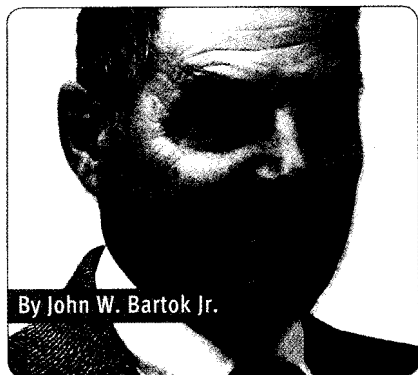


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68. Pay closer attention to your electric bill. Bartok, J. W., Jr. Greenhouse Management and Production 28(4):42-43. 2008.



By John W. Bartok Jr.

Pay closer attention to your electric bill

FOR SMALLER GREENHOUSES, electricity is usually charged at a fixed residential or farm rate. This flat rate includes the cost of generating the electricity and the added cost of transmission, distribution and service charges. There is not too much that you can do to reduce the bill other than reducing electricity usage.

Larger greenhouse operations that exceed a pre-determined level of energy usage pay a commercial or industrial rate. This rate includes generation, transmission, distribution and service charges plus a demand charge. Although your electricity use may stay the same from month to month, the bill may double from one month to the other. This is due to the demand charge.

Demand charge

A demand charge is added by the utility company to recoup the capital cost of having adequate generating, transmission and distribution capacity to provide your greenhouses with power when it is needed. Demand charges can make up as much as one-half of the monthly electric bill. This is where you might be able to save considerable dollars.

The power company installs a meter that measures both the total electric usage in kilowatt-hours and the average highest electrical usage in kilowatts over any 15- or 30-minute period during the month.

You can think of the demand being the speedometer and the total electric usage being the odometer on a car. Unlike the speedometer on a car, which returns to zero when you stop, the demand meter will stay at the highest level until it is exceeded or until the meter is reset at the end of the monthly cycle by the meter reader.

For the monthly electric bill, the demand reading is multiplied by \$5 to \$15 per kilowatt (kw) and added to the bill. Depending on the company, demand charges can vary depending on time of day (on-peak or off-peak time periods), day of the week (highest on weekdays), seasonal differentiation (summer to winter), interruptible power (with proper notification you would have to reduce consumption) and declining blocks (rate reduced if use exceeds given demand level). Some companies base demand on the highest 15- or 30-minute usage dur-

ing the whole year and then charge based on that value (ratcheting).

Reducing the demand charge

Here is an example of how the demand charge might be reduced.

For a gutter-connected greenhouse with 12 25-foot-wide bays that are 150 feet long (total of 45,000 square feet), there's a base load of 10 kw for lighting, controls and small equipment.

Fan ventilation: Two 48-inch, 1-horsepower exhaust fans per bay at 1 kw each. A total of 24 kw is used when all of the fans are operating.

Horizontal airflow fans: Three $\frac{1}{4}$ horsepower, 20-inch-diameter circulating fans per bay at 0.11 kw each. A total of 4 kw is used when all of the fans are operating.

Water pump: 5 horsepower submersible pump at 5 kw.

Materials-handling equipment: Flat filler, transplanting conveyor and associated equipment for a total of 15 kw.

If all the above equipment is operating at the same time for any 15- or 30-minute period, the total demand is 58 kw. Multiplying this by an average demand charge of \$10 per kw = \$580 per month. This amount of usage could occur in summer.

Shutting off the HAF fans when the ventilating fans are on and doing the transplanting early in the morning before the ventilating fans turn on would reduce demand by 19 kw or \$190 per month (19 kw x \$10 per kw).

This equipment affects electricity demand:

- A large number of fans operating during summer.
- Unit heaters that operate during winter.
- High-horsepower motors needed to operate water pumps, refrigeration units or materials-handling equipment.

Techniques for reducing demand

Here are some ways to reduce your electrical bill.

Install a demand recorder. Your electric bill does not tell you when the peak demand occurred. This can only be determined by using a demand recorder over a six-month or longer period.

Reduce total demand. Eliminate fan ventilation

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by building naturally ventilated or open-roof greenhouses. A central boiler system with small circulating pumps can distribute the hot water through the radiators to eliminate hot air furnaces. Turn off lights and equipment when they are not needed.

Increase the efficiency of existing equipment. Install adequate size wiring to reduce electricity losses to overheating. Replacing old motors with high-efficiency ones can save 10-15 percent in electric usage.

Install time clocks to control non-essential loads. Electric hot-water heater tanks should be large enough so that water can be heated and stored at off-peak periods.

Unload selected sheddable loads in response to increase demand. HAF fans can be deactivated by a relay that shuts them off when the first exhaust fans turn on.

Install microprocessor controls. The controls automatically reduce some of the load when demand reaches a specified level.

Change light bulbs. Replace incandescent lighting with more efficient, compact fluorescent lamps.

Keep greenhouses in good shape. This can reduce the need for heating and cooling. This could allow you to select smaller, cost-effective heating and cooling equipment.

Take advantage of rebates. Check with the power company for rebates on new, efficient equipment. ❖

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