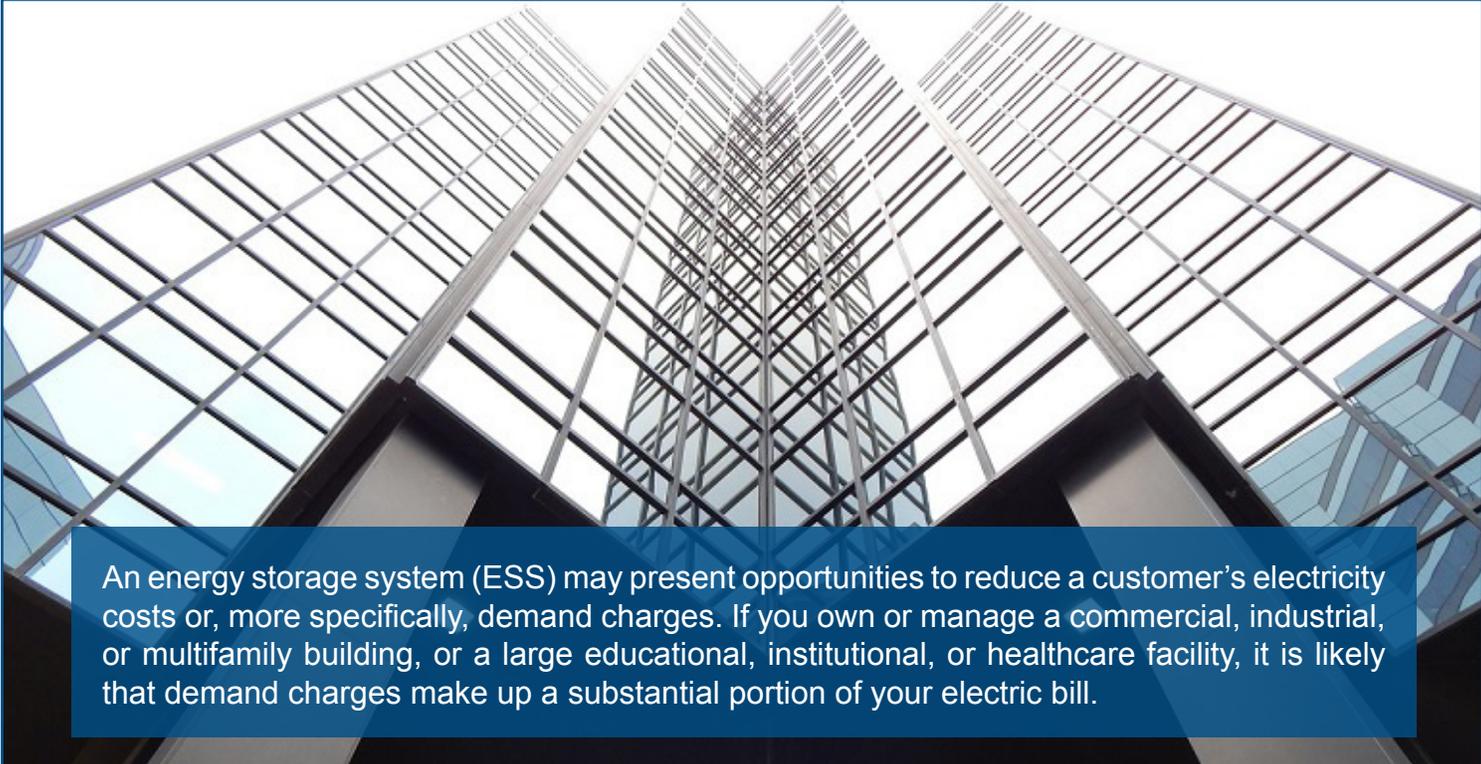


How Energy Storage Can Reduce Electricity Costs for Commercial Energy Users



An energy storage system (ESS) may present opportunities to reduce a customer's electricity costs or, more specifically, demand charges. If you own or manage a commercial, industrial, or multifamily building, or a large educational, institutional, or healthcare facility, it is likely that demand charges make up a substantial portion of your electric bill.

What charges are included in electricity bills?

Commercial electricity customers typically incur two distinct charges for their electricity usage each billing cycle:

- **Supply Charges:** The cost of the total amount of electricity consumed during a billing period, measured in kilowatt-hours (kWh).
- **Delivery Charges:** The charges associated with delivering electricity, which includes the demand delivery charge, or "demand charge." The demand charge amount is based on the highest period of demand for electricity during a billing period, measured in kilowatts (kW).

Why do utilities impose a demand charge in addition to an energy charge, which already accounts for the electricity a customer consumes?

To deliver a sufficient, reliable electric supply to their customers, utilities must maintain the robust infrastructure that makes up the electric grid at a scale that enables all end users to receive the amount of electricity they need, whenever they need it. In deriving a portion of a customer's electricity bill according to their highest level of electricity demand, the utility is attempting to distribute more of the costs associated with grid maintenance to those who require the most out of the power system.

Who pays a demand charge?

A demand charge is applied to end users who have the largest energy demands (e.g., large multifamily and apartment buildings; commercial, industrial, educational, industrial, and healthcare facilities; etc.). For many commercial customers, the demand charge can account for 30% to 70% of a monthly electricity bill.¹

How can an energy storage system reduce a demand charge?

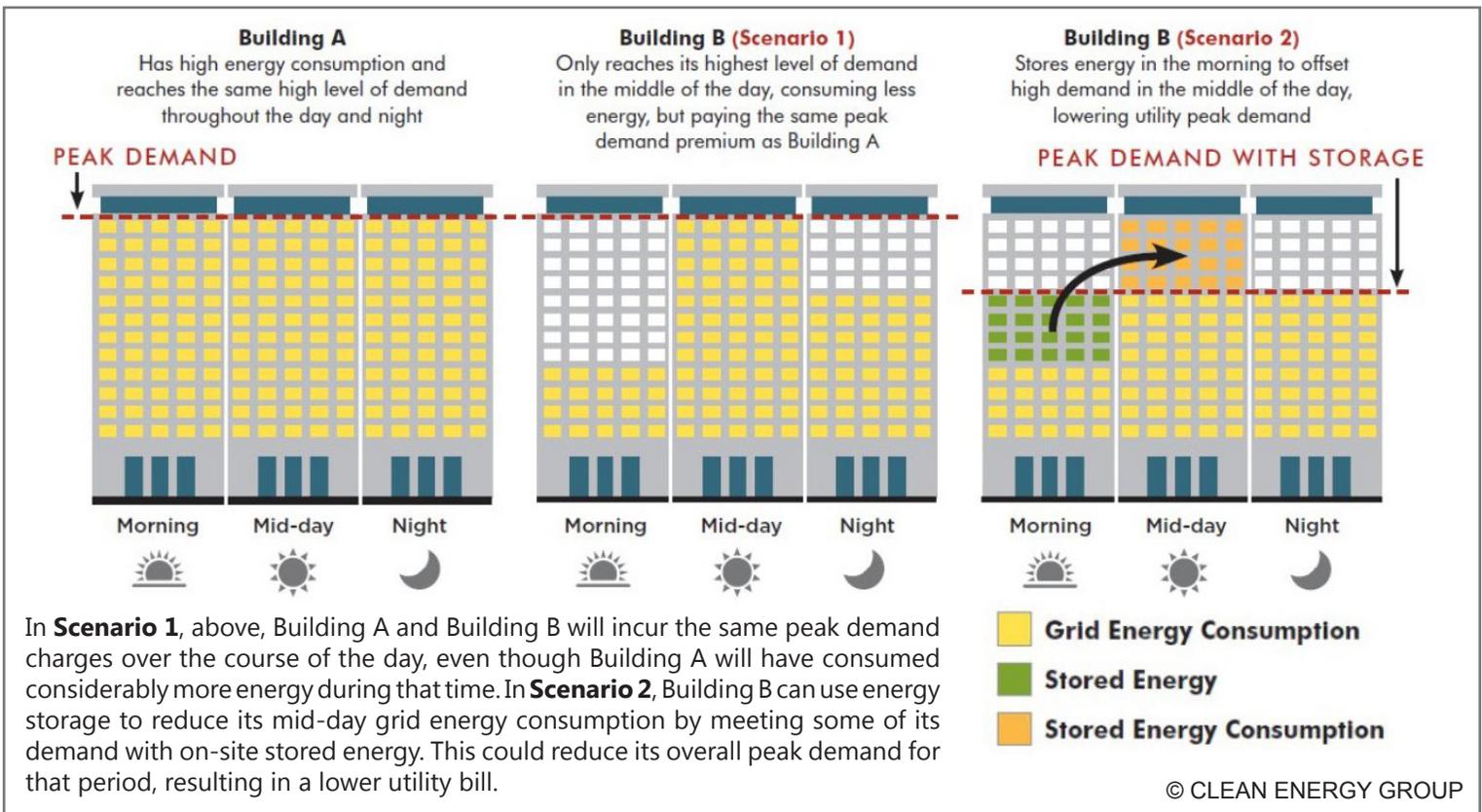
An ESS can help decrease peak demand by charging when demand is low and strategically discharging during times of peak demand. This means that for customers who are demand-billed, an ESS has the potential to decrease demand charges. Batteries can be discharged to hold demand for grid electricity below a certain threshold, effectively lowering a customer's peak demand and reducing demand charges – a process often called peak shaving.

¹ Clean Energy Group and the National Renewable Energy Laboratory, "An Introduction to Demand Charges."



NYSERDA
Supported





In **Scenario 1**, above, Building A and Building B will incur the same peak demand charges over the course of the day, even though Building A will have consumed considerably more energy during that time. In **Scenario 2**, Building B can use energy storage to reduce its mid-day grid energy consumption by meeting some of its demand with on-site stored energy. This could reduce its overall peak demand for that period, resulting in a lower utility bill.

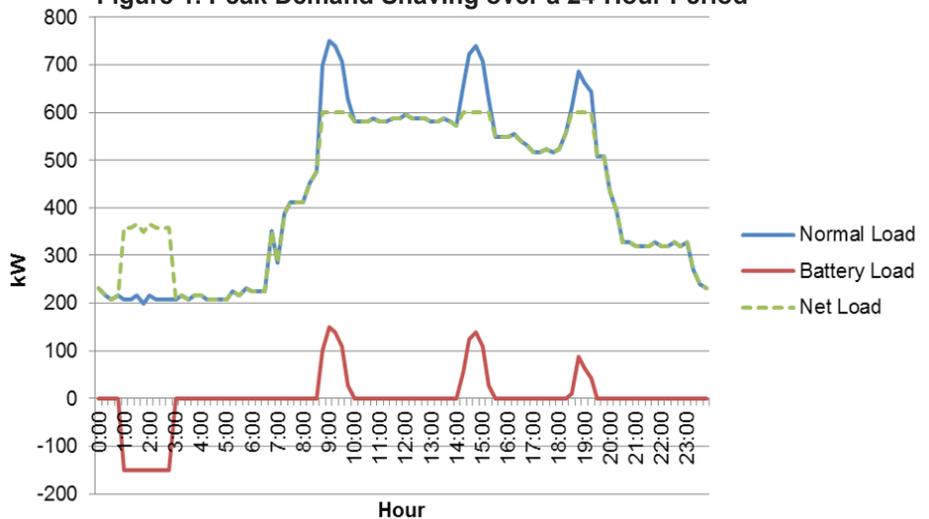
Figure 1 demonstrates how an ESS is operated to shave peaks in demand. Each instance of a peak in normal load causes the ESS to discharge, resulting in a net load that is much flatter. Because the net load reaches smaller peaks, demand charges will be lower.

How does Con Edison determine demand charges?

Con Edison structures demand charges based on a customer's Service Classification (SC) and rate. SCs are types of customers. The rates determine the demand charge calculation, and there are multiple rate options for each SC.

Many large electric customers are charged under SC EL9. EL9 customers can be charged a monthly "fixed" rate, a time-of-day (TOD) rate, or a standby rate. The majority of customers are on the "fixed" or TOD rate. With a monthly "fixed" rate, demand charges are determined based on the peak demand reached during that month, which is then multiplied by a cost (\$) per kW of maximum demand. With a TOD rate, peak demand is recorded every day for three time intervals in the summer (two in non-summer months): weekdays from 8 a.m. to 6 p.m., weekdays from 8 a.m. to 10 p.m., and all hours of everyday. The highest peak reached within each specific time interval during the month is then identified and multiplied by a \$/kW that has been assigned to the time interval. For customers with the TOD rate,

Figure 1. Peak Demand Shaving over a 24-Hour Period



these three demand charges are summed to determine the customer's total demand charge for the month. The standby rate applies only to customers who have their own generation source on-site in specific situations, which includes storage, solar, and CHP. The standby rate entirely changes how delivery charges are billed. Most significantly, it calculates demand based on daily, rather than monthly, peaks. Depending on the configuration, a customer may be required or may elect to switch to the standby rate when they install storage.



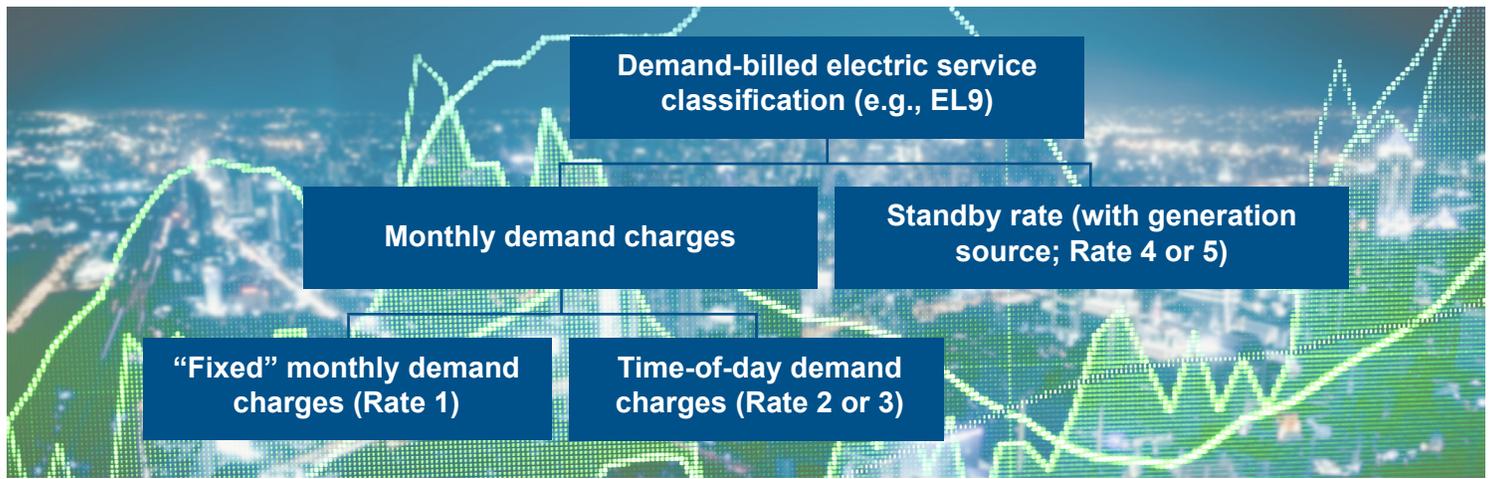


Figure 2. Customer A's Peak Demand

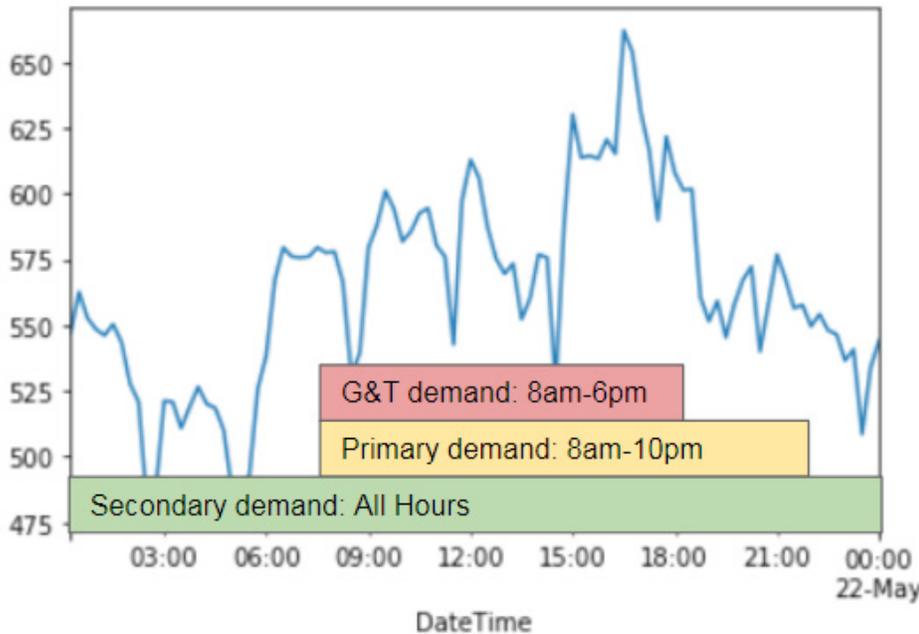


Figure 2 shows Customer A's demand over a 24-hour period during a summer weekday. Customer A is in SC EL 9 and is on Rate 3, a TOD rate. The peak demand, which is the same for all three time intervals, is approximately 660 kW.

For Customer A, demand charges would be calculated as follows:

$$\begin{aligned}
 &(660 \text{ kW} \times \$8.32/\text{kW}) \\
 &+ (660 \text{ kW} \times \$17.84/\text{kW}) \\
 &+ (660 \text{ kW} \times \$17.06)
 \end{aligned}$$

Customer A: (\$5,491.20)
 + (\$11,774.40)
 + (\$11,259.60)
 = **\$28,525.20**

Energy storage systems can achieve bill savings for customers by reducing a building's demand during certain time periods. Customers might see bill savings while remaining on a standard rate or by switching to a standby rate. Further guidance on energy storage use cases, including the value of switching to a standby rate, will be available in upcoming resources.

For information on customer-sited use cases for storage, please contact NYSERDA (energystorage@nyserda.ny.gov) or ERS (energystorage@ers-inc.com).

		Peak Demand		
Time Interval	Charges	Day 1	Day 2	Day 3
G&T demand: 8 a.m.–6 p.m.	\$8.32/kW	650 kW	660 kW	640 kW
Primary demand: 8 a.m.–10 p.m.	\$17.84/kW	650 kW	660 kW	650 kW
Secondary demand: all hours	\$17.06/kW	650 kW	660 kW	650 kW

