

Battery Storage Advantages for Fast Charging Stations

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Abstract

The recent volume growth in the Lithium based battery market has driven the price down. This is mostly due to the high volume demand of the new electric vehicle industry. This low price of electricity storage creates new business cases for utilities to control intermittent renewable energy generation, reduce peak power generation from gas power generator or improve asset utilization in the distribution system. The last one is of some interests for the deployment of DC Fast Chargers for electric vehicles. This type of charger is extremely important for the growth of electric vehicle sales as it allows convenient long distance driving. The current chargers are between 50 kW and 120 kW but quicker chargers are expected reaching more than 300 kW for a single charger and a charging stations can contain more than 6 chargers leading to strong peak power demand.

Local battery storage at the stations could reduce the peak load as DC Fast Chargers have usually low utilization rate. The average energy delivered per 24 hours is relatively low compared to the potential maximum energy deliverable. Peak load reduction has the benefit of avoiding substation upgrade therefore reducing the installation cost but it also significantly reduces the operating cost by decreasing or even nullifying the demand charge fee.

This paper goes through the different advantages of battery storage to operate a DC Fast Charging stations. Using real data from the Fast Chargers deployed in British Columbia, a design of the battery pack to install is presented. The battery storage and power demand is analyzed for actual and future fast charging stations. A cost benefit analysis is presented using battery cost, energy cost and demand charge fee estimation as well as new business opportunities using cost forecast of the battery storage system. The increasing number of electric vehicles on the road is also impacting the utilization of the stations and this impact is quantified using forecast based on the future vehicles releases.