by Gary Armentrout

Where will you be when the lights go out?

Most recall the winter of 2002 when the big ice storm hit south-central and eastern Kansas. The countryside was encrusted in ice. Trees were down, telephone service was out, roads and schools were closed, as were many businesses. For many, there was no power. And as if being out of power was not enough, many people were also without water.

Heartland Rural Electric, KCP&L, Westar Energy and many other electric utilities were out day and night trying to get lines back up and power back on to the thousands of people sitting around candles, lanterns, and fireplaces, all waiting for that moment when that power switch could be turned back on.

Gary Atmentrout
Training Director

Some had planned ahead for this moment. Food and flashlights, water and blankets, a radio had been stocked and some had even gotten a backup generator to have on hand for just that type of emergency. Many people though could only wait. In some cases, the wait was a long one.

Electricity is nearly a totally essential utility today. Without it, most can hardly cook a hot meal, wash clothes or take a warm shower. One can sit around looking out the window, trim some tree limbs out of the way so if and when a utility does show up, the crew can more easily get to the power line that the tree fell on – yes, that can be done but not a lot more. When the temperature is at 0 degrees or below and there is little or no heat, no power, no water and just the frozen outside to look at, people have time to think and ask some questions.

When the temperature is at 0 degrees or below and there is little or no heat, no power, no water and just the frozen outside to look at, people have time to think and ask some questions.

One of the first questions asked is, "Why didn't I plan ahead like some of my neighbors, I could be sitting here watching the ball game right now. All I need is a little generator and some gas and the game is on."

Many did ask that question, and among the questioners were a few water systems. Because when the power goes out the water system begins to drain and everyone knows it's not likely to stop unless the power comes back on.

KANSAS CITY POWER AND LIGHT PHOTO

A KCP&L lineman on the job restoring power after a recent Kansas ice storm.

Investigate generators

There are many types of generators available on the market today so a little homework should be in order before a purchase is made for the water system. The main question is sizing the generator for the need.

The right size of generator will provide just enough power (wattage) to operate all the system's essential equipment. "Essential" is the key word

because it is easy to damage a generator and any equipment being powered if too many watts are being pulled by an overworked unit. If the generator is too large, (too many watts) money will be wasted on the purchase and fuel needed to operate it.

There are two main ways to assess the right size generator needed and one thing that should be avoided. First, determine the amount of power (watts) needed in a generator. An ammeter can determine exactly how much power each piece of needed equipment will pull. Then total up the watts for all this equipment. That answer is the low-end of the overall power need.

The second way to determine the draw in watts of system equipment is to look it up. The instruction manual for most pieces of equipment will list those power requirements. Or it may be listed on the name or data plate found somewhere affixed to side of the equipment. Some pieces of equipment will list power requirements in volts or amps at a given voltage. It is necessary to change the amps/voltage to wattage. In order to do the multiplications use the formula: Volts x Amps = Watts.

The one thing to avoid is estimating generator power needs yourself. A generator dealer or qualified electrician can help determine the right size generator for the system. When starting to shop, generator dealers can easily estimate the size of electric generator for the water system or plant based on information given. To do it right, they should visit the system and work with the operator to help total up all of the equipment needing power before finalizing any decision.

Another good thing to remember is that electric motors take much more power to start than they do to operate. Electronic equipment with significant moving parts like pumps, fans, air conditions or compressors can require up to three or four times as much electricity to start as to run full time.

It is necessary to increase wattage requirements because of those start loads. As most system equipment will not start at the same time, only add enough power for the largest pieces

The one thing to avoid is estimating generator power needs yourself. A generator dealer or qualified electrician can help determine the right size generator for the system.

of equipment for extra startup capacity. It is necessary to figure what equipment has the greatest difference between startup and running load. Add to the running load all other equipment drawing power in order to get the total wattage requirement.

After all the information is gathered and totaled, it is a good idea to plan on buying a generator with a rated capacity of about 20% more than the original total needs calculated. This provides a little extra capacity or room to add a few pieces of equipment and it also helps extend the life of the generator.

Above: *This 50 KW portable generator was installed at Cherokee RWD 1 in 2005. The cost was approximately $12,000*
Above right: *This V16 standby generator was installed by the city of Osawatomie in 1939. This 2500 KW unit is one of three generators that the city uses to power more than the water plant .*

Before purchase, a buyer also needs to know the current or phase needs of system equipment. Most household current is 120 volts or single phase. However

most large water systems will have different power needs. Typically three-phase power, rated at 230/460 volts, powers larger horsepower motors such as well pumps or high service pumps in plants.

Two types of generators – portable and standby

Portable generators can be used to provide power as needed and then can easily be moved to another site, such as from one pump station to another. They can be used to power essential equipment during a power outage as does the standby generator. They are designed however to be operated for a shorter period of time, just a few hours. The portable generator tends to cost less and be much smaller. It will have a built-in fuel tank and standard power outlets. The smallest gas powered generators are less than 1 kW and can range up to as large as a 15 kW model. Larger diesel powered portable generators of up to 200 kW or more are also available.

A standby generator is installed to offset the effects of power outages. Such units are installed permanently as an emergency backup power source for a water system. They are hardwired into the water system's electrical system; diesel, gas, propane or even a PTO can power them. Standby generators at a starting size of around 7 kW to those as large as 2500 kW or even larger are readily available depending on system needs.

Money can be saved when purchasing a generator by limiting the number of devices to be run when the power goes off. When considering that most power outages do not last for more than a day, it is good to limit those power needs. Also remember about what is called the **rated capacity.** This is the power a generator can put out on an ongoing basis, which is normally around 90% of its maximum power.

If you have questions about auxiliary power needs, contact the system engineer, electrician or generator dealer for assistance. But don't wait until the next power outage to act. A backup generator is nearly an essential insurance policy to help protect the public health, welfare and safety. And those are the reasons we all are in the water business.

I have recently assumed the position of KRWA Training Director. Please share any interests you have on training needs. KRWA is here to provide training that is relevant so let us know and we'll respond.

I hope you will attend the KRWA Annual Conference in Wichita, March 28 – 30. The technical program is outstanding; the food and fellowship will be great. See you there!