

Commercial Generators

For many businesses, a power outage can be catastrophic, causing decreased output or production, spoiled inventory, lost labor hours and more. Fortunately, there are many ways to navigate outages and maintain electric stability. One of the most common is using a commercial generator.

1 What Is a Commercial Generator?

Commercial generators generally provide backup power to ensure critical equipment remains operational during an outage. They may be necessary or even legally required when a loss of power would pose a life-safety risk or cause substantial financial losses to a business.

Power sources for commercial generators include diesel, propane, gasoline and natural gas, though diesel is most prevalent thanks to its lower upfront and maintenance costs. Natural gas is also popular and benefits from having availability through existing utility infrastructure; however, during natural disasters, supply may be cutoff.

In general, there are two use types for commercial generators: continuous duty and backup. As their names suggest, continuous duty would be used constantly – even when grid power is available – and backup would be used during an outage or power quality event. The types of generators have different emissions requirements (see Part 7 for more information) that could impact their price, with continuous duty typically being more expensive. Brands of commercial generators include Caterpillar, Generac, Cummins and Kohler.

Along with generators, battery storage is another option for backup power. Battery storage has other benefits, such as power quality management and solar/renewable energy integration. This technology is further explored in our [Commercial and Industrial Battery Storage](#) fact sheet.

2 How Does a Generator Work?

Most generators have an engine powered by a fuel source (e.g., diesel, natural gas, propane) and some form of internal cooling and lubrication system. In addition, generators have an alternator that converts the mechanical energy produced by the engine into electricity. This electricity will generally be regulated based on the voltage so that it matches the requirements of the desired applications.



3 Why Buy a Commercial Generator?

There are many reasons to buy a commercial generator. The most common is for reliability and resiliency: Generators provide a level of redundancy for a facility that is becoming increasingly attractive. Outages can be impossible to predict and can lead to operational downtime that costs companies greatly. Having a generator alleviates some of the stress associated with these scenarios. In addition, generators can be deployed for cost-saving practices, such as peak shaving. Using a generator to “ride through” portions of the day when peak demand is being set can provide significant savings depending on a company’s electric rate schedule.

The main consideration when buying a generator is how much a power outage could cost a company.

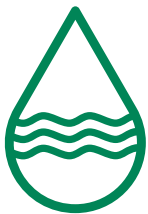
For some, losing power for a few hours or days isn’t a big deal, especially with the prevalence of remote work. For others, such as certain manufacturing facilities, a few hours of downtime could come at a huge loss.

Generator size is another consideration. Some facilities might need a generator that covers the entirety of their demand, while others might just need to cover their critical equipment. Demand requirements should always be assessed when sizing a generator.

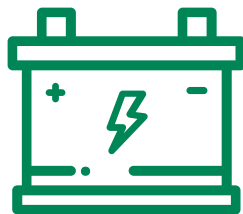


4 Maintenance Considerations

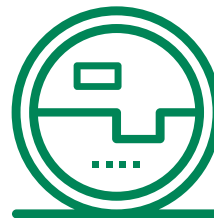
Routine maintenance and testing are essential to ensure generators are ready to perform without a hitch. Follow manufacturer maintenance instructions, which may include:



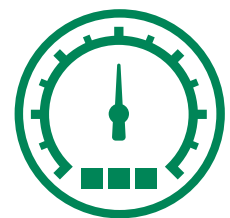
Fluid Level Check
Ensure engine oil and coolant are kept at appropriate levels.



Battery Inspection
Confirm battery health and inspect for leaks and corrosion. Replace battery if necessary.



Load Bank Testing
Verify the generator is functioning properly at full kilowatt (kW) output rating.



Fuel & Filter Check
Test fuel to ensure it is in stable condition, and check that filters are clean; replace if necessary.

5 Cost Considerations

The cost of a commercial generator is based on many factors:

- Voltage
- Size (kW)
- Application (standby, peak shaving, etc.)
- Fuel Type
- Fuel Tank Size (if applicable)
- Location (outside or inside)
- Noise Level Restrictions

Components like controls, an automatic transfer switch (ATS) and switchgears can impact the cost as well. At a high level, generators can cost in the range of \$30,000 (for 30 kW) to \$1,000,000 (1 megawatt), and even more when going above 1 megawatt. However, these costs are highly dependent on the manufacturer and factors above. Additional costs of installation and maintenance should be considered before making a final decision.

6 Safety Considerations

Commercial generators should always be operated in well-ventilated areas to prevent people and animals from breathing harmful carbon monoxide. Most generators are installed outside on a concrete slab, but if one must be installed indoors, it should have a dedicated room with adequate ventilation. Generators should not be located near windows, vents or other air intakes that could potentially allow circulation of carbon monoxide into the occupied portion of a building.

Here are other health and safety recommendations:

- Ensure the generator is installed by a reputable dealer that follows safety guidelines.
- Only allow authorized personnel near the generator and make sure there are safety barriers to keep unauthorized personnel away.
- Only allow trained personnel to operate the generator.
- Before starting the generator, make sure to follow manufacturer-provided safety instructions to prevent injury.
- Keep the generator dry and clean of dust and debris – it shouldn't be in an area subject to flooding. Built-up grime or debris can restrict output capacity and may shorten equipment life.



7 Legal Requirements

Legal requirements depend on several factors, including generator type, model year, installation date, installation location, application and sizing. Environmental requirements may include limits on combustion emissions – for example, emergency stationary backup generators can be operated for maintenance and testing purposes up to 100 hours per calendar year, but there is no limit on their use during an emergency per 40 CFR 63 Subpart ZZZZ. Per National Electrical Code (NEC) Articles 700 and 701, backup power for Emergency Systems and Legally Required Standby Systems is required for equipment whose operation is essential for safety to human life (such as fire detection/alarm systems, elevators, fire pumps, public safety communication systems, etc.) and to illuminate or power equipment whose failure could create hazards, hinder rescue or hamper firefighting operations.

It's important to select an installer/vendor that has a good understanding of local, state and federal requirements and to communicate with government agencies or Authorities Having Jurisdiction (AHJ) to ensure all legal requirements are met. Additional environmental, health and safety legal requirements may include but are not limited to the following:

- State/local building codes
- State/local permitting regulations
- NFPA 70 – NEC
- NFPA 110 – Standard for Emergency and Standby Power Systems
- 40 CFR 60 – New Source Performance Standards
- 40 CFR 63 – National Emission Standards for Hazardous Air Pollutants
- Storage Tank regulations (UST / AST)

Please contact your local electric co-op with questions or for more information on commercial generators, generator safety and maintenance, as well as local regulations and interconnection options.

Sources

[Essentra Components: How Does a Generator Work?](#)

[Kohler: EPA Emission Standards for Diesel Generators](#)

[Kohler: Understanding NFPA 110](#)

[NC Department of Environmental Quality: Emergency Generators](#)

[North Carolina State Building Code Chapter 27: Emergency and Standby Power Systems](#)

[PC Inc.: 7 Reasons Why Generators Are Important for Commercial Buildings](#)

[Resource Management Associates: Emergency Backup Generators & Environmental Permits](#)

[Retail Compliance Center: Emergency Generator Fact Sheet](#)

[University of North Carolina at Chapel Hill: EHS Emergency Generator Requirements](#)

[Woodstock Power Company: A Guide to Backup Generator Installation for Businesses](#)

[Woodstock Power Company: Safety Tips for Commercial Generators](#)

[Woodstock Power Company: The Keys to Industrial Generator Maintenance](#)

