



Elements

By Kevin Pegg

Off-Grid Fridge

What's a summer without cold drinks?

These days, the number of options for refrigeration in a remote, off-grid cottage environment is greater than ever. What will work best for you will come down to your needs, your budget and your site.

If you asked this question 10 years ago, there would be one answer if you were looking for anything beyond a conventional ice box: propane refrigeration. Thankfully, times have changed.

First let's look at the three main types of refrigeration as well as one non-conventional approach:

Thermoelectric

Generally used in small coolers, this type uses the Peltier effect, which is when an electrical current is pushed across two dissimilar metals; one metal gets hotter, the other cooler. While an elegant and simple technology, it is a huge energy hog. These coolers must be plugged in continually and will draw around 1.2 kWh per day, which is more than a modern full-sized fridge! These units are best for keeping things cool in a car, but that's about it. Many people are tricked by the low price tag (under \$200), and think they have the magic solution to cottage refrigeration until they realize they'll need a larger solar array than they would for most full-sized fridges.

Absorption

Commonly known as propane (LPG) refrigeration, and also used in three-way (AC/DC/LPG) units, absorption is when cooling occurs by vaporizing ammonia gas inside the refrigerator, using a heat source (propane or electricity). The vapour is then condensed and re-absorbed by the ammonia solution outside the unit. These units are only available in small sizes, the largest typically being 8 cubic feet. One popular model shows it will use 3.9 kWh on electric, or 1 litre of propane per day it operates. These units are generally more expensive than conventional electric units, and are only available through specialized stores or catalogues.

More than just an ice box—new, cool technology in off-grid refrigeration.



Compressor

These are the fridges most people are used to. You can hear the compressor cycling on and off throughout the day. This works by a vaporizing coolant inside the refrigerator. Heat is absorbed by the coolant and released outside the unit in coils. Some units may have coils on the back to dissipate the heat; others may use the side of the unit. As any refrigerator works by removing heat from the inside, it's critical to allow the unit to breathe so that the heat will be dissipated easily, allowing the compressor to run less, thereby using less energy.

Water-Loop

This is a less-common form of refrigeration, and more in the realm of the "Do-It-Yourselfer." It involves pumping cold water from deep in a lake or glacial-fed creek into a super-insulated box, cooling its contents. These systems can be constructed very economically and give decent

service. Temperature is limited by the source water, as there is no compressor or cooling agent. There's also the electrical draw of the pump unless you are gravity-fed.

Now, which will work best for your needs? Let's break down the options:

1. Full-sized, conventional electric. The modern refrigerator (**compressor**) has advanced in leaps and bounds in terms of energy efficiency. A modern fridge will use a fraction of the electricity of a 10-year-old unit due to improvements in technology and the general energy awareness that exists today.

If you have a medium- to large-sized power system, it can generally support this load. Most solar systems have excess power in the summer months, and this is a good use of it, as a refrigerator will also work harder in the summer.

You have a wide variety of units to choose from and there is an established network for

DREAMSTIME

any repairs that may be needed. The larger the unit, the more features it has (icemakers, etc...) and the more power it will use, so shop realistically. Do you really need a 24 cu-ft double-door unit for a cottage used only on weekends?

2. Propane, or LPG refrigerators (absorption) are the old-school way to tackle refrigeration and freezing. There are many brands and sizes out there. The fuel source is commonly propane and if your cottage has a very small electrical system and you have no need to expand, LPG may be the way to go. However, you need to consider the operating cost of these units. It's not uncommon to have an LPG fridge use \$50 of propane per month.

It's also important to consider this: clearly, common sense tells us not to leave combustion appliances running when not at the cottage, so it's not recommended to leave these on when not there. I know of two cabins that were blown up by LPG fridges.

However, they take about half a day to cool down and require yearly servicing by a qualified person, which may be quite challenging if your getaway is somewhere remote.

3. Three-Way (AC/DC/LPG) units (absorption) are commonly found in boats and RVs. They are basically LPG units with electricity added on as an afterthought. These units are extreme electrical power hogs, only suitable for shore power or in running vehicles, as they will deplete a battery bank very quickly. In DC mode, they can easily drain down a group 27 battery in an hour or two.

4. Alternative, high-efficiency refrigerators are another option. Sunfrost (compressor) has been making custom, high-efficiency refrigerators and freezers for decades and some Sunfrost owners have units that are 15-20 years old that are still going strong. These are premium units, built to order according to your specifics. They typically use less than half the energy required by the most efficient units available in mainstream appliance stores. They are available as DC or AC units. DC units can further save energy by not requiring the inverter to be on.

As they are high quality and custom-built, these units will cost notably more than a conventional refrigerator, with lead times of two months typically. They can be purchased

through renewable energy companies such as www.energyalternatives.ca.

Sundancer also has a very smart design—chest-freezer style. As cold air is heavier than hot air, when you open the door of a chest-style, the cold stays inside. When you open the door of a conventional upright fridge on a humid day you see the cold air condense to look like fog, rolling out to the floor, that is a loss of cooling and has to be made up again once the door is closed.

And finally, there's the good old-fashioned cooler. Fill it up with ice at home and lug away. Ice is generally readily available if you are in a populated cottage area. This is an inexpensive solution for people who do not have high refrigeration needs. How long the ice will last depends on the outside temperature, the number of openings and closings and how much food is in the cooler. As temperature will vary, it's important to ensure meat and dairy items are cold enough to prevent food contamination.

This gives a rundown of your options. Consider what works best for your lifestyle and budget and invest appropriately. And here's to cold drinks waiting for you when you arrive at the cottage! I'll drink to that. ☺

HANDCRAFTED LOG HOMES



Building quality homes for over 15 years



"New Home Warranty" program approved builder

Utilizing new technologies in our construction

References in new homes, restorations & renovations

Quality stains & sealants

Exporting worldwide

M & H Wood Specialties Ltd. Grandin Park P.O. Box 77027 • St. Albert, Alberta T8N 6C1

Toll Free: 1-888-991-5700 • Phone: (780) 459-5700 • Fax: (780) 460-2584 • www.mhwood.com • email: sales@mhwood.com