Tech Tip #1

Demand Control Theory

> Wally ran a hamburger stand that had 20 seats. Every day at noon sharp, 60 customers arrived for lunch. Wally had a **peak demand for hamburgers** at noon.
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> Wally called the 60 people together and said, "If you all insist on eating at noon, I will have to build a hamburger stand three times bigger... install a grill three times as wide... hire three times more help... put in three times more seats... and of course the hamburgers would have to cost three times as much."
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> "But," said Wally, "If 20 of you will come at 11:30, 20 of you will come at noon, and 20 of you will come at 12:30, I can serve all of you by spreading out the demand and continuing to sell hamburgers at the lowest possible cost."

This is the same type of problem faced by many utility companies who have a **peak demand for electricity.**

If everyone in the utility's territory uses energy at the same time, "demand peaks" occur in the system. The power plant sits idle or operates inefficiently during the non-peak hours.

Demand management spreads demand for electric energy more evenly over the high usage parts of a 24-hour day.

If usage of appliances can be spread out during the peak demand periods, the utility's need for the energy can be spread out too. Peak demand costs could be lowered and less generation would be necessary in the future.

As users of electricity, customers can help the utility and their pocket books by leveling their peak demand.

A demand controller is one of the most effective load management devices built for the home or business because it evens out the use of electrical energy. Since peak use of electricity for residences usually coincides directly with the utility's peak, demand controllers can have a significant impact on reducing the overall system peak.

Some utilities use the Energy Sentry® demand controller as a full-time energy management system within each home, 24 hours a day, 7 days a week. Other utilities use demand controllers during "on" and "off" peak times in conjunction with Demand Time-Of-Use rates. In both instances, rate reductions are usually offered as an economic incentive to customers who participate in the load management program.

Before an Energy Sentry demand controller is installed, a daily demand fluctuation from 1.0 KW to 18.0 KW is common. After installation, energy use within the same home will typically level off at approximately 6.5 KW. *Remember, the demand controller does not reduce total electrical consumption, any more than Wally reduced the total number of customers he served in his hamburger stand!* Rarely, if ever, does the Energy Sentry affect the amount of kilowatt hours (Kwh) consumed in the home. Instead, Energy Sentry merely shifts the time when the actual Kwh are used.

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The Energy Sentry works by the “store/defer” principal. Many residential loads (such as water heaters, heating and air conditioning) can actually store energy and also defer energy use to later periods of time. (Loads can be cycled on and off for brief periods).

Using advanced microcomputer technology, Energy Sentry constantly and automatically picks and chooses the best store/defer option. By doing so, the load factor of an Energy Sentry-controlled home is increased from 10 to 20 percent to sometimes as much as 60 to 90 percent. The higher the load factor, the more efficient the home.

Once installed, Energy Sentry usually controls the three basic residential loads: space conditioning (heating/cooling), water heaters and clothes dryers, the remaining loads, such as range, lighting, outlets, and small appliances, are measured but uncontrolled.

Based on the household’s needs, Energy Sentry will defer lowest-priority loads when a higher-priority appliance is in use. For instance, the water heater element maybe cycled during the time the range or oven is in use. Thus, the energy use within the residence is “evened out”, and the utility company’s problem of demand peaks is resolved.

ENERGY SENTRY®