ARCTIC ENERGY ALLIANCE
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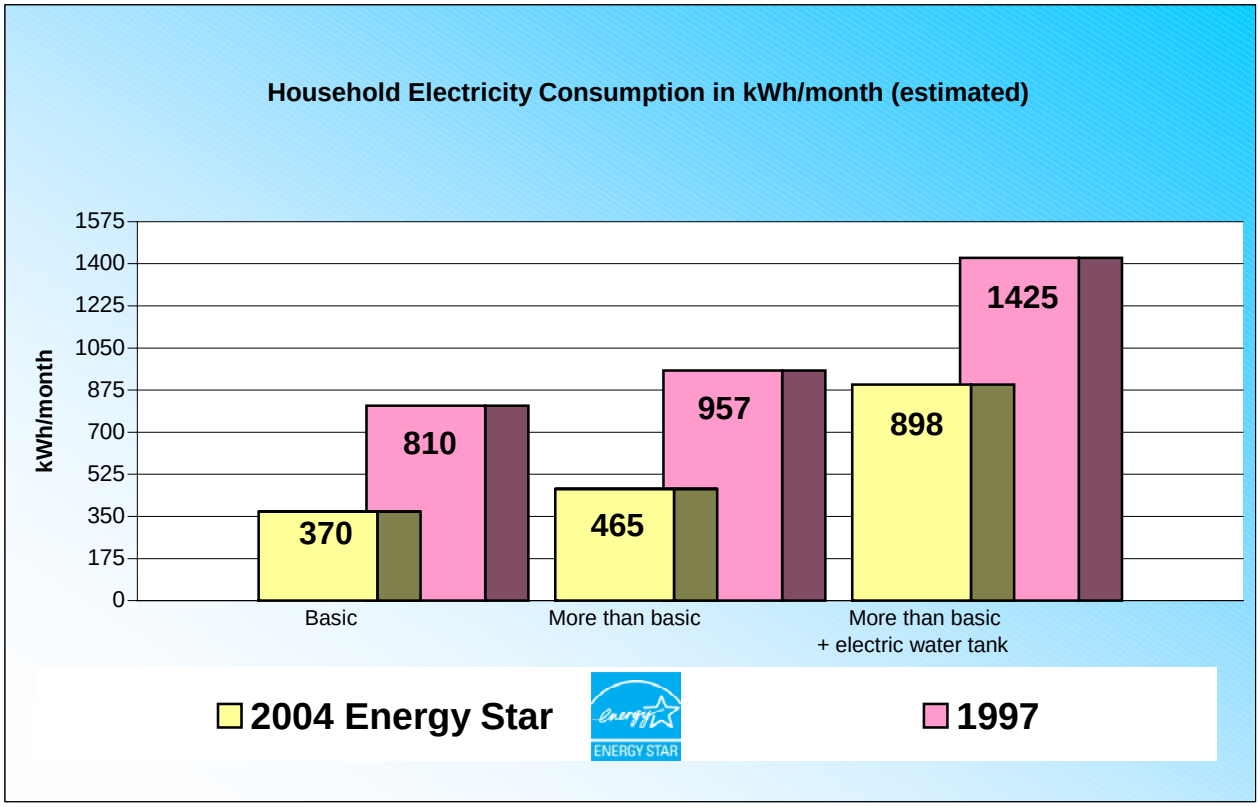
Can a household live comfortably using less than 700kWh/month?

Yes, it's easy without an electric water tank. The graph below shows the results of some calculations made to determine the average monthly electricity consumption of a household in NWT.



Summary

Many people think that as technology advances, people need more electricity to power all the new devices in their homes. This study shows that the opposite is true – advances in technology mean that homes can use much less power than they did in the past. This study compares a house using typical 1997 technology with a house that has all the same appliances and gadgets using 2004 Energy Star qualified technology.

The 2004 Energy Star case is far below 700 kWh/month as long as there is no electric water tank. With the addition of an electric water tank, the consumption jumps above 700kWh, but could be brought back under 700kWh by implementing simple conservation measures such as those described in the notes below.

This shows that people who use Energy Star qualified technology should have no problem using less than 700 kWh/month. It also shows how important it is that homes in communities with expensive electricity (such as those where electricity is generated with diesel or gas generators) should not use electric hot water tanks – it is much cheaper to use a fuel-oil or gas-fired hot water heater.

Notes

- 700kWh was chosen as a limit for this study solely because NWT residents have their electricity rates subsidised to the Yellowknife price for the first 700 kWh/month. Additional consumption is charged at a rate that more accurately reflects the cost of local electricity production.
- The 2004 Energy Star case is not an example of ultra low power consumption. Newer Energy Star appliances use even less electricity than 2004 models. Some organisations, such as Greenpeace, estimate that using high efficiency appliances and good practice, an average Canadian household could consume less than 110kWh/month without any loss of comfort[1] (excluding a hot water tank).
- The 1997 case is not an example of extremely high consumption. Older appliances tend to use more electricity than 1997 models and consumption can easily be increased by leaving unused appliances running.
- The monthly usage is a yearly average so it's likely that the consumption will be higher than shown on the graph in the winter and lower in the summer.
- Eliminating phantom loads in the 1997 case decreases monthly consumption by 68kWh.
- Behavioural changes such as only running appliances when required will also decrease energy consumption dramatically.

Definitions

3 levels of consumption

Basic includes a fridge-freezer, oven-range, washing machine (392 normal loads of clothes /year – that's more than 1/day), clothes dryer (based on 416 normal loads/year), furnace fan/boiler pump, block heater, VCR, DVD player, computer with printer, colour TV, ceiling fan, stereo, 3 clock radios, window fan, vacuum cleaner, kettle, microwave oven, toaster, iron, coffee maker, hair dryer, and household lighting. The time that each appliance is used per day is estimated and will vary by family.

More Than Basic includes everything basic and a dishwasher, separate freezer, video game console, electric blanket, and portable heater.

More Than Basic Plus Electric Water Tank is the same as More Than Basic with an electric water tank added. A medium home using 225L of hot water daily is assumed[2].

2 cases

The electricity consumption of appliances varies from brand to brand and with age. Generally speaking new appliances use less energy than older ones. Some appliances also draw a phantom load, which means they draw electricity when they're turned off or are in standby mode. The three categories above were calculated for two cases.

1997 case is so-named because the electricity consumption of the major appliances was calculated using government of Canada published averages for 1997[3] models. For appliances that were not covered by the government data, the value chosen was near the top of the range for different manufacturers.

2004 Energy Star case uses the 2004 Energy Star averages for appliances where Energy Star appliances exist[3] and uses the lower end of rated consumption for other appliances. In this case the usage patterns were left the same with the exceptions that a timer was installed on the block heater so it wasn't running all night and the phantom loads were turned off at the wall when not in use. The lighting was changed from incandescent to Compact Fluorescent Lights (CFL) as well.

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[1] http://www.greenpeace.org/canada/en/campaigns/climate-and-energy/solutions/energy-efficiency/12-steps
Twelve clever ways to save lots of electricity and money (and, by the way, also the planet), Greenpeace Canada.

[2] http://209.85.173.104/search?q=cache:lTvRqeePwm4J:www.oee.nrcan.gc.ca/equipment/english/page179.cfm%3FPrintView%3DN%26Text%3DN+family+4+225+litres+hot+water+day+energy&hl=en&ct=clnk&cd=1&gl=ca
Heating, Cooling and Comfort, NRCan.

[3] http://www.oee.nrcan.gc.ca/publications/infosource/pub/appliances/2007/?attr=0&text=N&printview=N.
EnerGuide Appliance Directory 2007, NRCan.