UNDERSTANDING PEAK DEMAND CHARGES

On your utility bill, the quantity of energy used is measured in kilowatt-hours (kWh) and is referred to as ***Energy Charges***. The rate of energy usage or power is measured in kilowatts (kW) and is referred to as ***Demand Charges***. These charges are typically separated on your utility bill.

The electric demand meter for your facility records both the demand and energy usage. This meter records your highest peak energy usage over a 15-minute interval. If your peak energy usage period occurs during the daytime, reducing your lighting load at night will have no impact on reducing your kW peak demand. It will, however, reduce your overall kWh usage and, therefore, lower that portion of your electric bill. To better understand your bill the difference between kilowatts (kW) and kilowatt-hours (kWh) needs to be understood. Briefly, kWh is the quantity of energy consumed, and kW relates to the rate at which that quantity is consumed.

To understand demand charges and load factor, consider this car analogy:
Two cars both travel 30 miles. One travels at 30 mph (rate of speed) and covers the 30 miles (distance) in one hour. The second care travels at 60 mph for 20 minutes and then travels the remaining 10 miles at 15 mph. Both cars cover the 30 miles in an hour, but the second car is defined by the high rate of power used during the 60 mph session of the 30 mile trip.

If you compare the car's engine and an electric company, they both have the same requirement: Provide enough power should the customer require maximum performance of their machine(s).

To further describe the rate of energy (kW), consider this scenario:
A simple commercial facility that only consumes electricity through lighting. If this facility were to operate its lights 24 hours a day, 7 days a week, the load (or rate of usage) would not vary at all. No matter what hour of the week the electrical usage was checked, it would always be consumed at the same rate. This rate of usage is referred to as demand and is measured in kW. However, this example illustrates a rare situation where the load factor is 100% and the customer consumes the same amount of energy all the time, so the utility can supply the same rate of energy each hour. The utility generating plant is never required to increase its capacity for this one customer because the customer's electrical load (demand) never changes. If this scenario were true for all customers the maximum demand on our utility company system would be known and predictable and a separate demand charge would not be necessary. Unfortunately this scenario rarely occurs, if ever.

Consider the electrical load of a hypothetical molding facility. It would have a constant base load of 20 kW. This load consists of the lighting and computers that would be on whenever the business is occupied. If this was the only load on the electrical service it would be billed a demand charge equal to 20 kW, since this load was maintained for a period of at least 15 minutes. At 10:00 AM this facility started MACHINE #1; A 15 kW

load. This motor will run for 45 minutes and shut off. The new demand charge would now increase to 35 kW. At 10:45 Motor #2, a 10 kW motor is started and will run for 20 minutes. The new cumulative demand charge would now be 45 kW and would be billed accordingly. If the startup of Motor #2 could be delayed until 10:45, the billed demand for the month could be reduced to 35 kW, resulting in a 2% decrease in demand charges. While this is a simplistic example, this represents the basic principles of energy management.

Customer load profiles are almost always more complicated than the molding facility example described above. Motors may be started at only certain times of the day, electrical heaters and air conditioning equipment operate in cycles, the full array of lights may be used only at certain times, and so forth. Because of these different patterns of usage, there are peaks in the electrical demand (just like the high velocity of the 60 mph car). Therefore, the utility charges a peak demand charge to these customers to cover the cost of supplying these large blocks of energy, even though it may only be for a relatively brief period of time. The concept of a “demand charge’ was introduced to treat consumers more equitably, meaning that those who require excessive peaks of power during certain hours, and very little power during other hours, contribute their fair share toward the utility’s installed capacity. Due to air conditioning loads, most commercial customers maximum peak demand occurs during the summer months, May through September. The monthly Billed Demand charge is based on the actual demand recorded or 70% of the highest demand recorded from May through September of the previous 12 month period, whichever is higher.