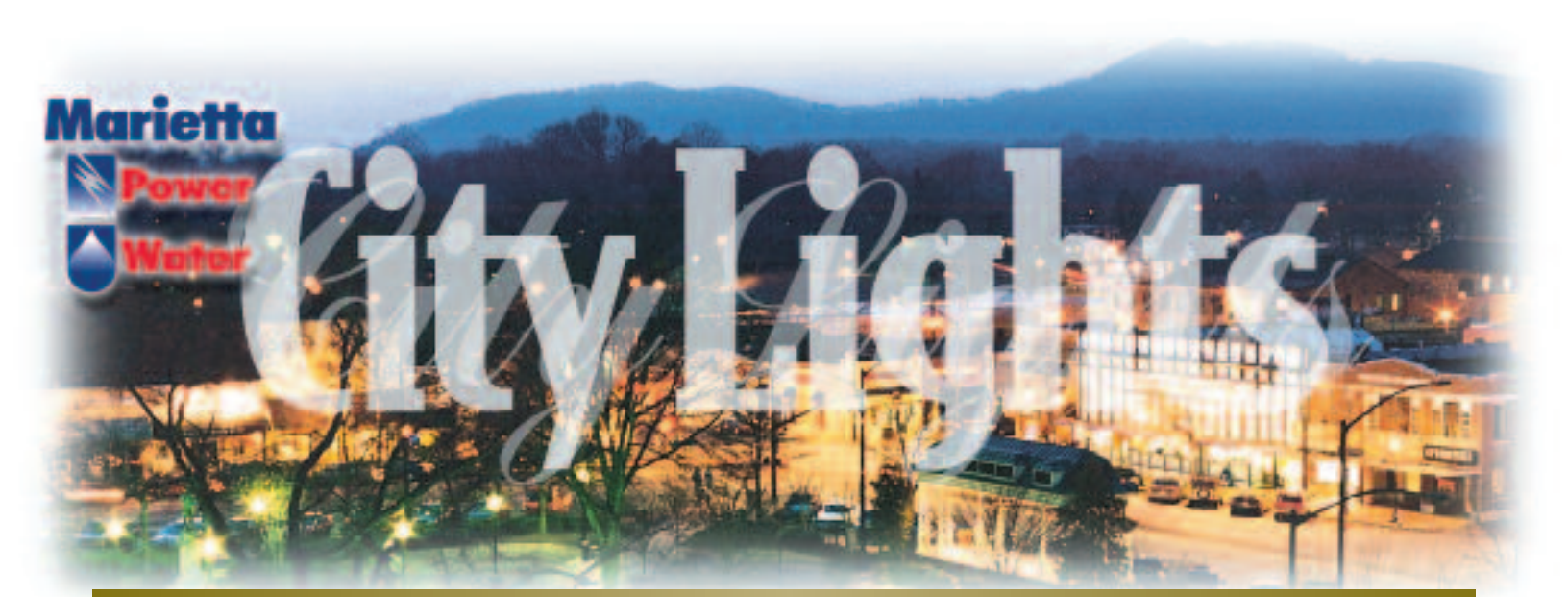


From Marietta Power and Water Summer 2008

Marietta Power and Water Recognizes National Public Power Week and Clean Water Week 2008 October 5-11

Marietta Power and Water will join the nation in recognition of the 22nd annual Public Power Week and Clean Water Week October 5 – 11, 2008. This long-established, dual event honors the importance and benefits of locally owned utilities.

As a valued customer of Marietta Power and Water, we invite you to celebrate Public Power Week and Clean Water Week with us. Events for our celebration include: a poster contest with our adopted school, Park Street Elementary; informational displays at Marietta facilities; refreshments for customers at the Marietta Power and Water Customer Service Center all week and a Customer Appreciation Hot Dog Lunch on Friday, October 10.

PUBLIC POWER
An American Tradition That Works

Marietta Power enjoys the distinction of being the largest municipal electric utility in Georgia. For more than 100 years, Marietta Power has provided reliable, high-quality services. And with consistently exceptional water quality reports, Marietta Water continually proves its commitment to providing safe drinking water.

The Difference Between kW Demand and kWh Usage

Energy users often confuse the concepts of kW (kilowatts or 1,000 watts) and kWh (kilowatt hours or 1,000 watt hours). The kWh term refers to the quantity of energy used, while the kW term refers to the rate at which this energy is used.

As a simple example, a 60-watt light bulb burns power at the rate of sixty watts (or 0.060 kW). In one hour, the bulb will consume sixty watts times one hour, or sixty-watt hours. In twelve hours, that same bulb will have consumed sixty watts times twelve hours, or 720-watt hours (0.72 kWh).

Let's say that your organization has 200 of these 60-watt bulbs that operate for twelve hours each day. The way to calculate your bill for a 30-day period is as follows: Energy Use= 200 X 60 X 12 X 30 divided by 1,000=4,320 kWh. This is the quantity of power consumed, and costs you $432 if you are paying $0.10/kWh.

For the above scenario, your organization is consuming power at the rate of 12kW (200 bulbs X 60 watts each divided by 1,000 to get kilowatts). This rate of using power is called demand. Commercial and industrial users generally pay a demand charge. Residential customers do not because their individual demand is not large enough to justify the cost of a demand meter.

Utilities instituted demand charges because some industrial or commercial customers

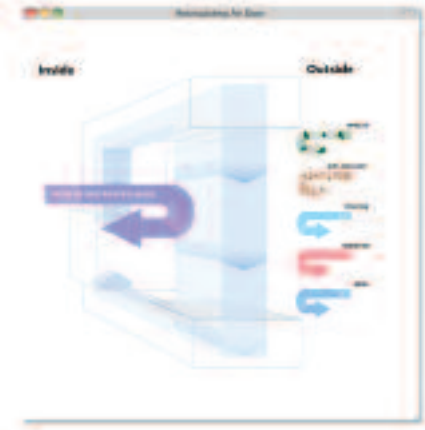
continued on page 2

The Impact of Heat Loss From Open Doors and Ventilation Fans

Open doors and ventilation fans are common in buildings and are necessary in performing routine work tasks. However, the amount of the resulting heat area loss can be significant.

Open Doors

The difference between the indoor temperature, the outdoor temperature and the size of your doorway will determine how much heat you are losing. Other factors that will affect heat loss are pressure differences or sufficient wind. For example, a five mph wind can triple the amount of heat loss through a door opening.



One possible alternative to open doors is an air curtain or air door to minimize the airflow through the open space. Air doors help to contain heated or air-conditioned air. They provide sizeable energy savings and personal comfort when applied in industrial or commercial settings. To see how an air door works go to www.berner.com/univ_diag_re.html. To determine the amount of energy you can save by using an air door go to www.berner.com/sales/energy.php5 to use an Energy Savings Calculator that calculates the payback of an air curtain, depending on the door size, indoor temperature, outdoor temperature.

Ventilation Fans

The amount of air that a fan draws can be complex and may even depend on the weather (barometric pressure) when vented outside. Fan efficiency determines the amount of air moved (cubic feet per minute or cfm) per unit of electrical energy input (watts) to the fan motor and can be affected by many variables: motor efficiency, speed of the fan motor and blade, blade design or shape, blade-to-housing clearance, housing design, and static pressure.

The amount of heat loss through a ventilation fan is over twice as much as the heat loss through an open door at the same outside temperature. The ventilation fan draws more air through the fan than an opening, since the air movement is similar to a "wind effect."

Ventilation fans may not be an efficient means of moving air from a building or space in the winter but can be highly effective in the summer to decrease the amount of hot air at the top of a building.

For more information on how you can save energy visit www.mariettapower.com.

The Difference Between kW Demand and kWh Usage continued from page 1

would have high demands for electricity over very short periods of time. Since electricity is a nearly instantaneous production-to-consumption product, the utility has to install peak load requirements capacity for all of their generation, transmission, and distribution equipment.

Having this excess capacity on hand all the time costs money, and this cost is shared by the utility and the customer who occasionally, but not always, needs this capacity on line to meet higher demand use.

The demand meter calculates the average use during the 30-minute period. Let's assume that a demand meter records the highest peak energy 30-minute period, counting the pulses in every interval, and then dividing by the appropriate time frame to complete the calculation. The meter doesn't care much about spikes in demand. A 5-second spike would represent only one-quarter of one percent of the 30-minute (900 second) demand meter averaging period. So, if large motor startup occurs at the beginning of any 30 minute interim and many more motors start-up soon after, the cumulative load of all of the small motors added to the large motors running an entire 30-minute period will result in a peak demand that discounts the effect of any short spike.

If demand meters worked by measuring instantaneous, rather than average demand over a particular interval, then the startup of a motor would present a significant cost. Consider that the starting current lasting for 2 to 3 seconds may be six to ten times the locked rotor current of a typical motor that does not have a soft start or a reduced voltage start feature. If this were the case, a 250HP motor would contribute over 1,200kW on an instantaneous demand meter, as compared to about 200 kW that would be measured on an averaged interval demand meter.

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Phase Loss Protection
"Can you provide some insight on single phasing protection?"

Phase Protection Solutions

There are products on the market produced by several companies called phase protectors or phase monitors. These devices are intended to sense more than just voltage, to detect phase loss and to shut off the motor before damage occurs. In most cases, either current or phase angle is also measured. This, in addition to a small voltage change, indicates a lost phase. Overvoltage, undervoltage, phase reversal and excessive on/off cycling can all damage motors. Phase protectors are capable of detecting these scenarios, and can be installed on any magnetically controlled, three-phase drive equipment. They react to either a total phase loss or a phase imbalance. Settings vary depending on the relay manufacturer, but a range of 5 to 15% is common. A time delay (default setting: 1 ¼-second) prevents nuisance dropouts. The action taken by the protector can range from audible and/or visible alarms to complete shutdown of the motor.

Most phase protectors can be hooked up to control units to run off the contact. When a phase is lost, undergoes alterations in sequence, or is undervoltaged, the phase protector will change state. This change of state can be used as needed to possibly disconnect the power to avoid damaging equipment, or maybe just to provide an alarm of some type to alert users to the problem. Phase protectors are chosen on the basis of the incoming line voltage and frequency that will be detected.

Phase drop protectors are relatively inexpensive, simple to install, and can provide protection by disconnecting the motor starter circuit when a failure is sensed. Prices usually range between $100 to $300, depending on the features — far below the cost of a new or rewound motor. Low voltage, phase loss and phase reversal (Model 258 lists for around $100). If you want ride through capability for up to 20 seconds to avoid nuisance tripping. Another option is to add a high voltage monitor in addition to low voltage, phase loss, phase reversal and ride through capability (Model 269 lists for just over $200). The phase monitors can be installed on each motor, or can be installed on the secondary side of the circuit breaker feeding these motors. A shunt trip capacitor is necessary when the monitor is installed on the secondary side of the circuit breaker, so that it can operate when there is a loss of power.

Other phase monitors can be programmed to not trip out when there is a loss of all three phases. This eliminates the need to reset the breaker once power is restored.

Motor Voltage Imbalance Can be a Major Power Quality Problem

Voltage unbalance lowers the performance and shortens the life of three-phase motors and it is also a primary cause of power quality problems resulting in motor overheating and premature motor failure. If unbalanced voltages are detected, conduct a thorough investigation to determine the cause.

Common causes of voltage unbalance include unevenly distributed single-phase loads on the same power system and unidentified single phase to ground faults.

It is generally recommended that voltage unbalances at the motor terminals not exceed one percent as established by the National Electrical Manufacturers Association (NEMA). The following chart outlines the impact voltage imbalance has on the operation capacity of a motor:

Voltage unbalance in percent	Derate motor to these percentages of rating
1%	98%
2%	95%
3%	88%
4%	82%
5%	75%
>5%	Do not operate

These unbalance numbers are general figures. Motor manufacturers should be contacted directly for specific unbalance tolerance limits.

Voltage unbalance is probably the leading power quality problem that results in motor over heating and premature motor failure.

Here are some steps that will help in preventing voltage unbalance:

- Regularly monitor voltages at the motor terminals to verify that voltage unbalance is maintained below one percent.
- Check your electrical system single-line diagrams to verify that single-phase loads are uniformly distributed.
- Install ground fault indicators as required and perform annual infrared inspections

Properly identifying and correcting voltage unbalances will save you energy and money.

Keeping in Touch

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Visit us online at **www.mariettapowerandwater.com**

Radiant Heating Provides a Cost-Effective Alternative for Many Commercial and Industrial Spaces

Although the concept of radiant heating has been around for centuries, homeowners have historically been the primary consumer of this type of energy. Just as the sun heats people and objects when it hits radiant heating can warm people and objects without having to warm the air in the room. Available in infrared radiant heating, hydronic floor heating, and radiant panels, radiant heating is increasingly being used in a number of commercial and industrial spaces as a cost-effective and energy-efficient alternative to conventional heating systems.

The guiding principle behind radiant heating is radiant heat transfer, which targets specific objects and people as opposed to the surrounding environment.

The numerous benefits associated with this type of heating include:

- More uniform heating without drafts associated with forced air
- Cost savings from not heating unoccupied space
- Quieter operation than forced air systems
- More energy-efficient than other options since no energy is consumed in the pump operation

While the initial capital cost may be higher than other types of systems, no space is required for the mechanical equipment of ceiling and floor systems. However, radiant heating systems do require large ceiling areas and uncarpeted floors in airtight building envelopes in order to be effective.

Some of the environments conducive to Hydronic Radiant Floor Heating systems include:

- Equipment maintenance facilities
- Manufacturing facilities
- Industrial and retail warehousing facilities
- Correctional facilities
- Educational institutions

Radiant Ceiling Panels are effective in these settings:

- Loading dock areas
- Hospitals
- Offices
- Restaurants
- Retail facilities

City Lights

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