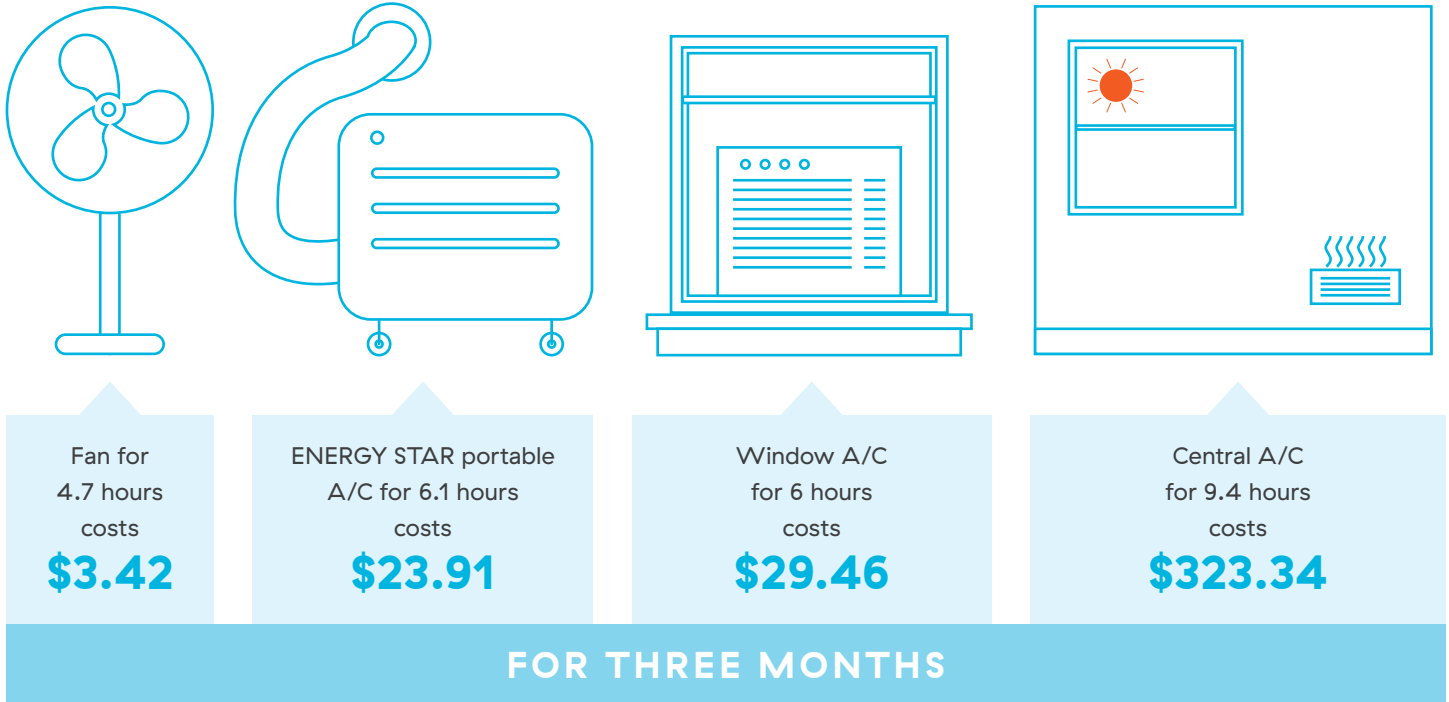
However, a recent BC Hydro poll found that 93% of British Columbians set them at less than 25 degrees Celsius or cooler. And around 20% of respondents on the Island and in the Lower Mainland set their thermostat between 17 and 19 degrees Celsius, while even more residents in the north – 32% – set it much lower than recommended. It is estimated that every degree lower an air conditioner is set it can add 3% in cooling costs. Adding to these costs, more than four in 10 British Columbians with air conditioning admit to leaving it on, at least part of the time, when they are not at home. Here is a look at the potential costs of moderate use for three different cooling options in British Columbia:

- A B.C. household that spends an average of \$40 a month on electricity in August would see its monthly bills grow to more than \$140 by using central air conditioning, running on an average time of nine hours a day at the recommended 25 degrees Celsius.
- Portable air conditioners, normally used for cooling one or two rooms of a home, offer a budget alternative and would add around \$8 a month to electricity bills if used an average time of six hours a day at the recommended 25 degrees Celsius.
- Pedestal fans are the most energy-efficient and inexpensive cooling option, costing just \$3 a month to run a pair an average time of six hours a day.

The survey conducted for BC Hydro shows that one in four British Columbians who do not currently have air conditioning are planning to add it to their homes. While more and more British Columbians are turning to A/C, the survey showed, many could be doing a better job of limiting heat buildup in their homes before turning to electrical devices for cooling. Only half said they close windows when the air outside is hotter than it is inside, just 12% have draft proofed their home and 23% said they did not close blinds and drapes to block the sun on scorching days.

Adding up the cost of cooling

ENERGY BILL IMPACTS OF FANS VS. VARIOUS TYPES OF AIR CONDITIONERS IN B.C. FOR THREE MONTHS OF TYPICAL USAGE



Source/calculation data:

- * Calculations based on three months of usage for the daily average hours of use for each cooling device from the BC Hydro Residential End Use Survey data
 - * Floor fan use based on 75-watt model and average daily use of 4.7 hours
 - * Room/portable air conditioner based on 400-watt model and average daily use of 6.1 hours
 - * Central unit based on 3500-watt model and average daily use of 9.4 hours
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The rise of A/C use and record-breaking summer demand

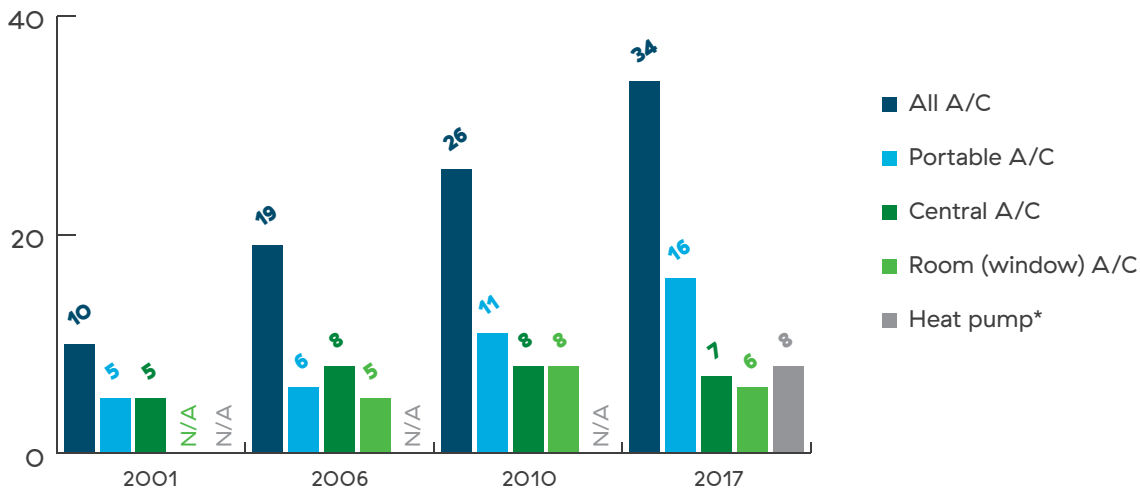
Unlike utilities in Ontario that experience their peak demand in the summer months, BC Hydro sees the biggest spike in electricity use in the winter – typically early January when the colder, darker days have residents turning the heat up higher and keeping the lights on longer. However, BC Hydro has seen an increase in the demand for power in the summer – largely due to the increased use of A/C. BC Hydro set a record for summer power consumption when the province’s peak hourly demand reached more than 7,500 megawatts on Aug. 28, 2017.

On an average summer day, BC Hydro typically sees air conditioning account for around 200 to 300 megawatts of demand. But on the hottest days, air conditioners can account for up to 1,300 megawatts of demand – about 20% of power being used across the province.

A growing fan base for A/C in B.C.

AIR CONDITIONING GROWS IN POPULARITY IN B.C.

% of homes with each type of cooling unit



* Information on heat pumps was collected for the first time in 2017, so earlier data is not available.

Source: BC Hydro Residential End Use Survey.

British Columbians have a lot to learn from residents of the Southern Interior

The use of air conditioning is on the rise across B.C. The majority of British Columbians in the North and Lower Mainland opt for portable A/C units, while those on Vancouver Island use heat pump A/C and the Southern Interior, where 65% of residents who have A/C, opt for central air conditioning.

Southern Interior residents tend to be best at using it efficiently and acting on important ways to guard their homes from overheating. In fact, 4 in 10 of them say they do not usually turn on their A/C until the outside temperature reaches 30 degrees Celsius.

More Southern Interior residents (39%) set the temperature on their air conditioner between 23 degrees Celsius and the BC Hydro–recommended 25 degrees Celsius than in any other region. Almost a third in the North set it between 17 and 19 degrees Celsius, and 8% of all British Columbians set their A/C to 16 degrees Celsius or cooler.

Southern Interior residents also scored higher in no–cost ways to keep their homes cooler, including:

- Closing blinds or drapes to block the sun: 97% vs. the B.C.–wide average of 77%
- Closing the windows when it is hot outside: 84% vs. 50% B.C.–wide
- Avoiding the use of the stove or oven on hot days: 63% vs. 45% B.C.–wide

Solutions

How B.C. households can try to avoid (or minimize the use of) air conditioning

BC Hydro recommends starting with no–cost actions that can help limit how much a home heats up during the day, including:

- **Closing doors and windows:** If the temperature outside is warmer than inside, keep doors and windows closed to keep the cooler air in the home and warm air out.
- **Covering windows:** Shading windows can block 65% of the heat that enters through windows. Cover windows that face east before bed to block out the early morning sun. Windows that face south should be kept shaded throughout the day and blinds or drapes on west–facing windows should be closed in the early evening.
- **Limiting appliance use:** On really hot days, limit use of the stove and oven, and other appliances such as the dryer or dishwasher. Use the microwave or a barbecue, go for a picnic, or serve up salads and other food that does not require cooking.

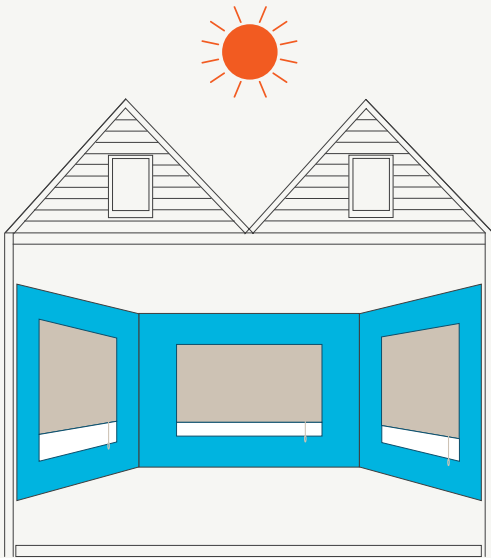
For homes that are too hot for comfort, BC Hydro recommends creating air flow to cool a home as soon as the outside temperature is lower than it is inside the home. Multiple open windows create that air flow, and floor fans near windows can be used strategically, drawing cool air in from lower levels of the home and pushing warm air out the upper, usually warmer, rooms.

Floor fans don't actually cool the air, but they have a cooling effect on skin. BC Hydro recommends using floor or ceiling fans in occupied rooms to produce a cooling effect.

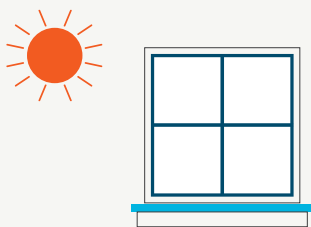
Deciduous trees and bushes on the south or west side of a home can have a dramatic cooling effect on a home in summer. In winter, deciduous trees drop their leaves so that the home can take advantage of the welcome sunshine.

Beat the summer heat with these tips for keeping your home cool

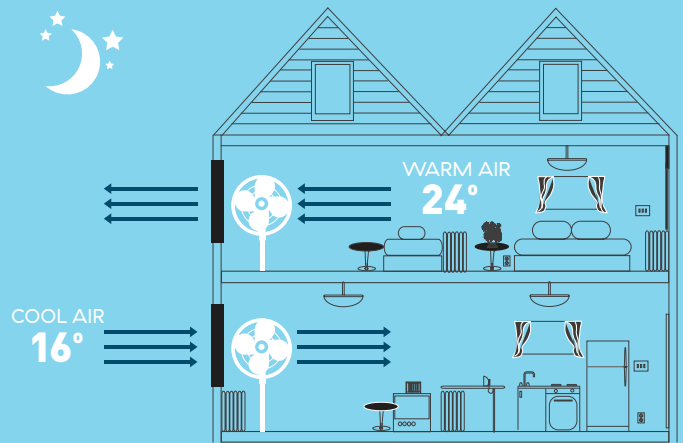
Tip 1: Close blinds/drapes



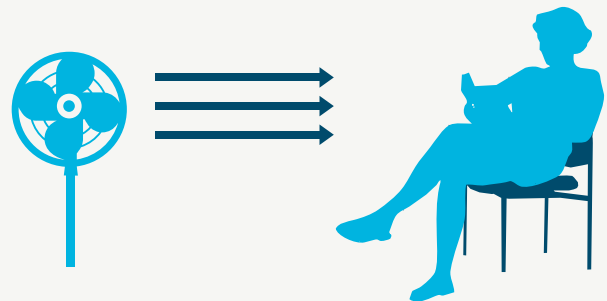
Tip 2: Close the windows during the day when inside temperature is cooler than outside



Tip 3: Position fans to move warm air out and cool air in during the evening



Tip 4: Position a fan to cool you when sitting or sleeping



ENERGY STAR and EER: How to choose an efficient air conditioner

In certain parts of B.C., central air conditioning may be the only way to keep a home cool and comfortable. Households may be able to avoid central air conditioning by using portable or in-window air conditioners and by choosing the most efficient models.

ENERGY STAR-rated portable room air conditioners are the most efficient and are ideal for use in single rooms, such as in a bedroom that needs to be cooler for sleep. BC Hydro recommends closing the door in an air conditioned room for maximum effectiveness and to lower energy use.

BC Hydro also has a recommended setting of 25 degrees Celsius for air conditioner thermostats. If the air conditioner is set any cooler, cooling costs from electricity use will rise dramatically.

BC Hydro recommends looking for an air conditioner's SEER (or in Canada, EER), rating – the higher the rating, the more efficient the device.

- For room air conditioners, the EER ranges from a low of 9.8 (least efficient) to a high of 12 (most efficient), and look for the ENERGY STAR label.
- Central air conditioners have an EER range of 13 to 24.5.
- Ductless central air conditioners have an EER range of 13 to 26.

Buying and operating central A/C: Tips and advice

For those in areas where central air conditioning is the only option for keeping the home comfortable, BC Hydro offers the following advice that can help ensure a central air conditioning system is right for the specifics of the home and that it operates efficiently:

- Shop for ENERGY STAR. An ENERGY STAR-certified central air conditioner (A/C or “central air”) uses 8% less energy, on average, than a standard model.
- Select the right size for your needs. Use a qualified air conditioning contractor and insist that they do a proper “heat gain” load calculation based on measurements of the home. Under-sizing a system may mean it will not get as cool as desired. Over-sizing may result in too-frequent cycling of the system, causing excessive wear and tear, uneven cooling and inefficient energy use.
- Ensure that the outside compressor component of the central air conditioning system is shaded from the sun as much as possible. Direct sunlight will make it harder for the air conditioner to get rid of heat.
- Keep windows and doors tightly closed when the air conditioning system is in operation.
- Select the highest thermostat setting that is comfortable. BC Hydro recommends a temperature of 25 degrees Celsius, as the higher the setting, the lower the costs.
- Adjust the thermostat when away from home. For more than four hours, adjust it to 28 degrees Celsius. If there is no one home for 24 hours or more, shut it off.
- Clean air filters at least once each season. A dirty air filter can prevent proper air flow and could even damage the air conditioner itself.
- Get an annual inspection. A professional air conditioning contractor can clean and tune the system to extend life and ensure efficiency.
- Make sure the coils on the outdoor portion of the air conditioner unit are straight and kept clean. If they are clogged or dirty, clean them with a hose (provided that power to the unit is off).
- Consider using a ceiling fan to reduce the amount of time the air conditioner is needed.
- Shut power off when the cooling season is over. Most units have an electric heater that runs over the winter and uses energy. Flip the circuit breaker to turn this off, but do not forget to turn the power back on a few days before operating the system the following year.

