

Understanding Your Electric Bill

Understanding what you pay for on your electric bill can help you reduce it. Many customers have four separate charges on their business electric bill. Some of these charges do not apply to smaller customers. Every customer has a fixed monthly basic charge and an energy charge billed in kilowatt-hours. The demand charge is based on the highest or peak use of power during the month. Large customers with many motors also have a reactive power charge.

Basic Charge

The Basic Charge covers services you use regardless of energy consumption: meter reading, billing, and customer service. This charge is based on the number and type of meters. In some cases, a building has multiple services, each of which has a basic charge. If separate meters are not needed for tenant billing, then combining electric services into one meter will reduce the basic charge, although this will usually require customer cost for an electrician to rewire the electric services.

Energy Charge

The energy charge relates to the energy you use. Energy is measured in kilowatt-hours (kWh).

Example 1: Use one 100-Watt light bulb for 10 hours:



$$100 \text{ Watts} \times 10 \text{ hours} = 1000 \text{ Watt-hours} = 1 \text{ kilowatt-hour} = 1 \text{ kWh}$$

Example 2: Use ten 100-Watt light bulbs for 1 hour:



$$10 \text{ bulbs} \times 100 \text{ Watts each} = 1000 \text{ Watts. } 1000 \text{ Watts} \times 1 \text{ hour} = 1000 \text{ Watt-hours} = 1 \text{ kWh}$$

Demand Charge

Whenever you turn on a piece of equipment, you expect to have enough power available to operate it. Because electricity isn't stored, it must be generated as it's needed. EWEB must have

access to enough generating and distribution capacity to meet all customers' maximum power needs. Business customers pay a separate demand charge to cover the cost of having this capacity in reserve. Residential customers pay for

For billing purposes, rates are based on a separate *delivery charge* and *energy charge*. The delivery charge covers the cost of constructing and maintaining the electric distribution system. The energy charge is related to the cost of wholesale or generated electrical energy. From the customer's point of view, the combined rates for the energy and delivery charge apply to all the electrical energy used. Two examples of energy use are shown below. In both cases, 1000 Watt-hours or one kilowatt-hour (kWh) of energy is used.

Your energy bill can be reduced by saving energy. You achieve savings by either (1) reducing the operating hours, (2) reducing the amount of equipment on at any one time, or (3) improving the equipment efficiency. An example of an efficiency improvement is to replace the 100-Watt bulbs with 25-Watt compact fluorescent lamps. The total fluorescent energy use (kWh) would be only 25% of the incandescent lamp use. That's a savings of 75%, both in kWh and in your energy charge.

this capacity through a higher residential energy rate. It's a bit like owning a car. You have to make loan and insurance payments based on the size of your car no matter how much you drive. Those are fixed costs. If you only drive down to the corner store once a week, the cost per mile for driving will be very high.

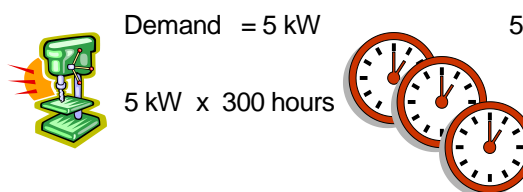
Demand is measured in units of power or kilowatts (kW). A business customer is billed for the highest 15-minute period of power demand during the monthly billing period. Then the meter is reset for the next period. Examples 3 and 4 show two different cases that have different demand charges. Operating all three motors at the same time in Example 4 creates 15 kW of demand, or three times the demand one motor creates in Example 3. This triples the demand charge. Notice that in both cases the energy (kWh) use and the energy charge is the same.

Approximate and rounded energy and demand rates are used in examples.

To measure demand, electric meters record the average demand over each 15-minute period and remember the highest or peak period for the month. A short spike—such as a power surge when a motor starts up—may create a large instantaneous power use, but it will have negligible impact on demand that is averaged over 15 minutes. On the other hand, equipment that operates for longer periods at the same time as other large equipment will increase electric demand.


If your operation allows, you can reduce demand charges by staggering motor or other equipment use, so that less total equipment power is on at any given time. You can manage your demand with controls, changes in your operation, or improvements to equipment efficiency.

Example 3: Use one 5-kiloWatt piece of equipment for 300 hours in a month.



Demand = 5 kW
 5 kW @ \$5.00/kW-month = \$25.00 Demand Charge
 5 kW x 300 hours = 1500 kWh. @ \$0.05/kWh = \$75.00 Energy Charge
 Monthly Energy & Demand cost: **\$100.00**

Example 4: Use three 5-kiloWatt pieces of equipment simultaneously for 100 hours in a month.



Demand: 3 x 5kW = 15 kW
 15 kW @ \$5.00 = \$75.00 Demand Charge
 15 kW x 100 hours = 1500 kWh @ \$0.05 = \$75.00 Energy Charge
 Monthly Energy & Demand cost: **\$150.00**

Reactive Power (Power Factor) Charge

A full technical explanation of reactive power is beyond the scope of this document. Simply put, when there is a large inductive load—typically because there are many motors at a facility—*reactive power* must be measured to properly allocate power costs to that facility. A standard Watt-hour meter does not record reactive power. When motors or other inductive loads cause a shift between voltage and current, more current must be generated and supplied to accomplish the

same electrical work. The reactive power meter measures the highest 15-minute period of reactive power in kVARs. When reactive power (kVAR) is significant in relation to true power (kW) it is called *low power factor*. Low power factor can usually be corrected with an investment in power factor correction at the facility. Properly applied power factor correction will reduce reactive power charges.