

The Rolling Blackout Survival Guide:

What you need to know to prepare now

By Lee Bellinger

In This Report: The Most Important Power Back-Up Systems for Your Home

Unless you live in a very large city, you might not be aware that your utility company has plans for rolling blackouts. They know something you, the average consumer, do not know. They know the infrastructure of our power system is aging – and not being replaced or updated!

That's why all electric companies have plans in place for rolling blackouts. (In case you're not sure what a rolling blackout is, it's when the utility company shuts off your power for a certain block of time because it can't keep up with the increased usage on its system.)

I'll get into practical solutions and personal work-arounds for rolling blackouts in just a moment, but first let me briefly take you inside my research into this vexing nationwide crisis in the making.

Rolling blackouts – also called controlled or rotational blackouts – are used to prevent widespread, long term power failures when utilities cannot or will not, due largely to government interference, expand their infrastructure to meet peak demand.

But these “planned” outages don't usually fit into *your* plans. You'll probably have only a few hours' notice, if any, and then the lights will go dark. Your computer won't function, your coffee maker will go cold, and your air conditioning won't blow cool air anymore. Everything will stop working. Imagine how disruptive that can be – even if it's only for a few hours. And if any member of your family relies on life critical equipment such as an oxygen system or a CPAP machine, the result could be more than merely disruptive.

Old Equipment not being Replaced

Rolling blackouts are on the rise. Utility companies are not following appropriate guidelines for replacing obsolete equipment. Most transformers in the United States have lifespans of around 40 or 50 years. Yet the *average* age of these transformers is 42 years! Many transformers have loose parts and frayed wiring.¹ Utilities can't replace or fix this hardware without rate increases, which are tightly regulated almost everywhere.

As Bill former Secretary of Energy Richardson said, “America is

“a superpower with a third-world grid.”

Like everything else that gets old and isn't updated or replaced, the U.S. power grid is beginning to falter. From transformers to steel towers to power lines, many parts need replacing. Rolling blackouts occur when the need for power is greater than what the system can produce and deliver. Old equipment doesn't handle this stress well, which can cause it to fail – extending time the power is out while repairs are made.

Take what happened in Ritchie County, West Virginia on June 29, 2012, for example. Three huge steel towers toppled over like Tinker Toys and a fourth tower was pushed off kilter when 70-mile per hour winds hit the area.² The toppling towers caused the power to be out for several days. Power was out for homes and businesses in West Virginia, Washington D.C., and Maryland. The towers, erected over 40 years ago, had withstood stronger storms. However, lack of maintenance after four-plus decades of exposure to the elements caused them to topple.

Storms are only one of the conditions power companies monitor. They also monitor sweltering heat. Heat causes the most overload on a power system. When it's hot, air conditioning systems run longer. In addition, power lines lose efficiency and transformers fail in hot weather. Power companies know this and instigate rolling blackouts, due to high energy use, in the summer. Southern California Edison did this the summer of 2012. They called them 'flex alerts' and noted on their website that people need to have emergency kits and family communications plans for their rolling blackout times.

Let's be honest – very few families have emergency kits and family communications plans for rolling blackouts. They simply count on the power company to deliver power. That used to be a fair assumption. Not anymore.

Rolling blackouts are a part of our future. It's estimated that an additional \$11 billion *per year* for the next seven years is needed to repair our current system and avoid these short-term blackouts.³ That's over \$77 billion dollars. And you know as well as I do – *it ain't gonna happen.*

Federal Mandates

Money isn't the only reason, however, you need to be prepared for rolling blackouts. Another problem for your local utility is new laws driven by the "green technology" agenda. Congress enacted several mandates requiring coal-powered plants to further reduce emissions by 2018. Most coal-fired plants can't make these adjustments in that time frame. These plants will have to shut down – further reducing electricity production. With less power produced, and increasing demand, rolling blackouts will become the new norm. Obama is keeping his 2008 campaign promise to bankrupt coal-based power companies.

Electricity is Not a Commodity

Pardon me if this section is a bit dry and technical, but I want you to get the full picture of what government meddling is doing to the reliability of your power grid access.

A completely different factor threatening your power reliability is the recent government restructuring of the system. Electric utilities began as locally managed companies. They would sell power to each other only when needed. As of the year 2000, however, all the utility companies are in a national grid. That sounds like it would be more efficient. In reality, however, this national grid causes all kinds of problems.

You see, electricity doesn't flow exactly like water, and the grid was built based on how water "flows." Because of the physical properties of electricity, it sometimes doesn't go where people want it to go. Thus it causes "gridlock" in some areas and overflow in others. If the overflow happens on frayed lines, boom (literally!) – a power outage.

Another component of the unified grid is it allows manipulation of the supply and demand for electricity. Market manipulations caused California's electricity crisis in 2000. Basically, supply and demand was faked. Unscrupulous people saw a way to make money through inflated price bidding. This happened in part because they took advantage of the deregulation of the electrical grid.

The national grid system means market manipulation could happen again. This same grid system means outages across the country can also affect you. Superstorm Sandy in New York and New Jersey caused power outages as far away as Detroit.⁴

Awareness

Being aware of the problems that will most definitely arise in the future lets you plan and prepare for when these problems strike. When planning for rolling blackouts you should consider back up power, heat, light, and the ability to cook.

But, I want to alert you to some other problems that may occur as well so you can include these scenarios in your planning. Then I promise we'll drill down on solutions. Your time reading this report is going to pay very big dividends for you and your family the next time the grid goes dark.

Weather

The weather is the single largest reason your power goes out. And in the last few years, it's seems the weather has been really weird... even freakish.

Even more than increased demand, the weather wreaks havoc on our national power lines. The situation in Ritchie County, West Virginia noted above is a classic case. The summer storm was not expected to cause any difficulties, yet it shut down gas stations, interrupted electricity, internet, and cell phone usage, and even stranded 232 passengers on a train for over 8 hours.⁵

Utility companies follow the weather closely because of the devastating affects storms can have on the power system. They try to be pro-active in fixing any problems as soon as they happen.

However, this isn't always possible. Sometimes the weather does the opposite of what's predicted.

Take what happened in Little Rock, Arkansas, on Christmas Day in 2012 for example. A winter storm hit the area, killing 16 people, and knocking out power to nearly 200,000. It took over 4 days for half of those individuals to have power restored.⁶ During that time the temperature was hovering around 26 degrees and there was over 10" of snow on the ground. How would you fare in such a situation? What would you do for heat? Would this impact the post-Christmas sales for your business?

This storm occurred just after Superstorm Sandy devastated New Jersey and New York. In some of those areas, power was off for almost a month. Imagine being without electricity in the winter for four whole weeks! How would you keep warm? What could you use to cook your food? What food could you cook? You wouldn't be able to watch tv, work on your computer, use your cell phone, or even take a hot shower without electricity!

Hurricanes, tornadoes, snow, ice, heat waves, and even solar storms play games with our electric grid. They're like birds hitting a spider's web – they wipe out the web and it takes time, manpower, and money to repair lines, transformers, and other equipment. And weather isn't the scariest bird to hit the electrical web either.

Cyber Attack

All the major public utilities have automated computer systems in place. You probably already know that computers manage the flow of electricity, natural gas, and water. What you might not realize is that these utilities are very vulnerable to attack from cyber spies.

As early as 2009, software programs that could be used to disrupt the nation's information system were found in the U.S. electrical system. This spyware is believed to be from China, Russia, and other countries that harbor anti-U.S. sentiment. U.S. intelligence agencies not the utility companies themselves, discovered the programs. These hostile programs are intended to disrupt and destroy communication infrastructure. Intelligence officials warn that if we go to war, several nations could disrupt our information infrastructure, taking down electrical facilities, nuclear power plants, and financial networks.⁷

You'd think that discovering this would bolster cyber-security in the U.S. However, a full three years later, in 2012, a researcher interested in cyber security purchased industrial computer networking equipment on e-Bay. He discovered a critical weakness in equipment that controls the U.S. infrastructure. He made his concerns publically known after the manufacturer of the equipment refused to take his concerns seriously.⁸

An aging power system, weather, cyber spies, financial manipulators, and even our own federal government and its mandates all cause problems for the electricity grid that covers our country like a giant web. This web is becoming more and more fragile, and less and less reliable. At the

same time we, as consumers, are becoming more and more dependent on electricity. Think about the gadgets you use that need electricity; your air conditioner, your furnace, your lights, all your household appliances, entertainment systems, computers, copiers, your telephone, and your car (even non-electric cars depend on power-operated gasoline pumps). Although you can't control the demise of the power grid, you can control how you deal with power outages. So now let's get down to my specialty – practical solutions that you can implement in your household today to insulate yourself from the worst effects of rolling blackouts.

You Can Prepare Now for Electricity Blackouts

Plan for outages.

Yes, you read that correctly – you need to plan that the power will be out in your area. It might be next week, next, month, or next year – there's no way to know for sure. But power reliability *is* steadily declining. Since 1990, demand for power has increased by 25%; however, the infrastructure needed to transmit electricity has increased by only 7%. The power grid is vulnerable – to the demand of surges, to weather, and to terrorist attacks. It's also old and inefficient.⁹

Assess where you live

What disasters do you need to prepare for?

Consider where you live. If you live close to the ocean or even several hundred miles inland, then hurricanes may happen in your area. Find out if you are in an area that has tornadoes or earthquakes. Wherever you live, you need to prepare for power outages.

After deciding what events you need to prepare for, think about what you need to protect.

What do you want to accomplish?

Do you work from home? Then a source of electrical backup power for your computer is a necessity. Do you have a deep freeze? Then you probably want some form of back-up power system for that as well. The good news is many of these solutions may be easier than you think.

These days there are lots of options from back-up power supply/surge protector for your home computer; to generators that will run several appliances for days; to whole home back-up systems that will run everything in your home for a couple of days to over a year. Some of the variables you need to factor in are cost, portability, and space.

Four Back-Up Systems:

Let's start with small and simple first – steps that are quick and easy to implement, yet can pay hefty rewards in terms of keeping you comfortable and maintaining normalcy when the grid goes down.

One. Portable Power Packs

Portable Power Packs are exactly what they sound like. They are portable power. They weigh between 20 – 30 lbs and plug into your wall, your car, or use solar panels to store electricity. They are designed to provide backup power for computers, small tv's, portable fans, lamps, etc.. Some of them come with attachments to jump start your car, if needed. Others have additions such as small universal inverters that provide power for your computer and cell phone when you travel overseas. These are the least expensive and most portable way to go. They range in price from \$100 to \$500. Batteries last 2-8 years, depending upon the type used.

Two. Portable Generators

Although portable generators can power your whole home, if you get one large enough, they are not hard-wired into your home. They are usually used to provide power to your freezer, some fans, and other appliances through extension cords. They have to be manually started and stopped. They use gasoline, diesel, or propane and are good for mainly short power outages. If you think you might have an outage for longer than about 12 hours, you will need to store fuel.

Portable generators are heavy. Choose one that's on wheels, or buy a cart to move it on. They range in price from \$300 - \$4,000. Big box home centers and farm supply stores typically have a range of options and competitive prices. Online sellers may offer even better prices, though you'll need to factor in substantial shipping costs.

Gasoline-powered generators are usually less expensive than diesel or propane types. However they have a high cost in terms of maintenance and operating requirements. Storing gasoline can be a problem because unleaded gasoline has a short shelf life of only about six months. If you use "old" gas in your generator, it just gums up and doesn't run. When the power goes out, you won't be able to run to the gas station to buy more gas. The pumps at gas stations need electricity to pump gas. Gasoline-powered engines also need their oil changed every 20 hours or so, and may have start-up problems in cold weather.

In addition, gasoline-powered generators are noisy, meaning they are very likely to attract unwanted attention. On a still night, they can be heard for up to a mile or more away. If you purchase one, be sure to add gas stabilizer to your gasoline. Also fill four 5-gallon gas cans and store these in your yard, away from your home. Every 3 months, pour the gasoline into your car and refill the gas cans. That way you'll always have fresh gas for your generator.

Diesel powered generators are more efficient and last longer than gas-powered engines. However, diesel generators are substantially more expensive. They are somewhat quieter than gasoline-powered portable generators, and diesel is far less volatile than gasoline and therefore easier to store.

Propane-powered generators work just like gasoline and diesel powered ones, but with one big advantage -- propane is the easiest stored fuel and it has practically unlimited shelf life. You'll just need to have a large propane tank nearby. Your propane dealer can help you determine what size tank to choose based on how many days you want to be able to run your generator.

Some portable generators come equipped with a multi-fuel switch. This gives you more options when one type of fuel is not available. One often overlooked factor is that portable generators are often advertised by their short-term starting watts, rather than by continuous power. You need to know the continuous power capacity so you will know which appliances you can run from the generator.

Consider your Sensitive Electronics

Most computers will not work with most portable generators. Your microwave, TV, and other sensitive electronic devices may also blow out if connected to a portable generator. This is because portable generators produce what's referred to as dirty power. Dirty power fluctuates and damages sensitive electronic equipment, such as your computer.

If you want to power these items, buy a generator with an inverter, called a powered portable inverter generator. They cost more money than standard generators, but they output clean power. Inverters also run more efficiently than other portable generators. They calculate how much power you are drawing from them and adjust their power usage to match – which means when you are using less power, they use less fuel. (They're also a bit quieter than standard generators.)

Whole Home Systems

Whole home systems include whole home battery packs as well as whole home generators. Whole home systems are hard-wired into your home and need to comply with code requirements and be installed by a professional electrician. They regulate power like your furnace regulates heat, generating power on demand rather than outputting it continuously the way a portable generator does. For safety as well as ease of use, they should be installed with an automatic transfer switch, which monitors the power coming into your home. Think of a transfer switch as the thermostat. It turns the battery or generator on and off.

While there is power coming into your home from your utility lines, the whole home system is in idle mode. When the transfer switch detects that the power from your utility has stopped, it safely disconnects from the incoming line and connects to the battery pack or generator. It takes only 10 to 45 seconds to complete this process and restore power. When the utility power comes back on, the transfer switch detects this automatically and safely returns the back-up power system to standby.

Three. Whole home battery packs can store power for up to several days. They gain their power from your home's electricity, a generator, and/or solar panels. You decide which appliances you

want to have access to this power when your electrician installs the battery pack. Many battery packs, however, are not robust enough to run an air conditioner. This is because air conditioners require more than the steady power most appliances use. They also require start up power. Your refrigerator and other appliances cycle on and off, which requires some start up power; however, their needs are miniscule compared to an air conditioner's start up power needs. If you live in a very hot area of the country and want to run your air conditioner, most battery packs aren't robust enough to generate the start up power needed. If you want to run your furnace, make sure you get a back-up battery system large enough to run it.

A battery back-up system requires a professional, licensed electrician to install the system. A good thing about battery packs with solar panels is that they can be used year-long to supplement the electricity you get from your utility company. This can reduce your monthly power bill, which helps defer the high cost of installing such a system. Batteries last 3 to 10 years, depending upon the type used.

Four. Whole home standby generators are usually powered by natural gas. They can also be used with propane. Whole home generators, also called standby generators, will run between 10,000 and 12,000 hours (which is over a year), as long as they have natural gas/propane to power them. They are not meant to be run continuously, however. While they are in power-generating mode, they need their oil changed every few weeks and may have other maintenance needs depending on where you live. Once installed, standby generators can last for over 20 years and while in standby mode they only need minor yearly maintenance.

How much power do you need?

If you want to make the sizable investment in a whole home system that runs everything, then have an electrician measure your electrical usage. If you have decided on a portable generator, you can get a rough estimate of the size you'll need by gathering the power requirements from each item that will be connected to the generator. (To convert amps to wattage, multiply the listed amps times your voltage. The resulting number will be the wattage needed.)

Other considerations:

When choosing a home power back up system, look at all your options. See the system working if possible. Generators – both standby and portable - are about as noisy as a lawn mower and the noise can be irritating to neighbors if you live on a small lot. Worse, they can attract roving urban refugees like moths to a light, and that's the last thing you want to deal with in a crisis. You should also check for any noise restrictions in your neighborhood. Also ask if the system is listed with Underwriter's Laboratory (UL) or FM, or a respective safety agency.

Also consider your weather and how long you want to have back up power. If you live in area prone to below freezing temperatures and don't want to worry about frozen pipes, then you

probably need a standby generator. Keep in mind that even El Paso, Texas had a major deep freeze just a couple years ago; frozen pipes are a risk almost everywhere in the U.S.

Safety:

Any type of generator should only be used outside. All hard wiring should be done by a licensed electrical contractor. Not all electricians are specialists in backup power; shop around until you find one who is.

If you get a portable generator, make sure to also purchase several heavy-duty power cords so you can connect fans, your freezer, and other appliances. Some have 3 - 4 outlets in the end so you can plug several devices into one cord. Try to put these cords along walls. Never put extension cords of any size under rugs where they could get hot and start a fire.

Comparison Chart:

Consideration	Portable Power Packs	Portable Generator	Whole Home (Standby) Generator	Whole House BackUp Battery
Cost	\$100 - \$500	\$300 - \$4,000	\$2,000 - \$12,000	\$900 - \$8,000
Do it Yourself	Yes	Yes	No	No
Professional Install	No	No	Yes	Yes
will power air conditioner	No	No	Yes	No
Automatically starts	No	No	Yes	Yes
Portable	Yes	Yes	No	No
Must run outdoors	No	Yes	Yes	No
Noisy	No	Yes	Yes	No
Needs fuel	No	Yes	Yes	No
Must charge before using	Yes	No	No	Yes
Maintenance	No	Yes	Yes	No
Hours	18 - 350	fuel	fuel	700 - 10,000
Wattage	400-800	1,000-15,000	7kW - 150kW	300-4,500
Solar Panels Available	Yes	No	No	Yes

Computer Considerations: No matter if you choose a whole-home system or a portable system, if you have a computer at home it's a good idea to have an uninterruptible power supply. This backup power system will stay on for a few minutes during a power outage. It will give you time to back up your files and turn off your computer system.

Other Items to Have on Hand:

A whole-home system will power your whole home. It will keep you warm. It will provide light. It will power your tv and computer. It will let you cook, power your refrigerator and freezer, and even provide electricity so you can do laundry. A high-out standby generator can even keep your air conditioner running.

Portable systems, however, will not power your air conditioner or your whole home. If you choose a portable system, consider what you want it to power. Portable systems will run space heaters for heat, fans for cooling, lamps for electricity, crockpots and hotplates for cooking, and computers and other electronics.

You might choose a portable generator to power your refrigerator, freezer, fans, and some lamps, and get a portable power pack for your computer. You will still need something to use for cooking, however.

Cooking: Cooking can be done on a gas range or in a gas oven, if you have them. Or you can use your barbeque outside to cook. Many barbeques now have features where you can actually bake inside them. Some have a side burner to use with a pot or frying pan. These are ideal in an emergency situation.

Another option is a small propane camp stove, sold at big-box supercenters and sporting good stores. Propane camp stoves should be used outside. They emit fumes and carbon dioxide. Do not use them for heat.

Lights: Although lamps can be run off a generator or back up battery, it's a good idea to have battery run lanterns as well. These lanterns will last almost indefinitely if you choose one that has lithium batteries and LED lights.

Heat: A portable battery pack or portable generator can power a space heater. If you live in a very cold area, however, a space heater might not be enough. Consider getting a wood burning or gas stove. These can keep an entire home toasty warm in the middle of winter and they start at about \$850.

Other Items: Emergency flashlights and an emergency radio are also must-haves for any power outage, including rolling black outs. Emergency flashlights and radios can be powered by more than once source of power. These sources include batteries, plugged into the wall (or back up power source), solar power, and/or hand crank/shaking. They are invaluable in an emergency as they let you see and hear what is happening around you.

APPENDIX A:

The Smart Citizens Guide To Protecting Perishable Foods

Whether facing a rolling blackout or a prolonged power outage, you may find yourself in the position of having to protect your perishable foods, or tap into them to feed your family.

You already have enough challenges to deal with in a power outage. The last thing you need is to get sick or come down with food poisoning on top of everything else that's going on. So make sure you use the following simple guidelines for perishable food during a power outage.

First of all – When in doubt, throw it out!

Water: Drink only approved water. If your water has been contaminated, bring water to a full rolling boil and boil for at least 5 minutes. Cool before drinking. This will kill any micro-organisms and make it safe to drink. Your tap water can become contaminated if a pipe breaks, water pressure in the system drops, or if the system is flooded. Also boil water used for cooking and washing.

Canned Food. Throw out any broken, cracked or chipped glass containers. Also throw away any cans that are dented or have broken seams. All canned foods are vacuum sealed. Opening them for the first time produces a small popping sound as air rushes in and breaks the seal. If you do not hear that little pop and rush of air, the seal has been previously broken. These foods should be thrown away.

Refrigerated food:

- If your power goes out, keep the refrigerator door closed as much as possible.
- Most refrigerated food will stay good in the fridge, with the door closed, for 3-4 hours.
- Any food that stays warm for two hours (40 degrees F) should be thrown out.
- Make sure your refrigerator has an appliance thermometer so you can check the temperature.

Frozen Food:

(If you have purchased a back-up power system, such as a generator, obviously you can use the power from the system to keep your perishable foods fresh.)

- Frozen food will stay frozen in your refrigerator's freezer section for 4-6 hours, depending on how full the freezer is.
- Frozen food in a free-standing freezer will stay at freezing temperatures for about two days.
- If your freezer is not full, group packages together so they stay colder longer
- Put empty cardboard boxes in the freezer to help the temperature stay colder longer.
- If possible, buy ice, or purchase dry-ice in blocks to help keep the temperature cold. A 25-block of dry ice will keep the temperature at below freezing for about 4 days.

- Put meat and poultry on a tray on the bottom, if possible, so as they thaw they won't contaminate other foods. Or put them in sealable, plastic bags.
- Again, any food that stays warm for two hours (40 degrees F) should be thrown out.
- Make sure your freezer has an appliance thermometer so you can check the temperature. A safe temperature for your freezer is 0 degrees F or lower.
- If the power comes back on, you can refreeze food if it hasn't gotten below 40 degrees F. The exception is baked goods such as breads, donuts, cakes, cookies, etc. They can usually be refrozen even if they've come to room temperature.

General Food Notes:

- Throw out any food that is moldy, smells funny, or is discolored.
- Discard any food that has come into contact with flood waters.

Eating/Cleaning Notes:

- Use plastic wrap on plates to save on washing.
- Wash all utensils, plates, cups, and pots/pans in hot soapy water.
- If you need to sanitize, such as after a flood, wash dishes in hot soapy water then sanitize by immersing in a solution of 1 gallon of clean water with 1 Tbsp unscented chlorine bleach for 15 minutes.
- Wash your hands before eating.

Many thanks to freelance editor and researcher Julie Gubler for her invaluable help in bringing you this report.

End Notes:

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