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Charging into the Future:

The Significance of Battery Storage & Fast EV Chargers in the Retail Sector

Application Commercial Real Estate | Retail Stores

Deployment Benefits EV Fast Charging | Peak Shaving | Battery Storage

Overview

Grocery Retail Industry

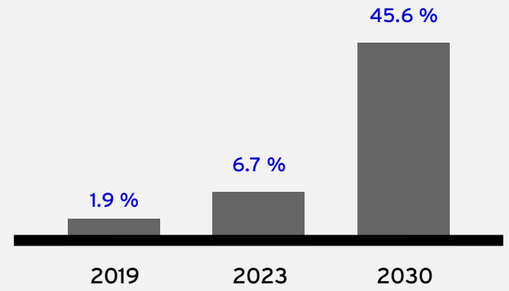
The grocery retail sector is undoubtedly one of the most essential businesses in any economy, catering to customers' basic needs by providing them with food, household, and personal care products with over 70,000[1] supermarkets and grocery store locations throughout North America. Consequently, grocery companies are continuously looking for growth and revenue opportunities by innovating to meet evolving consumer needs and preference. Enhanced amenities such as Electric Vehicle (EV) charging stations are often considered a practical approach to address evolving shopping needs of consumers. However, such amenities come at a significant cost and can pose profitability challenges, making it hard for brick-and-mortar stores to justify their implementation. Hence why, there is clear demand for infrastructure designed with customers' experiences in mind which also provide lucrative returns on investment.

61% of all fast chargers **need to be installed at retail and on-the-go** destinations in order to meet electrification infrastructure needs.

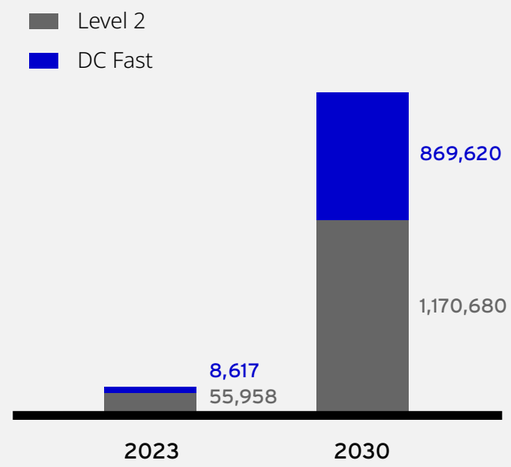
The EV market is rapidly growing in North America, and with it comes a giant need for charging infrastructure to support the adoption of EVs. While current EV penetration rates are still in the single digits (6.1%) they more than tripled in less than three years[2]. This trend is only expected to increase moving forward as adoption is forecasted to reach 45% of vehicles on the road by 2030, while governments have declared even more aggressive targets for the sale of zero-emissions vehicles. The United States Government has a target of 50%[3] of all new vehicles sold by 2030 to be EVs and the Government of Canada has a slightly higher targeted of 60%[4].

Such significant targets can only be achieved if the charging infrastructure is there to facilitate that adoption. It is estimated if federal target for EVs sold are met, there is a need for 869,620[5] DC Fast chargers and 1,170,680 public level 2 chargers. Furthermore, the locations for these installations are just as important as the number of stations that are needed. Deployment focus must be around high traffic areas where it is convenient for drivers to charge. It is predicted that by 2030, the demand for fast chargers at on-the-go and retail destination locations will be 533,000[6] (61%) chargers, making grocery stores a necessity and top priority for deployment.

Current EV Penetration Rate & Forecast



Required Number of Public EV Chargers



Challenges

Energy Consumption

Grocery stores are significant consumers of energy due to the operation of many of their systems, such as refrigeration, lighting, and air conditioning. Because of the scale and complexity of their operations, high levels of energy consumption are required for them to function efficiently.

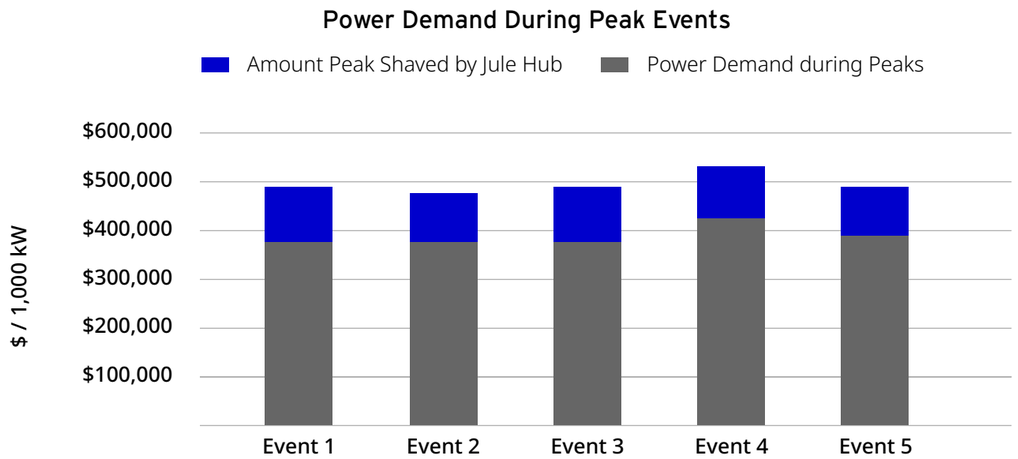
The most effective way for any commercial location to lower their utility bill is through Peak Shaving. In most states and provinces, utility companies will significantly increase the cost of electricity during the times of day where it is high in demand (recorded during five events annually), in order to lower the strain it creates on the grid. This cost increase can be up to 46 times greater than what would be charged during regular hours and can be even greater for high energy consumers such as grocery stores, as they account for sizeable amounts of the overall demand.

Photo by Benziad on Unsplash

$100k

saved from peak shaving

According to the U.S. Environmental Protection Agency (EPA), grocery stores consume an average of 50 kWh of electricity per square meter per year, which is 4 times greater than the average commercial building. Such energy consumption drives up operating costs significantly, not to mention the environmental implications generated towards greenhouse emissions. As a result, grocery retailers are increasingly looking for ways to reduce their energy consumption to shave off their utility bill and carbon footprint.

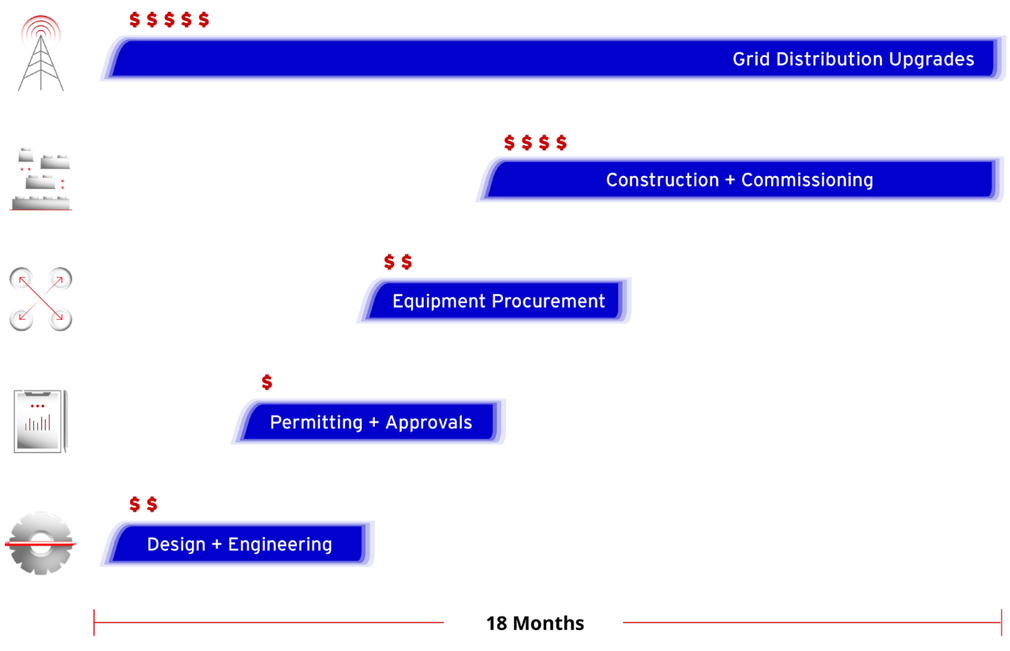


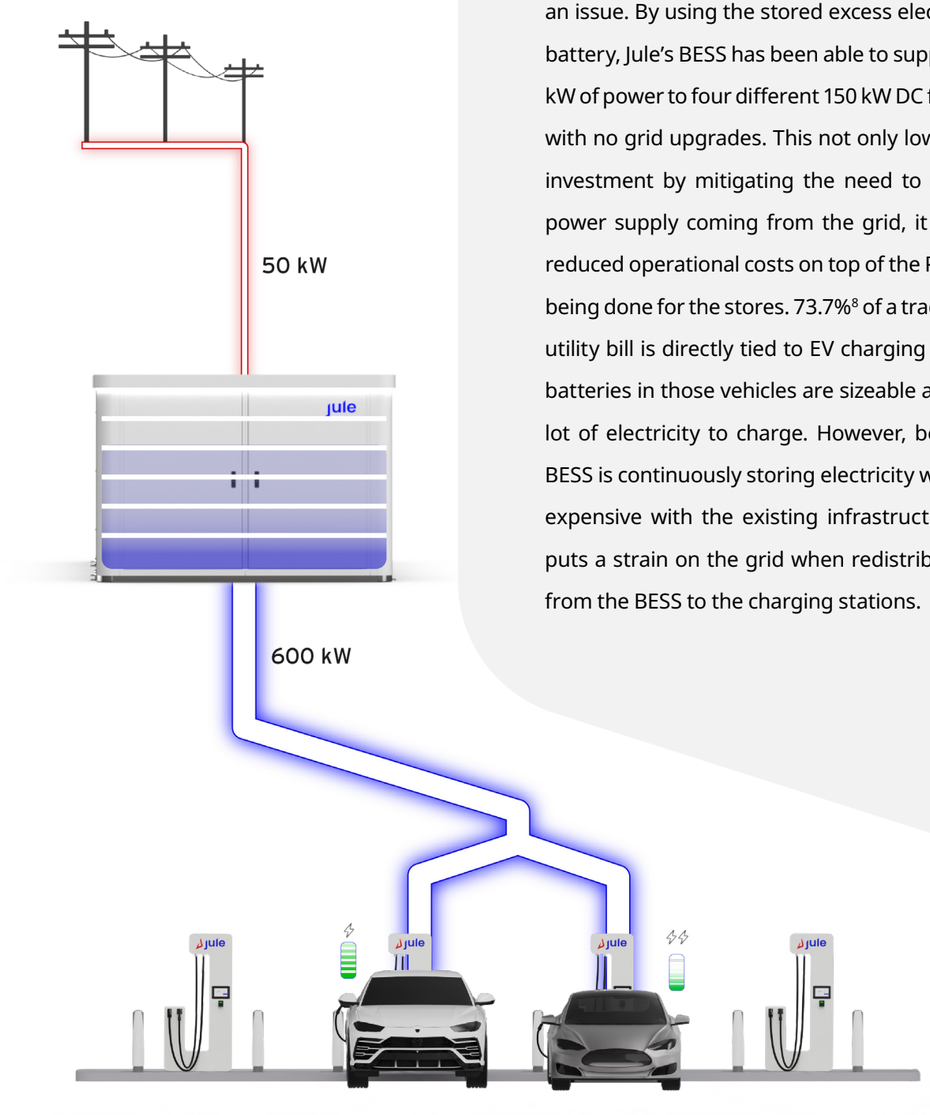
With Jule's Battery Energy Storage System (BESS), grocery stores across Ontario have been able to significantly lower their peaks while still maintaining the same level of energy consumption. By storing excess electricity during low-demand periods in the BESS and using it during peak hours, grocery stores have been able to drastically reduce the amount of energy they are drawing from the grid. These peak reductions translate directly into dollar savings from their utility bill, amounting up to **$100,000 saved annually in OPEX.**

Challenges

Available Grid Power

However, even though Jule's BESS was able to generate significant value through Peak Shaving, on its own, the battery would have been sitting at full capacity most of the day not being utilized outside small Peak windows of 6 hours[8]. This meant that the BESS was only being used to a quarter of its capacity. Furthermore, commercial sites are often constrained in terms of the amount of power they can draw from the electrical grid due to the limited infrastructure available. As a result, most sites (including the ones in Ontario) only have 30 to 50 kW of spare power available. This poses a significant challenge for electrification initiatives, as additional equipment such as fast EV chargers require anywhere between 100 - 350 kW of power per charger, making it impossible to support such infrastructure without significant grid upgrades to be done by utilities. Unfortunately, these upgrades represent a significant financial burden for site hosts, costing upwards of $1,000,000[7] (in addition to the hardware) for a single charger.





Fortunately for the grocery locations across Ontario that are partnering with Jule, upgrading the existing grid infrastructure to install fast charging was not an issue. By using the stored excess electricity in the battery, Jule's BESS has been able to supply up to 600 kW of power to four different 150 kW DC fast chargers with no grid upgrades. This not only lowered CAPEX investment by mitigating the need to increase the power supply coming from the grid, it also further reduced operational costs on top of the Peak Shaving being done for the stores. 73.7%[8] of a traditional site's utility bill is directly tied to EV charging alone as the batteries in those vehicles are sizeable and require a lot of electricity to charge. However, because Jule's BESS is continuously storing electricity when it is less expensive with the existing infrastructure, it never puts a strain on the grid when redistributing power from the BESS to the charging stations.

This can be done as Jule's technology works similarly to a water tank. It stores energy (in this case electricity) from the existing available "drip" 50 kW feed into the BESS and discharges it at a higher power (up to 600 kW) like a fire hose would from a water tank.

Challenges

Customer Satisfaction

Key Figures*

3,447
Charging Sessions

30 min
Average Session Duration

257,403 miles
Range Delivered

104 tonnes
CO2 Offset

Pairing Jule's BESS with EV fast chargers didn't only make sense from a cost optimization and technological perspective. Grocery stores have also become a preferred place to charge for EV consumers due to their convenient location and extended periods of dwell times. EV drivers are often on the lookout for a place to charge their vehicles while they run errands, and grocery stores provide an ideal opportunity for them to do so. Additionally, they are also often located near highway corridors and major roads, making them easily accessible for long-distance travelers looking to recharge. These factors combined with the revenue from the charging stations themselves represent an opportunity. Capitalizing on this is critical for any grocery store chain as EV penetration targets get closer.

These additional revenue streams have been a primary point of focus for Jule's grocery partners across Ontario. With each location having four stations where customers can charge their EVs, this represents multiple sources of additional revenue on three different fronts. From the charge sessions themselves – where customers are charged on a per minute basis* that typically amounts to $20-$25 for 45-60 minutes of charge (or 80% state of charge). From the dwell time spent at the stores while charging – the average time spent for customers charging at Jule stations is 30 minutes, aligning it perfectly with the time it takes to shop. Lastly, from EV owners that would not otherwise shop at a given location if it wasn't for the chargers. Jule chargers are all networked, meaning they appear and can be found on charging applications such as PlugShare, making the stations where they are located target businesses for EV drivers.

Jule's charging stations facilitate these streams further by removing frictions that typically exist with public charging. Jule's stations do not require any apps to initiate sessions or make payments. Users are able to initiate and pay for their charging sessions at the station by tapping their credit or debit card. This differs from most other networks who require users to download their proprietary apps and add funds into their digital wallets before they can pay for a session. Drivers are then forced to have different accounts with different amounts of funds on their phone. Furthermore, Jule's payment system is fully compatible with any rewards programs, giving stores the ability to provide incentives for customers to charge at their location or to shop at their store, seamlessly.

* Data collected from the Jule Energy Management System that monitors all station deployments

Summary

Conclusion

Installing fast chargers at grocery stores is becoming crucial as EV adoption rates are expected to reach 45% of vehicles on the road by 2030. Retailers that do not take advantage of this opportunity risk falling behind as grocery stores represent a key location for consumers to recharge. A battery backed solution such as Jule's is critical as it enables stores to provide a key amenity for drivers at a much lower infrastructural cost while also continuously reducing operational costs through Peak Shaving. There are far too few chargers deployed to accommodate EV demand and electrical grids are not able to sustain the power demand. However, this makes for an immediate opportunity for businesses to take advantage of, by becoming early entrants while governments are providing incentives to support this growing market. With a Jule solution, grocery retailers can future proof their business and allocate their energy more efficiently all while becoming more grid resilient.

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Citations

1 (IBIS World, n.d.)

2 (Citi)

3 (The White House, n.d.)

4 (Government of Canada, n.d.)

5 (McKinsey & Company, n.d.)

6 (Rocky Mountain Institute)

7 (National Association of State Energy Officials)

8 (Board, n.d.)

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