

# DEMAND METERING



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This booklet has been prepared to assist you in understanding Central Hudson's Demand Metering. Electric demand can be a very difficult concept to understand, but it is a very useful tool to recover the costs associated with the delivery of service we provide to our commercial and industrial customers. Each customer's unique operation determines the service required and the necessary metering. Central Hudson uses the demand charge to recover these sometimes unusual requirements.

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# DEFINITIONS

**Amperes (AMP):** The amount of electric current that flows through a wire at any given time.

$$\text{AMP} = \frac{\text{WATTS}}{\text{VOLTS}}$$

**Demand:** The actual or estimated use of the customer's load (equipment) averaged over a 15-minute time interval.

**Kilowatt (kW):** A unit of electricity equal to 1,000 watts.

**Kilowatt hour (kWh):** The amount of electric energy consumed in a measured amount of time. 1,000 watts used for one hour equals one kilowatt hour.

$$\text{kWh} = \frac{\text{WATTS} \times \text{HOURS}}{1,000}$$

**Kilovolt - Amperes (KVA):** A measure used to determine the capacity needed to serve a customer. One kilovolt-ampere is equal to 1,000 volt-amperes.

**Power factor:** The relationship of power being supplied compared to the energy being effectively used. Power factor can range from 0 to 1.0

$$\text{POWER FACTOR} = \frac{\text{kW}}{\text{KVA}}$$

**Volts:** A unit of electric pressure that forces amperes to flow through wires.

**Watts:** A unit of measurement of electric power.

$$\text{WATTS} = \text{VOLTS} \times \text{AMPERES}$$

# WHAT IS DEMAND?

Demand is the ability to meet a customer's electric needs instantaneously, at any time of the day or night. This means that the utility must have sufficient electrical equipment and systems in a continuous state of readiness. The cost associated with being ready instantaneously is called a demand charge. This is in contrast to charges that our customers pay for kilowatt hours, which equates more to how much electricity a customer purchases.

In the case of residential customers for whom the use of electricity is fairly similar from house to house with little variation, it is possible to apply one simple rate of charges, which includes cost of the product, fuel used for generation, and the demand or "overhead." It is a misconception that residential customers do not pay demand charges. Actually, the rate they pay is a combination of consumption and demand charges. This is only possible because there is an almost constant ratio between consumption and demand, which is quite predictable.

In the commercial/industrial field, charges for energy consumption and demand are sepa-

rate and distinct. Because electricity cannot be stored, utilities must have transformers, wires and substations online and ready to meet customer requirements. These have to be sized to meet the peak period of need and are very expensive. While some customers only need this costly equipment once in a while, others need it almost constantly. Most customers fall somewhere in between. In order to spread the cost of extra equipment required to meet such peaks, utilities have separate charges for demand.

The following analogy can be used to illustrate demand: A restaurant normally serves 100 people for dinner. However, once a month, the local 50-member Rotary Club meets at the restaurant and the restaurant must have seating capacity for 150 customers. Therefore, although normal demand is only 100, the peak demand of 150 customers necessitates larger facilities and equipment. The same is true with an electric system. The demand charge partially offsets the costs we have invested in facilities and equipment to serve our commercial and industrial customers' peak needs.

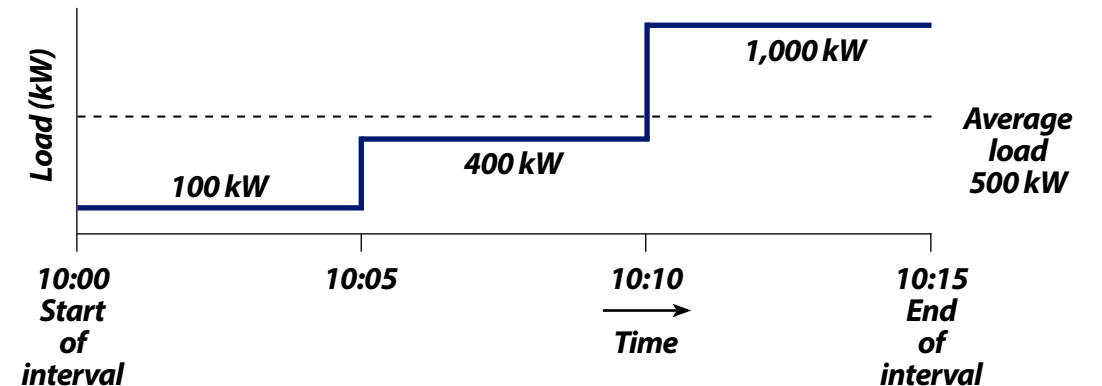
# HOW DO WE MEASURE DEMAND?

It is important to remember that the meter only records demand in 15-minute intervals during the entire month. The peak demand shown on your bill is the highest average load for a 15-minute interval recorded on the demand meter. With this method of billing, demand customers have the opportunity to control demand in order to save money on demand charges.

This graph (below) shows a customer with usage of 100 kW for five minutes, followed by 400 kW for five minutes, and 1,000 kW for the next five minutes. The average load or

demand for this 15-minute interval is 500 kW. If this is the highest 15 minute average demand encountered over an entire month, then 500 kW is the peak demand for that month.

Or, suppose that there is one 10 kW appliance and one 15 kW machine operated in a plant. If both units operate simultaneously, it will cause 25 kW to register on the demand meter. But if they can be operated alternately, the maximum reading will be only 15 kW because the 15 kW unit will only be operated when the 10 kW unit is off.



# HOW DOES A CUSTOMER ESTABLISH DEMAND?

Electric demand is measured in kilowatts (kW). A kW is roughly equivalent to the power required by 10 100 watt light bulbs, a one horsepower motor, or a 12,000 BTU air conditioner. The amount of electricity used over a period of time is known as energy consumption. This is measured in kilowatt hours (kWh). One kWh is roughly equivalent to the electricity consumed by 10 100 watt light bulbs burning for one hour, a one horsepower motor running for one hour, or a 12,000 BTU air conditioner operating for one hour.

It is important to be aware of the difference between consumption measured in kilowatt hours and demand measured in kilowatts.

Often, customers who have the same level of demand will have much different levels of consumption. For example, two businesses with identical electrical equipment with the potential for using a maximum demand of 200 kilowatts of electricity are shown on the next page as Company A and Company B.

Demand meters are installed for commercial and/or industrial customers when we determine their monthly demand will exceed 10 kW. If a customer uses more than 2,500 kWh in each of three consecutive months and the customer's demand is not presently being measured, demand metering may be called for.

To explain to a customer how a demand meter records, one might compare it to the speedometer and odometer in a car. The electric meter records the kilowatt-hour consumption in much the same way an odometer records accumulated miles driven. The speedometer, on the other hand, registers the exact speed at any given point in time just as the demand register measures the customer's load at any given point in time. The only difference is that the speedometer registers less when the vehicle slows down, whereas the demand register remains at the highest level registered during the month. This peak reading remains until the meter reader resets the demand meter at the time of the monthly reading.

## COMPANY A

Company A has no employees. Once a month, the owner uses everything electrical for half an hour. Everything is then shut off until the same time the following month. The meter readings would show only 100 kilowatt hours of consumption ( $\frac{1}{2}$  hour x 200 kWh = 100 kWh). The monthly demand reading would be 200 kW because everything was in use at one time. Company A pays for:

- Demand .....200 kW
- Consumption .....100 kWh

## COMPANY B

Company B has several employees and operates 40 hours a week (160 hours per month). During the month, Company B registers a demand of 200 kilowatts, just like Company A, but uses this amount of electricity for longer periods of time (200 kWh x 160 hours = 32,000 kWh). Company B pays for:

- Demand .....200 kW
- Consumption .....32,000 kWh

The same utility facilities are needed to supply both Company A and Company B with electricity. How the electricity is used is the choice of each business.

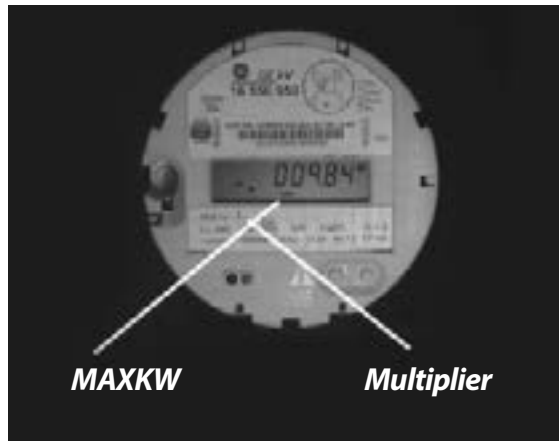
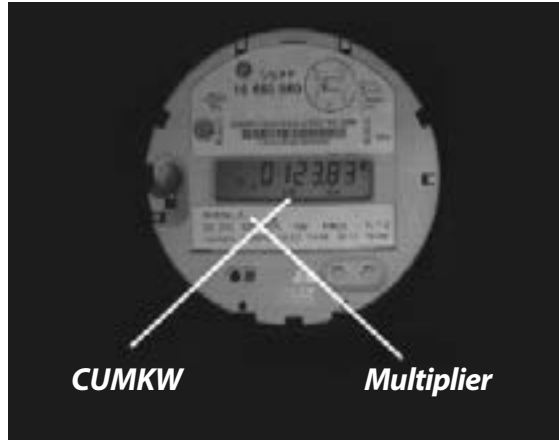
# READING DEMAND METERS

Meters that measure demand in kW as well as usage in kWh are required for customers billed on a demand and energy basis.

The majority of meters now installed for commercial and industrial customers utilize scrolling digital displays (LCDs) to display the usual kWh index as well as the Maximum Kilowatt Demand index (MAXKW), which is the current month's peak demand registration and the Cumulative Kilowatt Demand (CUMKW) readings.

The maximum demand for a billing period is the value displayed on the LCD indicated as MAXKW. The meter demand is reset after the meter reader reads the meter. This display will then indicate the maximum kilowatt for the customer for the next billing period, until it is again read and reset.

The CUMKW can be used also to determine the maximum demand (MAXKW) when you are not present to see the meter being read.



This can be accomplished as follows:

- Wait for the LCD display to scroll to the value CUMKW, read the CUMKW value and record this number.
- After the next meter reading by Central Hudson, record the CUMKW value again.
- Subtract the old CUMKW value from the most recent value, sometimes called the "as left" index, to obtain your MAXKW value for the past billing period.

See the example below:

<b>CUMKW reading from present month</b>	<b>123.83</b>
<b>CUMKW reading from previous month</b>	<b>- 113.99</b>
<b>MAXKW</b>	<b>9.84</b>

A meter multiplier may also be used. This multiplier is indicated on the nameplate of the meter. If a multiplier is present, you must multiply the MAXKW and CUMKW values by the multiplier to obtain agreement with your bill.

# HOW ARE DEMAND CUSTOMERS BILLED?

To illustrate how demand billing works, suppose there is an industrial building with lighting, cooling, production machinery and miscellaneous equipment. The full installed load totals 300 kW. The business is shut down and no employees occupy the building during the month.

On the first day of each month, the owner goes into the building and turns everything on for 15 minutes; everything is then shut off and the building is locked up until the next month. The delivery charges associated with the energy consumption and demand would be billed as follows:

The average cost of electric service for this example (see Example A on the next page) would be \$26.45 per kWh (\$1,983.38 divided by 75 kWh). This is an unusual and

extreme case, but it serves as an example of how demand charges can impact a customer's bill.

An important consideration to keep in mind is that the registered demand is based on a complete 15-minute interval. If, in this example, the equipment only operated for 10 minutes (or two-thirds of the demand period), the amount of demand registered on the meter would be 200 kW. If it operated for five minutes, the registered demand would be 100 kW.

Consider the same building in full operation (assume a 40 hour week, four-week month) and all equipment will be on at the same time. The energy consumption and demand would be billed as in Example B.

The average cost of electric service for this example would be \$0.04632 per kilowatt hour (\$2,223.48 divided by 48,000 kWh), which is more in line with the expected cost of service.

\* Note: These billing examples use charges for illustrative purposes only and do not reflect current rates or include customer charges, supply charges or taxes.

## EXAMPLE A

### ENERGY CONSUMPTION

**300 kW x ¼ hour = 75 kWh**

**75 kWh x \$0.00501 per kWh = \$0.38**

### DEMAND

**300 kW x \$6.61 per kW = \$1,983.00**

### TOTAL DELIVERY CHARGE

**= \$1,983.38**

## EXAMPLE B

### ENERGY CONSUMPTION

**300 kW x 160 hours = 48,000 kWh**

**48,000 kWh x \$0.00501 per kWh = \$240.48**

### DEMAND

**300 kW x \$6.61 per kW = \$1,983.00**

### TOTAL DELIVERY CHARGE

**= \$2,223.48**

# CUSTOMER ENERGY CHOICE FOR DEMAND METERED CUSTOMERS

Customer Energy Choice provides electric and natural gas customers the opportunity to purchase their energy supply from independent marketers rather than through their utility.

Previously, your electricity and natural gas had been supplied and delivered by Central Hudson at prices regulated by the New York State Public Service Commission. But in the newly competitive electric and natural gas markets, this has changed.

Energy service companies can now supply your electricity and natural gas at market-based prices, and you will be able to choose your energy supplier from among these companies. Central Hudson believes that all customers should have the choice to select a supplier who can best meet their needs. We will also continue to offer you the option to purchase your electricity and natural gas from Central Hudson, as you have in the past.

No matter which supplier you select, Central Hudson will continue to operate and maintain the delivery system of wires and pipes that brings energy to your home or business. We'll still be there to answer your calls and respond when storms and other emergencies interrupt service. And, we'll still be here as a committed corporate citizen doing what we can to help the communities we have served for more than a century.

Participation in our "Customer Energy Choice" plan is also available to customers billed under a demand rate. If you elect to buy your electricity from an alternate supplier, Central Hudson will charge for demand and delivery service only; your alternate supplier will charge for energy supply.

For more information about any of the billing services offered to our demand customers, or for the most current rates in effect, visit [www.CentralHudson.com](http://www.CentralHudson.com)



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