

Strategies for EV charging resiliency during natural disasters

Consulting case study



Key highlights

A large northwestern utility hired E Source to investigate mobile and deployable electric vehicle (EV) charging options to enhance charging resiliency during natural disasters. We investigated the feasibility of several products currently on the market that are designed to be deployed to provide sufficient energy to stranded EV drivers in a natural disaster or other emergency.



Challenges

With natural disasters such as hurricanes, snowstorms, and wildfires occurring more frequently and intensely than ever before, utilities are developing strategies for supporting their EV customers during a disaster-caused outage. In fact, some state regulators are requiring utilities to plan for how they'll assist EV customers if grid-tied charging stations are de-energized.

Solution

The disaster-preparedness plan E Source crafted included the use of mobile and deployable EV charging technologies. The charging capacities of each potential solution varied significantly— from products as small as a suitcase that could ride in a tow truck to flatbed-sized battery arrays that can charge scores of cars. And some offered additional features like built-in solar capacity that allows the unit to self-charge. We then right-sized the potential solutions and identified preferred deployment locations by examining traffic volume and patterns, local penetration of EVs, and EV sales forecasts for the next several years.

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Outcomes

E Source experts analyzed several technology options, including mobile, deployable solutions designed to address a variety of outage durations and driver demand.

Vendor	Product	Approximate number of cars that can receive a 40-mile charge	Product size or platform
Tesla	Megapack Mobile Supercharger	54 to 154	Fits on a semi-truck flatbed
Dannar	4.00	6 to 25	About the size of a high-profile sport utility vehicle
Lightning Systems	Lightning Mobile	9	3,700 pounds; fits in the back of a cargo van or midsize cargo trailer
Freewire Technologies	Mobi	4	Slightly larger than a shopping cart
Beam (formerly Envision Solar)	EV Arc 2020	1 to 2	Fits on a midsize trailer
SparkCharge	Roadie	Less than 1	Each module is about the size of a suitcase; up to five modules can be connected

We also investigated more-permanent solutions, such as deploying a diesel generator to power EV equipment as well as well as islanding a microgrid that, while not mobile, would include local charging stations.

There are several use cases for EV drivers in an emergency and each required a different solution. Ultimately, E Source's EV charging resilience strategy included a recommendation to deploy several of the battery-based solutions described above as well as diesel generators. We also strongly advised the client to consider islanding a microgrid for a longer-term solution. The client is conducting additional research and will soon begin implementing E Source's recommendations.