

Farm and rural backup power: Good luck is not a plan

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The need for a backup power option for your farm or rural property has never been more apparent. Our reliance on electricity to power our farms, homes, and communication devices means that having a backup option is not just a convenience but a necessity. The requirement is evident for livestock owners dependent on power ventilation and well pumps. For everyone else, a loss of power to run well water pumps, refrigerators, heating equipment, computers, and communications equipment when an outage lasts more than a few minutes can be inconvenient and costly.

The hydro grid in Ontario is very dependable, but it can never guarantee power when seasonal wind storms, ice storms, and thunderstorms sweep in. Wind events and an ice storm can take out power for several days, and you need a backup plan. In May 2022, a Derecho wind event cut a swath from Brampton to Ottawa, leaving ten dead and hundreds of thousands without power for days. Farms in the storm's path ran on backup power for over a week. The best time to develop your backup power strategy is today, well ahead of catastrophic events.

What type do you need?

There are three basic types of generators: smaller portable units, power-take-off (PTO) units run by a tractor, and built-in standby generators. There are several ways to configure these systems to get power into your farm's electrical system to power some or all of your equipment during an outage. An approved transfer switch that isolates your system from the grid is required so that you do not electrocute a hydro worker or damage the generator when the power comes back on. Transfer switches can have a manual or automatic disconnection and power transfer from the generator into the system. There is also a role in your strategy for smaller battery back-ups and surge protectors for essential and sensitive systems like routers or computers. These devices will hold uninterrupted power for a short time until the backup power kicks on.

What systems do I need/want to run during a power outage?

To determine the best option for your farm operation, you must decide what equipment you need to run during an outage vs. what other equipment it would be nice to have during an outage. Consider what equipment needs to run, whether power needs to restart even if you are not home to start it, and your budget. What size do you need? Establish the electrical equipment you need to operate during an outage to make a difference, what other circuits would benefit from power, and what high-usage equipment you can forgo. i.e., the house air conditioner or clothes dryer. Be sure to include equipment like basement sewage and sump pumps. You can have quite a costly mess if these systems do not have continual power.

What equipment would be mandatory during an outage? Likely - farm ventilation, water pump, milking and feeding equipment, furnace, and sump or sewage pump. What would be nice to have? Hot water, stove, some lights/TV. What can you live without? The air conditioner or power to the shed or the shop? For livestock operations that rely on ventilation fans and need reliable power for watering and feeding equipment, the most reliable alternative is a more significant permanent stand-by generation (diesel) with an automatic transfer switch. But for smaller farms and rural property owners, there are other options.

Types of generators

Portable generator: \$1,000 to \$2,500

- Depending on commercial or recreational models
- Pricing on these vary quite a bit from brand to brand

Portable generators can be a good option for rural homeowners. They are the least expensive and can be used anywhere or shared between users. But how they are connected safely and effectively to your home systems is critical. Extension cords through a door or window are potentially unsafe and would not easily allow you a code-compliant connection to a furnace or water pump. A new device called a GenerLink offers a safe and code-compliant option to connect portable generators purchased from local retailers to your house or small farm electrical system (max 200 Amp service) and for generators up to 40 Amps output (10,000 watts). This unit is an approved manual transfer switch that connects the generator to your house. It is ordered with the correct cord to match your generator output and installed at your power meter base.

When an outage occurs, you start the generator and plug the line into the base of the GenerLink. It will power all the systems connected to your electric service, so it is essential to understand that you are now the load manager and must balance the demand load from the house with the output of your generator. You may not be able to run high-load circuits such as the air conditioner or clothes dryer, but a GenerLink allows you to manage the entire 30 or 40 amps of power in your house by choosing which specific equipment. **Hint:** a few dabs of nail polish on electric panel labels can help you identify key circuits to leave on or off during generator use to limit the load. Small LED lights on the bottom of the GenerLink unit show connection status so you can turn off your generator when Hydro is restored to your system.

A GenerLink generator connection is the safest connection option for portable generators. Other small sub-panel kits are available, but they soon reach the cost of the GenerLink. This tool offers the most versatility in circuit selection and load management, as you can manage the actual load used by the entire house and not be limited to selecting circuits based on the maximum breaker rating. The GenerLink facilitates portable 8,000 to 10,000-watt generators to run a refrigerator, freezer, water pump, and furnace, along with a few lights and TV as required, with minimal compromise in family activities - as long as you do not run everything simultaneously. And if you needed to run your stove or another high load, you could always turn off other appliances or loads and use some of the stove elements.

"The GenerLink unit is the most cost-effective way for small generator users to connect a portable generator to their home electrical system safely," states Brent Graziotto of Graziotto Electric, serving rural customers in Nobel, Ontario. For his customers who are upgrading their electrical system and those who do not need or want the expense of a more extensive auto-start standby system, he recommends this to his rural residence and small farm customers.

As another option for a transfer connection, both Bent and Scott Childerley from Sommers Generators agree that those who are considering an auto-start generator in their future should invest in the transfer panel with a portable generator receptacle that can be similar in cost to a GenerLink but can have an easy upgrade with the addition of an auto-start generator in the future.

Never run a portable generator in an enclosed building or garage or where the exhaust might enter a living space. Portable generators must be shut down every few hours for inspection and refueling.

PTO Tractor driven generators

PTO – 10,000 up to 150,000 watts (150kW).

PTO generators and manual pole-top switches were once the main options for farmers across Ontario. They offer a cost-efficient way to access significant power and run entire farms, including feed milling equipment and silo unloaders. They are portable and can be moved and shared between farms or towed to an outlying barn. PTO generators require a manual transfer switch, and someone capable of safely operating a tractor must be on the farm to hook up the generator and run the tractor. The PTO generator must be stored someplace accessible in both summer and winter.

Scott Childerley from Sommers Generators points out that, "For some applications, PTO generators can be an excellent choice: certain applications such as remote field locations, irrigation, or pumping out flooded field space in the spring can sometimes still be more cost-effective than a permanent generator that you may only use one week to one month per year." A concern with PTO generators is the quality of the power. In our modern age of electronic equipment, we have sensitive computer boards in all types of equipment, including digital farm thermostats, milk cooler controls, robots, and well pump controllers. Even your fridge would be susceptible to damage from fluctuations from a power supply that does not provide the correct voltage or stable frequency.

Permanent standby generator systems

- ***Home-series (10kW – 26kW; 3600 rpm air-cooled NG/LP)***
- ***Commercial-series (35kW – 60kW; 1800 rpm liquid-cooled NG/LP)***
- ***Commercial/Agricultural Diesel Cost (10kW – 30kW; 1800 rpm liquid-cooled DSL)***
- ***Commercial/Agricultural Diesel Cost (55kW – 150kW; 1800rpm liquid-cooled DSL)***

A permanent auto-start system is the most reliable for rural properties and livestock farms. Generators are powered by diesel, natural gas (NG), or liquid propane (LP) fueled engines, generally with an automatic transfer switch. The automatic transfer switch constantly monitors the incoming power. It will start the generator when the power goes off and automatically transfer power in less than one minute after it goes out. These systems are designed to run for several days when you provide adequate fuel supplies. Home systems run from 10kw up to 26kw. Larger farm systems (diesel, NG, or LP) run from 15kw to 80kw or larger for large applications. However, these larger applications are becoming more and more prevalent, depending on the area. These units require a mounting base or a small building to house them. Like any tractor engine, they require regular maintenance. They usually include a battery maintainer and often a block and oil pan heater for winter dependability.

Your local generator supplier can help you design a system to meet your needs, level of protection, and budget. Sizing and siting are essential concerns. The layout of your current electrical system will dictate the location of the meter and electrical panels, how you connect a transfer switch, and where you might locate a generator and transfer panel. Please consult a dependable generator client services representative to investigate further pricing and details of accurately sized, individually tailored backup power solutions for your operation.

What lies ahead for farm power?

In addition to regular inquiries from dairy and poultry producers across his sales district, Scott Childerley of Sommers Generators is looking to supply equipment for new and unique situations where he believes generators and new battery technologies could play a role.

Here are two examples:

- Helping fill the energy gap for clients to meet their "Peak or prime power" needs. For example, a farmer looking to add another dryer may find that upgrading the electrical service from the road into the new dryer location is prohibitive compared to adding an on-farm power option when excess power is required for short periods.
- New packages of generators, solar inverter(s), and energy storage systems (ESS) (batteries) as a tertiary/alternative supply for storing power and running during peak periods to save on operating costs or moving toward "off-grid" applications (even just for remote locations) will become more practical to meet unique power demands.

Scott states, "New systems are coming to market that combine integrated power generation and storage. Battery storage systems will increase demand with the enhanced stress we continue to put on the electrical grid. They also can (in some cases) offer a more cost-effective solution to running Hydro to a particular area of the property for one select machine/function – e.g. remote field irrigation pumps, well pumps, and off-grid/partial off-grid operations."

Modern society depends on a constant supply of electricity. We often take this for granted – until a power outage occurs. Livestock producers depend on electricity for ventilation, milking, pumping water and feeding equipment. The economic loss from not having a backup plan (or two) is enormous, not to mention the inconvenience to your family. A safe, reliable power generator option is critical to every farm's electrical system and emergency plan.

The biggest outside threat to our rural properties is damage from weather events; the most widespread impact is summer thunderstorms, winter ice storms, and power disruption.

The next power disruption is not a question of "if" it will occur; it's a matter of "when" and for how long. Make your backup power plan today.

Reference: [OMAFRA On-farm generators for emergency use \(2020\)](#)

Photo of GenerLink transfer switch and standby unit on a dairy farm from Sommers Generators

