



Facilitating a transforming grid: Unlocking energy storage with data

U.S. DOE Electricity Advisory Committee Meeting
Wednesday, June 7, 2023

Peter Olmsted
Director of Public Policy
FreeWire Technologies



FreeWire Technologies

Leading manufacturer of battery-integrated Direct Current Fast Chargers (“DCFC”)

Who FreeWire was founded in 2014 in San Leandro, California

What Flexible, turnkey EV charging & power solutions w/ energy storage

Customers Retail, fleets, public, utility, automotive, workplace, local gov

Investors include:

BlackRock.



RIVER
STONE



ABB



Gly
Capital
Management

OCTAVE VENTURES

Customers include:



TA

AMERICAN
ELECTRIC
POWER



massDOT
Massachusetts Department of Transportation



Rotten Robbie

meijer

Google

NETFLIX



LA
Department of
Water & Power

New York Power
Authority

MACK



Boost Charger™ in Lodi, CA

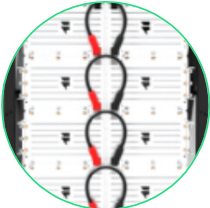


High-Power EV charging with low grid impact



NEXT-GEN POWER CONVERTER

Proprietary power conversion technology with silicon carbide architecture & 99% efficiency



ADAPTIVE BATTERY PACK

Proprietary battery pack with flexible architecture that switches between 400V & 800V



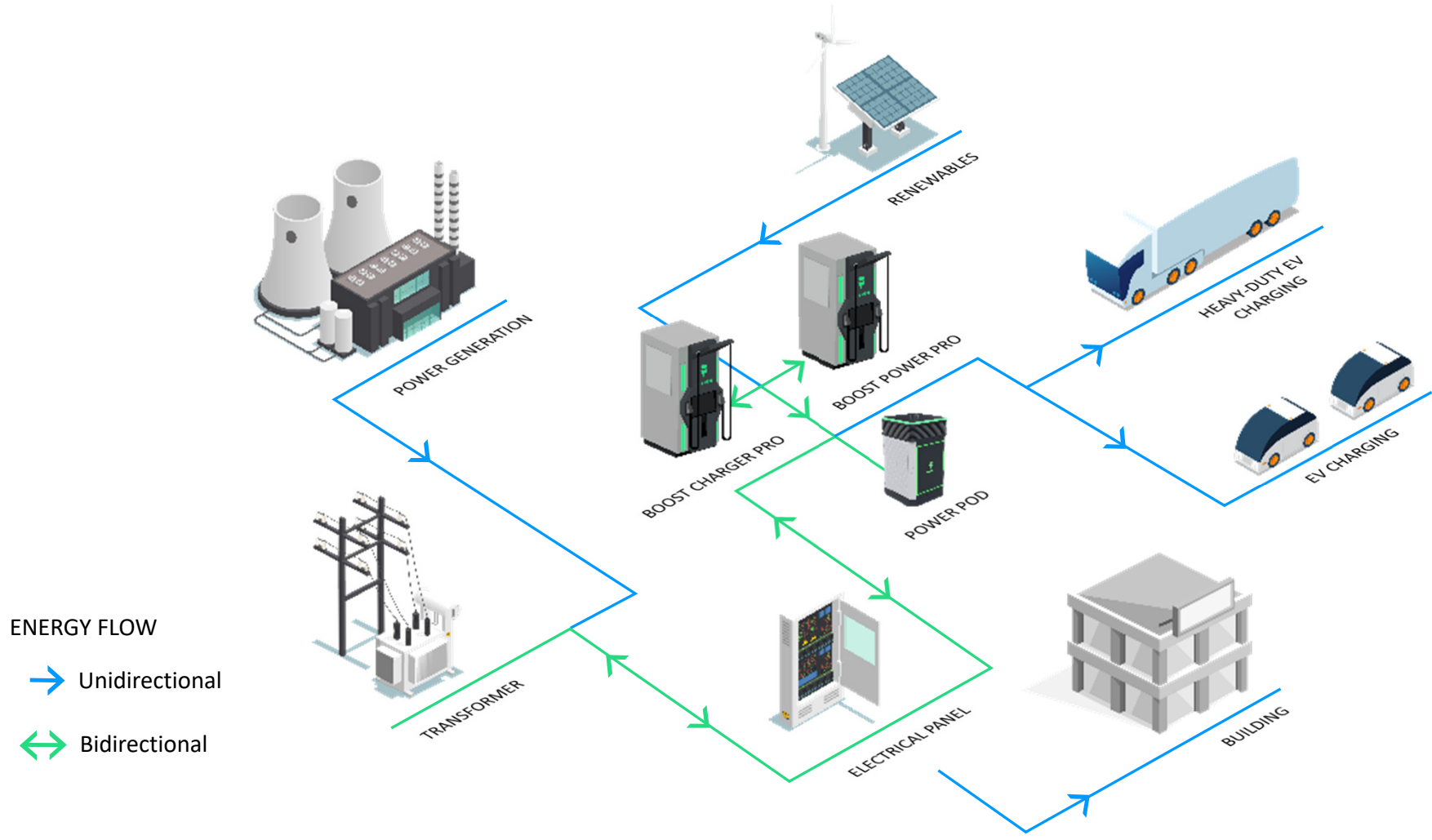
Product Roadmap

Boost 120	27 kW Input / 120 kW Output
Boost 150	27 kW Input / 150 kW Output
Boost 200	27 kW Input / 200 kW Output
Boost Pro	Grid Down (Resilient Charging)
Boost Power	Fully Bi-Directional (Charger-to-Everything)

ADVANCED CONTROL SYSTEM

Optimized to enable distributed energy services

Multiple power assets & loads = multiple data sets





Data impacting the ESS business model

Deployment

- Power available to support new load
- Grid constraint / congestion
- Demand for power (EV charging)

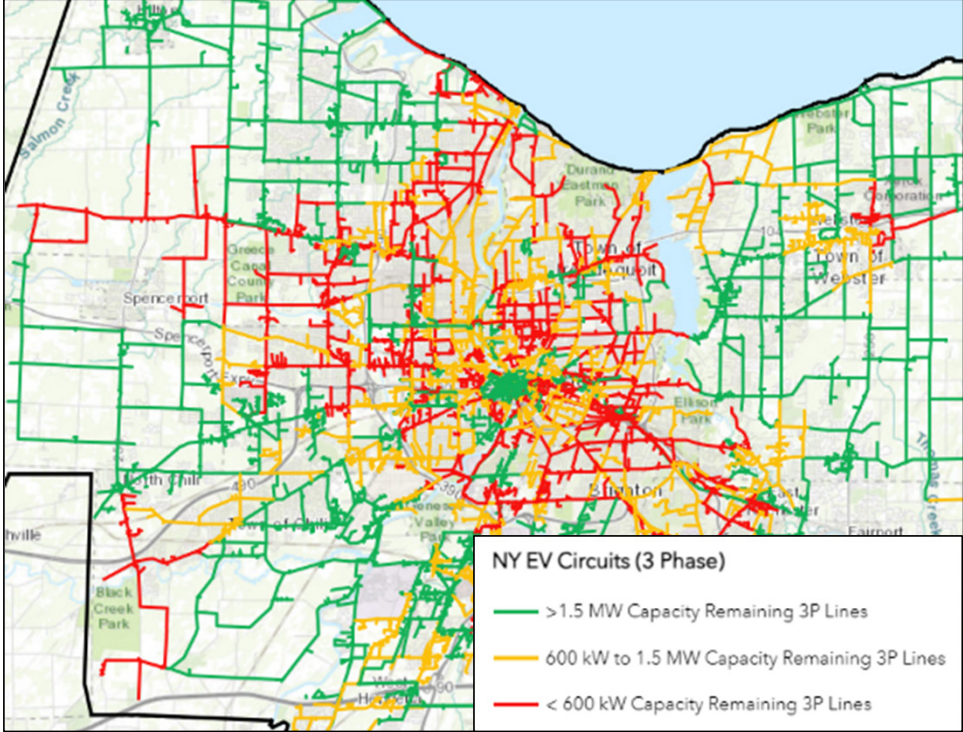
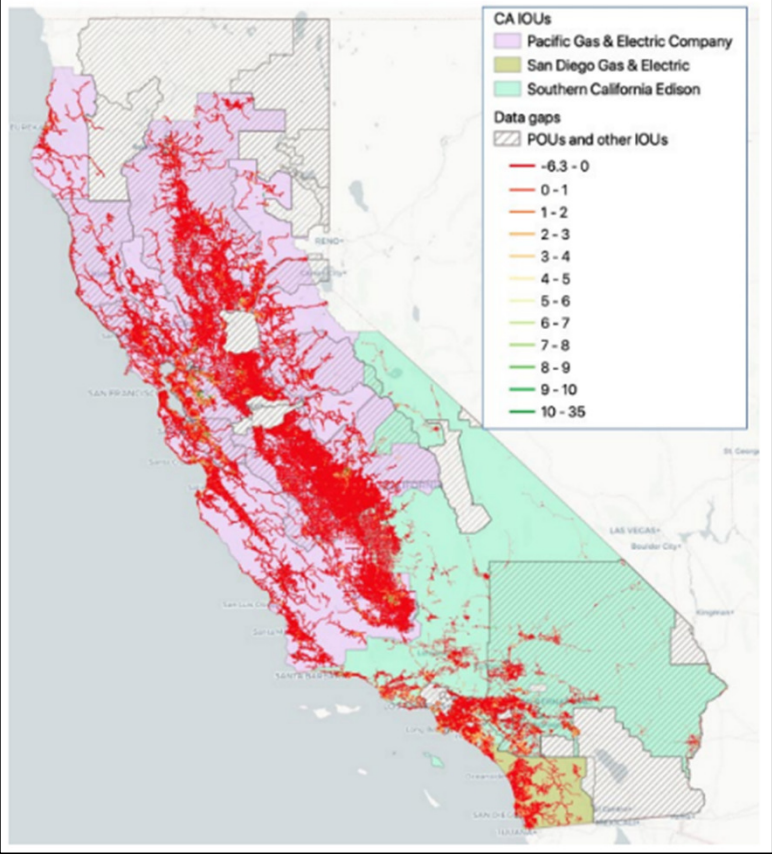
Operation

- Tariffs, utility / grid programs
- Load profiles
- On-site power needs (e.g., resiliency)
- Utilization and demand (EV charging)





Grid hosting capacity data



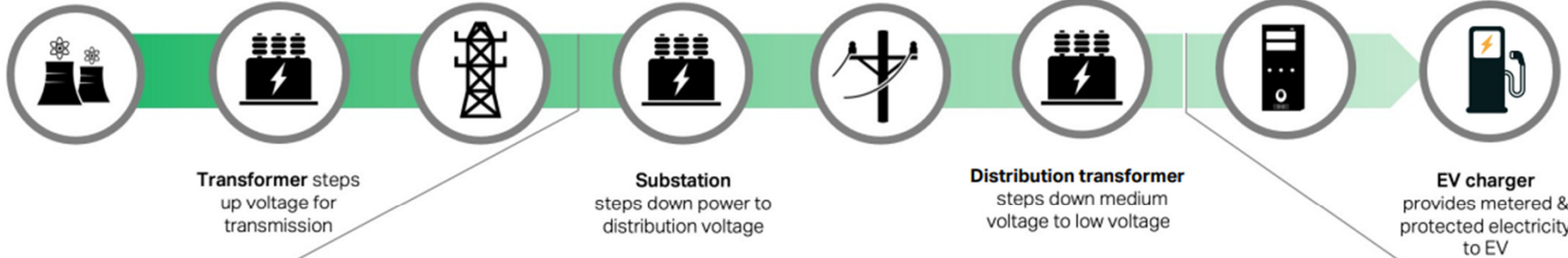


Power generation facility produces electricity

Transmission lines carry electricity long distances

Distribution lines carry medium voltage to customers

Meter & EV supply equipment to allocate electricity, allow authentication and control



Cost of grid upgrades

COMPONENT	Distribution Substation	Distribution Substation	Distribution Feeder	Distribution Feeder
UPGRADE	Build New	Upgrades	Add Feeder Breaker	Extend or Upgrade
WHAT TRIGGERS UPGRADES	>3-10 MW Added	>3-10 MW Added	>5 MW Added	>5 MW Added
TYPICAL COST	\$4-35 Million	\$3-5 Million	\$400 Thousand	\$2-12 Million

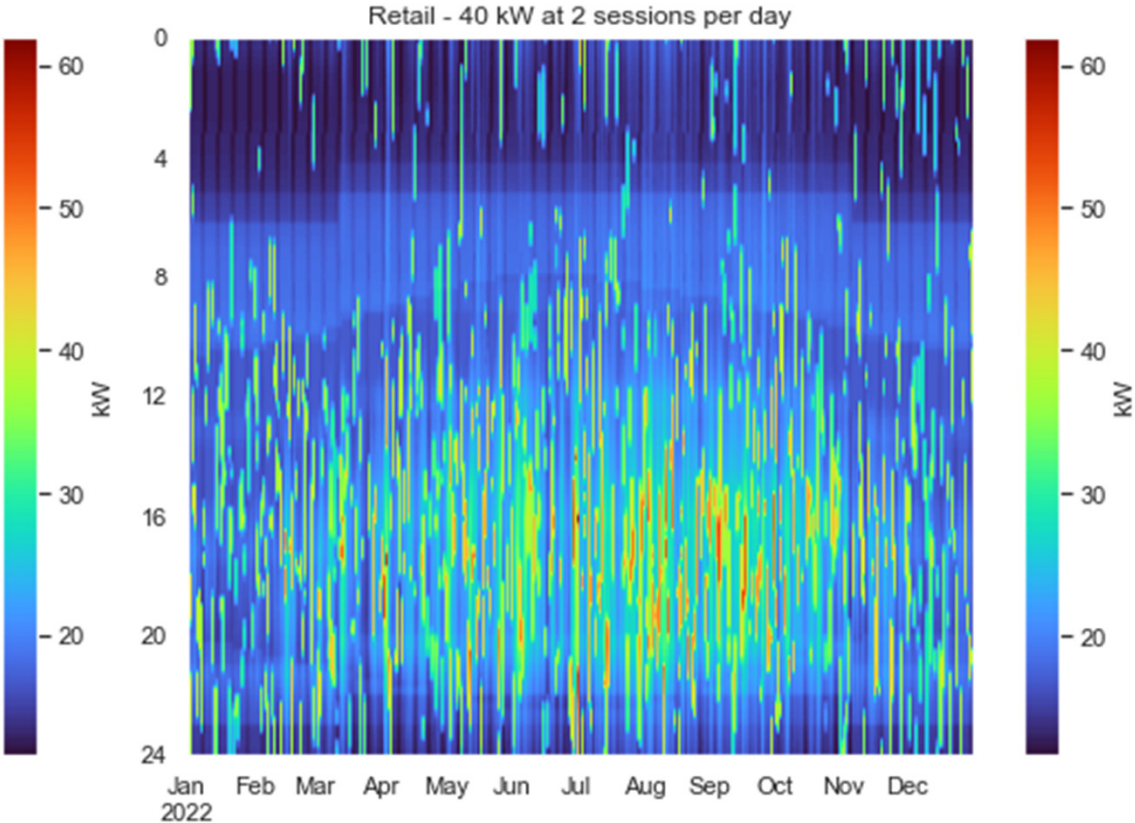
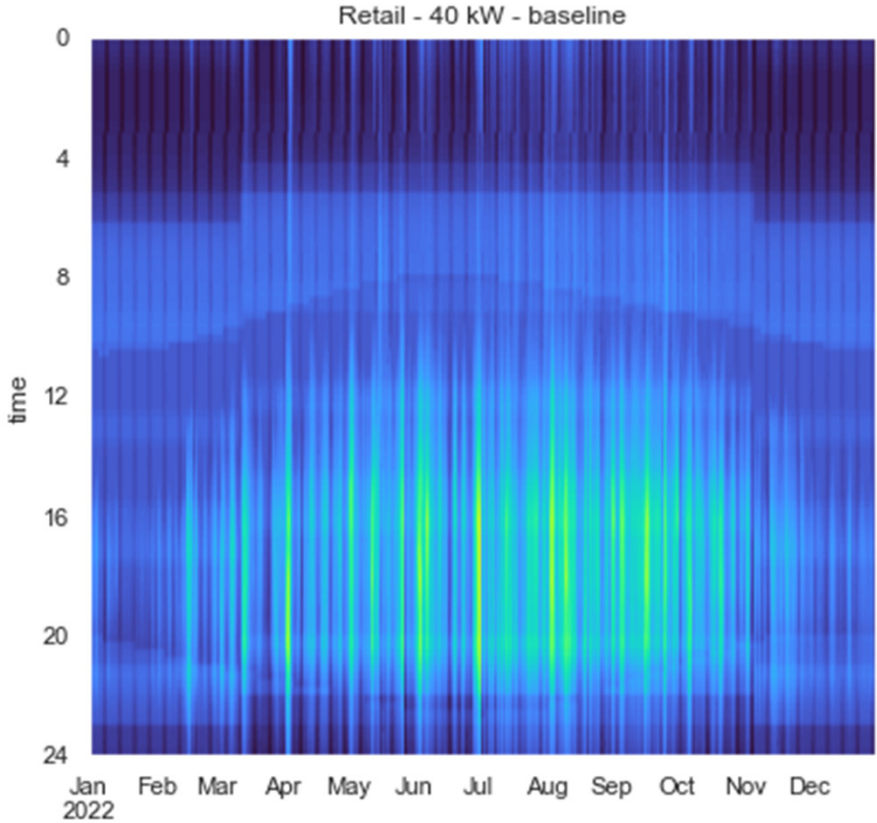
Time needed for grid upgrades

COMPONENT	Build New Substation	Upgrade Existing Substation	Add Feeder Breaker	Distribution Feeder Extension / Upgrades	Distribution Transformer
TYPICAL TIMEFRAME (MONTHS)	24-48	12-18	6-12	3-12	18-24

Source: NREL



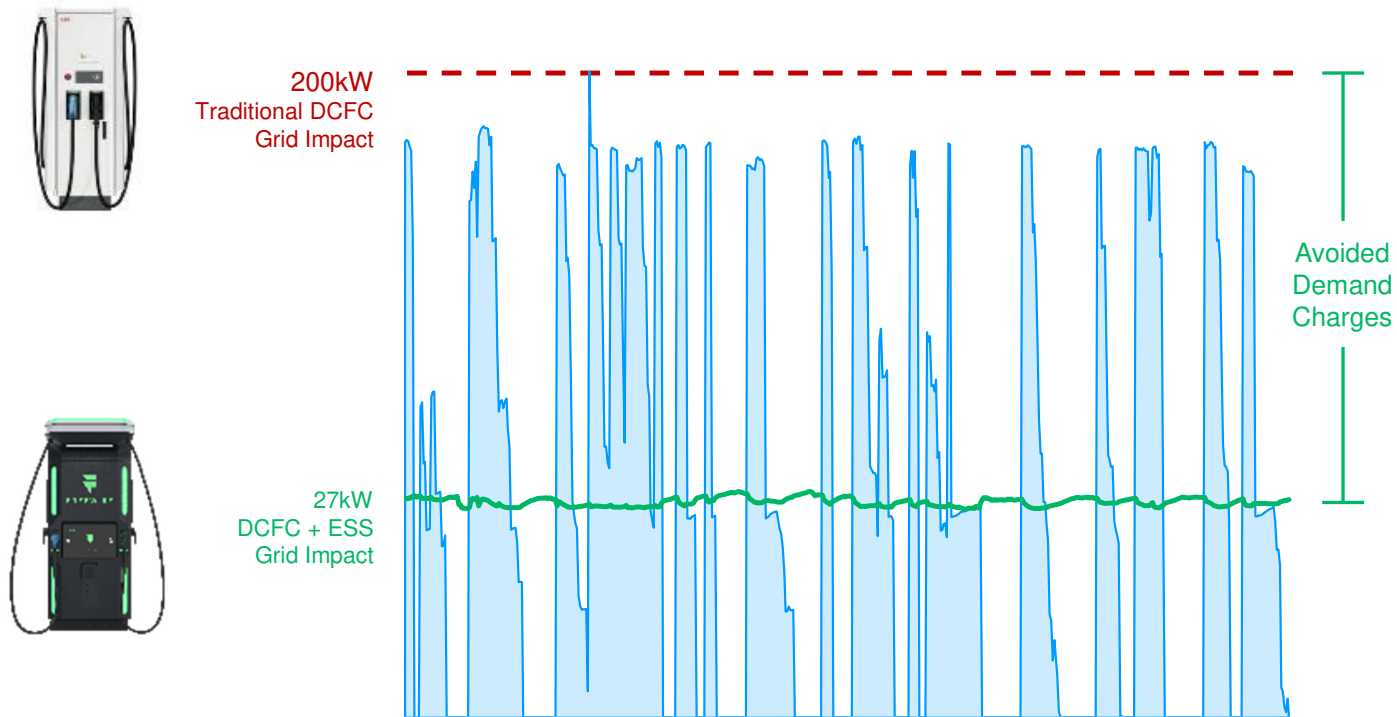
Site load becoming increasing noisy due to electrification





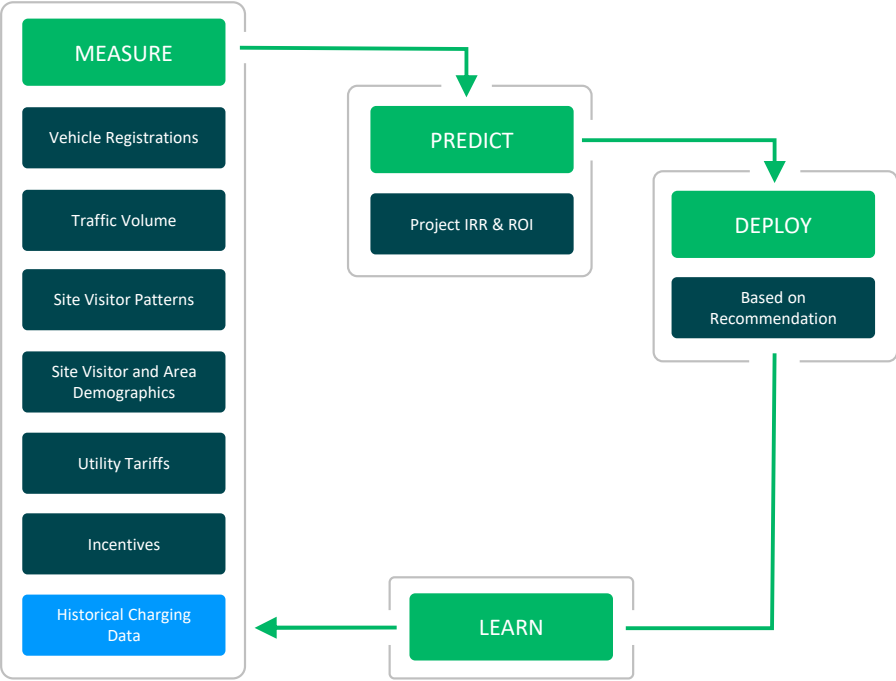
Greater electrification = greater need for accurate price signals

Daily Charging Sessions and Grid Impact

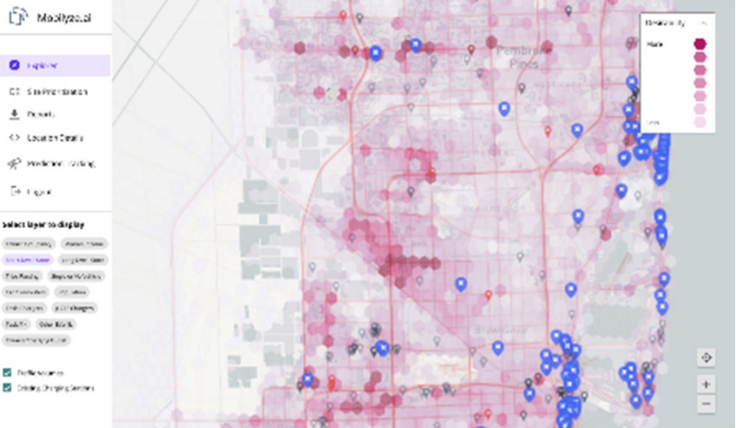




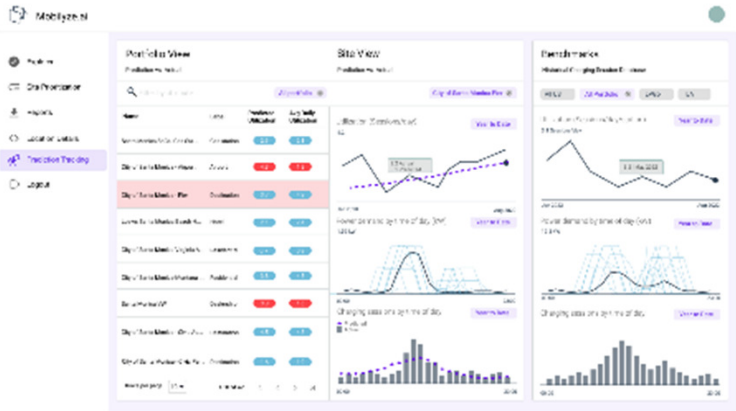
New data needed to forecast utilization and optimize site selection



Utilization Forecast



Portfolio Analysis





Granular data needed to optimize ESS

1. Cost to serve new and increasingly distributed load
2. Data to inform opportunities for avoided costs
3. Modeling and tariff engines to inform customer decision making
4. Greater access and utilization of customer energy usage data