Supercharging EV networks:
Energy management solutions for EV charging

Presented by Liam Weaver | RE+ 2023

EV charging infrastructure will be essential to meeting the nation's electrification goals...

- The transportation sector is the United States' largest source of greenhouse gas (GHG) emissions, accounting for 28% of emissions*
- Transitioning America's gas-powered cars to electric vehicles (EVs) is an important step toward reducing emissions
- A robust network of charging infrastructure is necessary to support the transition

**www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions*

...but there are challenges with installing EV infrastructure

- It can add 1 to 15 MW of peak load and fluctuate widely depending on when chargers are drawing energy from the grid
- It can greatly increase energy costs for customers, driven by high peak demands and interconnection costs or delays

Example: 10 high-voltage charging stations can incur costs of more than $250,000/year in demand charges and between $200 to $1 million in additional upgrade costs, not to mention months or years of delay in interconnection.

A solution: Integrating EV charging + solar + storage

Installing EV charging infrastructure has energy impacts. Your organization needs to think about how much load the charging infrastructure will add to your site demand. On-site energy flexibility solutions like solar and battery storage help you power this demand and get the most value out of your EV fleet charging.

Benefits unlocked:

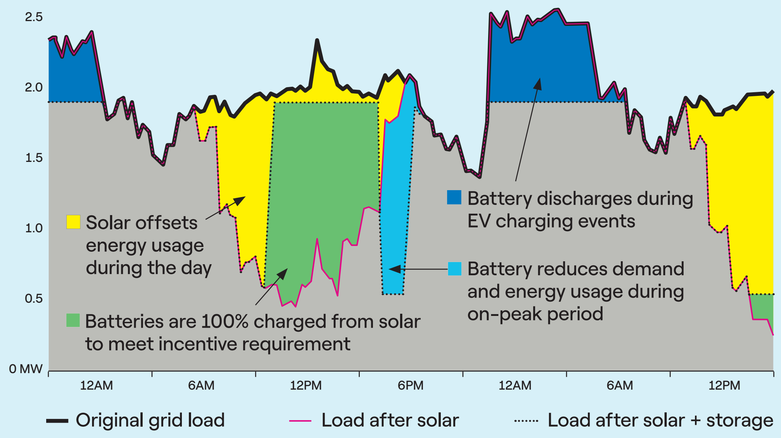
- Generate utility bill savings
- Avoid potential interconnection cost or delays
- Match charging with clean energy supply to support corporate environmental goals
- Provide energy resilience during system outages

In this example, storage leverages solar in the middle of the day to reduce peaks from EV charging, reducing annual solar export from 13% to less than 1%.

3,443,417 kWh
Annual existing site load

1,332,730 kWh
Annual EV consumption

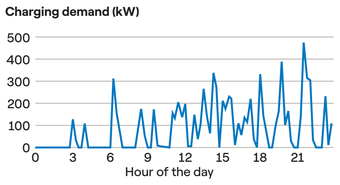
1,630,024 kWh
Annual PV Generation



We've identified 4 key applications for EV charging + solar + storage

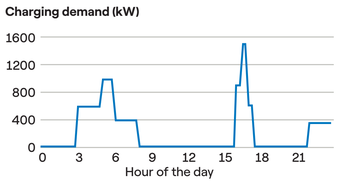
Public charging

Site owners or Charge Point Operators can increase charging margins and charger uptime



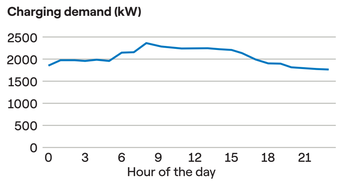
Fleet charging

Commercial fleet owners can shorten vehicle payback period and expedite time to interconnect



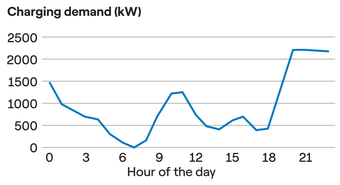
Depot charging

Depot developers can increase utilization rate and reduce charging costs



Transit charging

Transit Agencies can reduce charging costs and boost energy resilience



Spotlight: UMass Boston

System specs

- 1 MW carport / rooftop solar PV system
- 110 kW across 11 EV chargers
- 0.5 MW / 2.0 MWh lithium-ion battery system
- Cloud-based optimization software

Results

- Fully financed and implemented by Enel
- Optimization software automatically operates assets
- 17% total projected energy savings
- Est. $1.9M in demand charges and incentive earnings

How NEVI is supporting the rollout of public charging

The Bipartisan Infrastructure Law (BIL) established the National Electric Vehicle Infrastructure (NEVI) Program, which authorizes $5 billion to support the installation of public EV fast charging stations along highways to make finding a charge as easy as filling up at a gas station.

NEVI funding can cover up to 80% of the costs associated with installing and operating an EV charger, including:

- Construction or upgrade of EV charging infrastructure
- Workforce development activities
- Operation and maintenance of EV charging stations
- EV charging station signage
- Installation of on-site electrical service equipment
- Data sharing activities
- Community and stakeholder engagement
- Related mapping analysis and activities

Because NEVI supports the national build-out of EV charging infrastructure, proposed EV fast charging projects must be located along designated highways and be publicly accessible.

Good candidates to host public EV chargers:

- Grocery stores
- Parking lots and garages
- Shopping centers
- Gas stations and convenience stores
- Hotels
- Event venues
- Restaurants
- Transit centers

Each EV charging port must have an average annual uptime greater than 97%

Choosing the right chargers and integrating those chargers with distributed energy solutions will be essential to meeting NEVI criteria and maximizing EV charging performance.

enelnorthamerica.com

To learn more about Enel's distributed energy solutions, please contact Liam Weaver, Senior Manager, Solutions Engineering: liam.weaver@enel.com