

CALFLEXHUB SYMPOSIUM

SEPTEMBER 24 | 8am-6pm PT



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SAM GODA

ELECTRIC VEHICLES AND THE PROMISE OF MANAGED CHARGING

Jingjing Liu, Technology Researcher III, Berkeley Lab; **Frances Bell**, Co-founder, Bidirectional Charging;
Casey Donahue, CEO, Optiwatt; **Daniel Hilson**, CEO, BetterFleet;
Nate Underwood, Senior Business Development Manager, ev.energy;
Sam Goda, Policy & Regulatory Affairs Manager, Kaluza



2024

Panelists Introduction

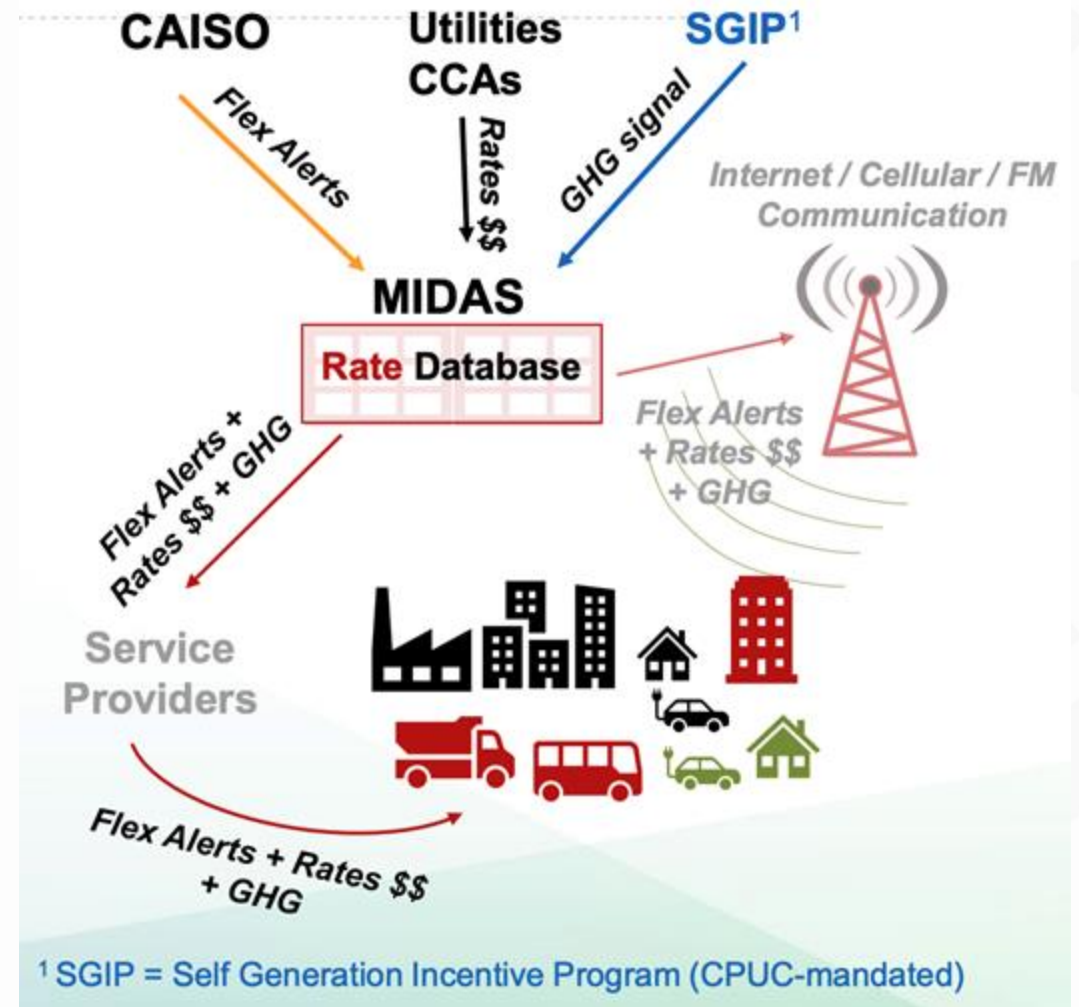
- ❖ Sam Goda, Policy and Government Affairs Manager, **Kaluza**
- ❖ Daniel Hilson, CEO, **BetterFleet**
- ❖ Nate Underwood, Senior Business Development Manager, **ev.energy**
- ❖ Frances Bell, Co-founder, **Bidirectional Energy**
- ❖ Casey Donahue, CEO, **Optiwatt**



REDWDS Overview

Responsive, Easy Charging Products With Dynamic Signals (REDWDS)

- ❖ CTP GFO-22-609 (March 2023)
- ❖ Context:
 - Rising EV adoption
 - Make EV charging grid friendly without compromising mobility
 - Navigate dynamic rates, DR programs
 - Support LMS



Solicitation Requirements

- ❖ Phase 1: \$20M / Phase 2: \$188M
- ❖ **Automatically** retrieving grid signals:
MIDAS, ELRP/DSGS, dynamic rates (SCE)
 - telematics or EVSE
- ❖ Scope:
 - **Product** development (multi-sector)
 - **Field** deployment (50% DAC/LI)
 - **Data** reporting
- ❖ Interoperability standards (ISO15118, OCPP)
- ❖ EVSE type; V2X; high power (>22kW)

10 Awardees:



ev.energy Corp

dcbel LLC

Kaluza Ltd

Prologis Mobility Bruns Auri Inc

Bidirectional Energy Inc

IoTecha Corp

Everergi LLC

Compass Global Inc (Optiwatt)

Weave Grid Inc

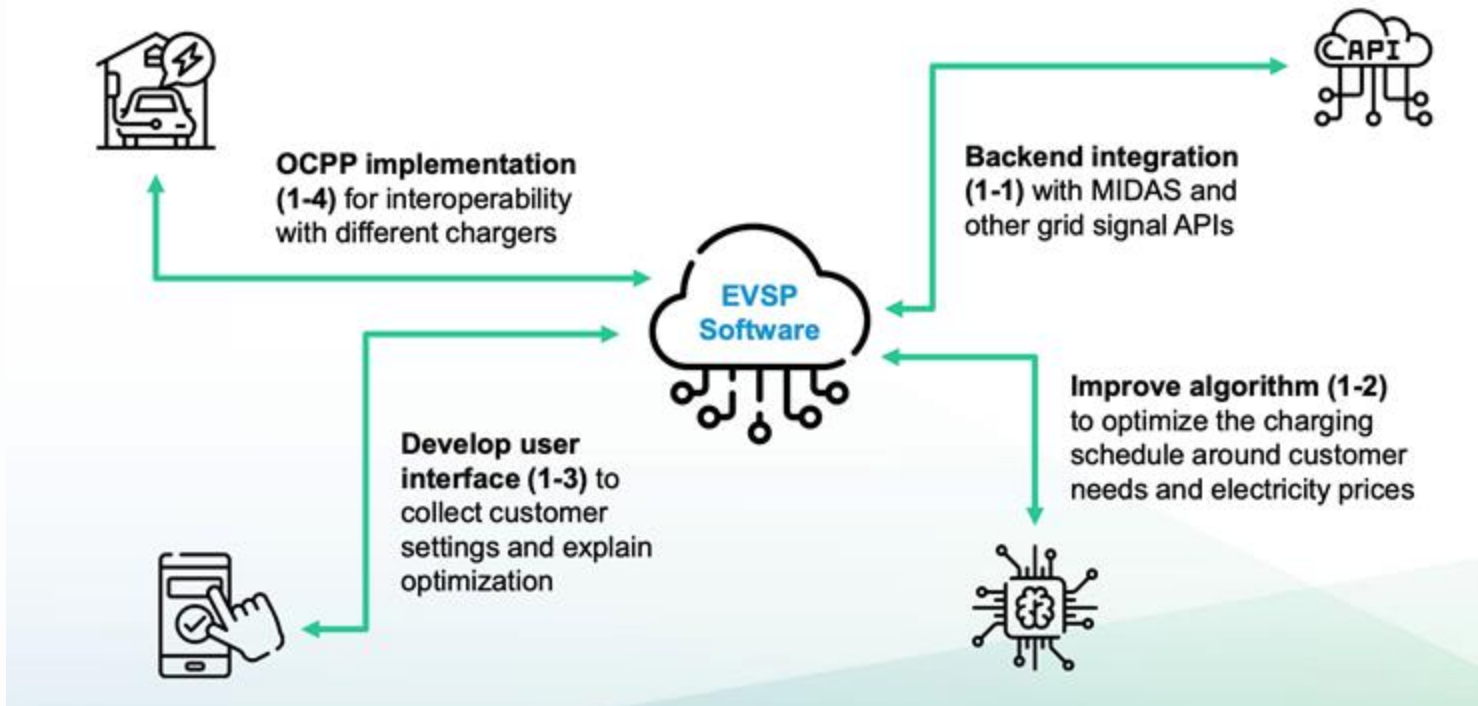
Gridtractor

EV Charging Management Product

This example is from the perspective of an EV charging network or EVSP (sometimes called charge point operator).

Product is expected to be:

- ❖ Grid responsive
- ❖ Easy to use
- ❖ Creates value for the customer



Sam Goda, **Kaluza**

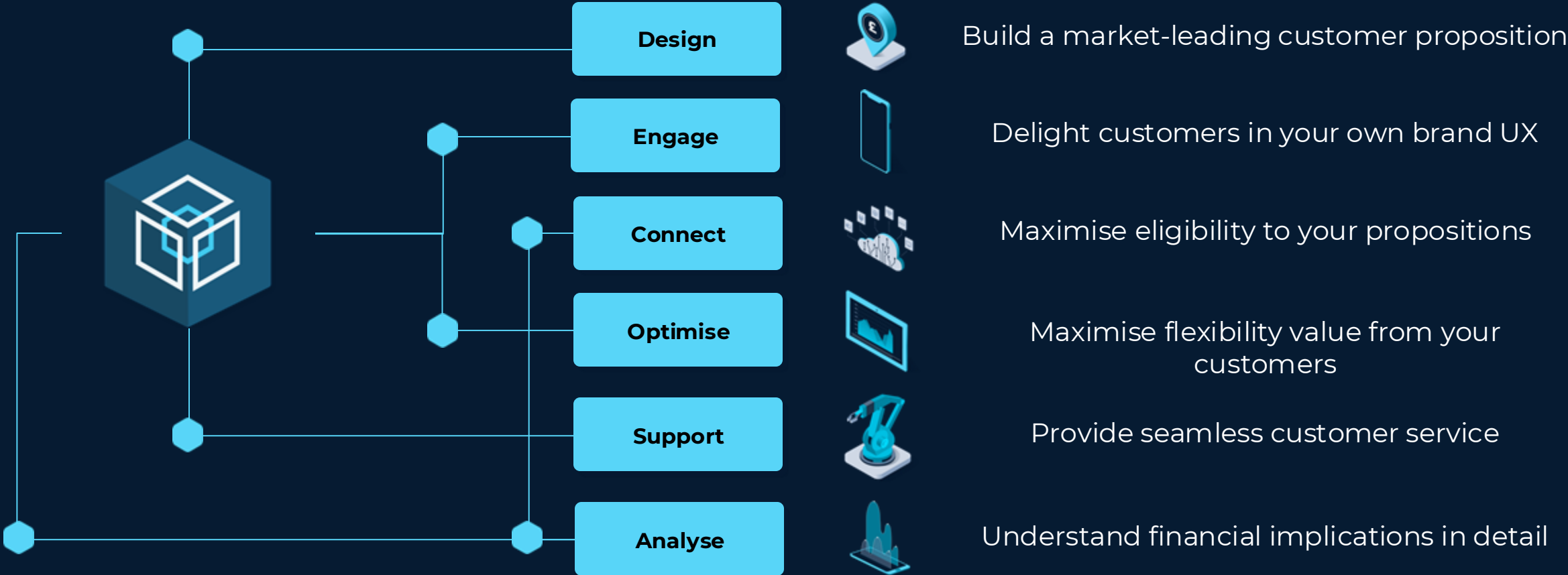
Contact: samuel.goda@kaluza.com



The Kaluza Flex solution

Enable your customers to save money & maximise renewable consumption

Modules



A platform for building unique propositions

Value created by shifting charging in high-priced periods to low priced periods can be packaged to the customer in a variety of different customer-facing products.

Optimisation Inputs

Customer Settings

Ready-By-Time, State-of-Charge

Device telemetry & metadata

Live status and nameplate data

Intraday Price Curves

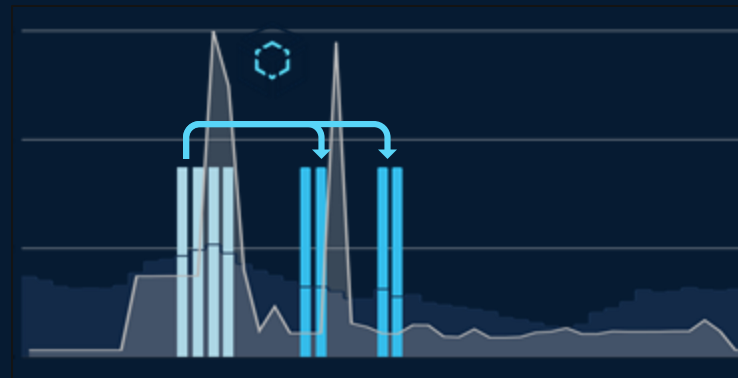
Updated real-time, by location

DSO and TSO Services

Ancillary market constraints

Site-level forecasts

E.g. generation from owned PVs



Device Load Shifted around Inputs

Outcomes presented to the customer

Customer Propositions

Type of Use

Low, flat rate per device

Dynamic Time of Use

Variable price, updated intraday

Smart Charging Rewards

Delivered as bill credits or voucher

Free Miles

Credits for public charging

Demand Response

Event-based availability reward

TREE - Tech for Reliable EV Electricity

CEC REDWDS award to help customers manage EV charging and respond to demand response events.

300 V1G / 30 V2X - Demonstrate successful and consistent patterns of load shift with V1G to times when energy is cleaner. Establish V2X export occurs in response to grid events.

50% low-income/DAC - Lower barriers to participation by customers in low-income / disadvantaged communities.

Test dynamic tariffs - Validate customers on dynamic rates experience cost savings via incentives in rate structure to shift EV charging to off-peak hours.

Grid signal integration - Engage and activate customer responses to dynamic grid signals (e.g. Flex Alerts, Emergency Load Reduction Program) while meeting customer mobility needs.



Full integration with
Wallbox
166 Pulsar Plus L2
30 Quasar Plus V2X



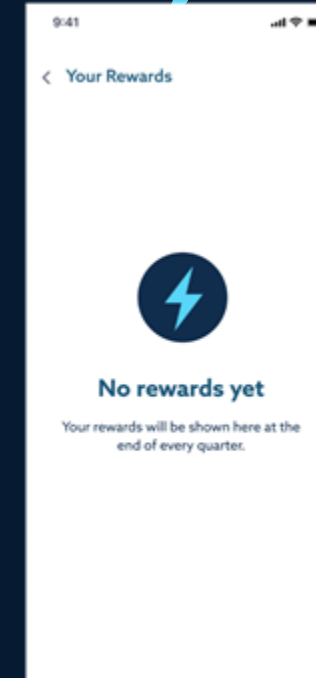
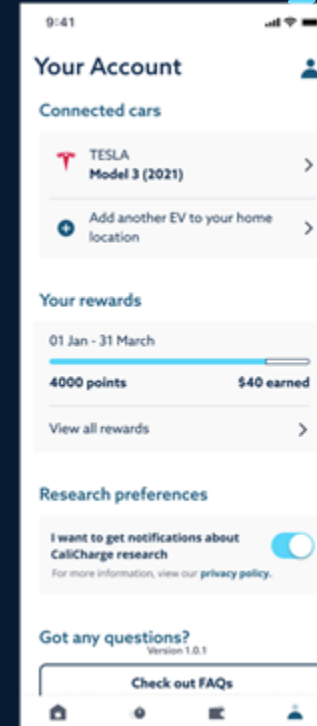
Cali Charge



Get rewarded for driving electric just by plugging in.

Participants earn 50 points for each day they plug in their car for over 6 hours.

1000 points equal \$50 voucher of their choice.



Community Organizations
EV enthusiasts to spread the word

Facebook and Google Ad
Targeted ads in PG&E territory

PG&E Hourly Flex Pricing Program
Utilizing new programs and utility promotion

ValleyCAN Direct Recruitment
First time EV Owners in DAC Community

Interested in our program?

→ CaliCharge.energy



Daniel Hilson, **BetterFleet**

Contact: dhilson@evenergi.com



About BetterFleet

BetterFleet is used by fleets around the world to streamline the transition to zero-emission vehicles and create a better transportation future.

- ❖ An EVenergi company, founded in 2016
- ❖ On a mission to accelerate the transition to zero-emission vehicles

A single platform to plan, optimize and manage complex zero emission fleets

- ❖ Planning your fleet transition
- ❖ Procuring vehicles and charging equipment
- ❖ Managing vehicles and charging in operation



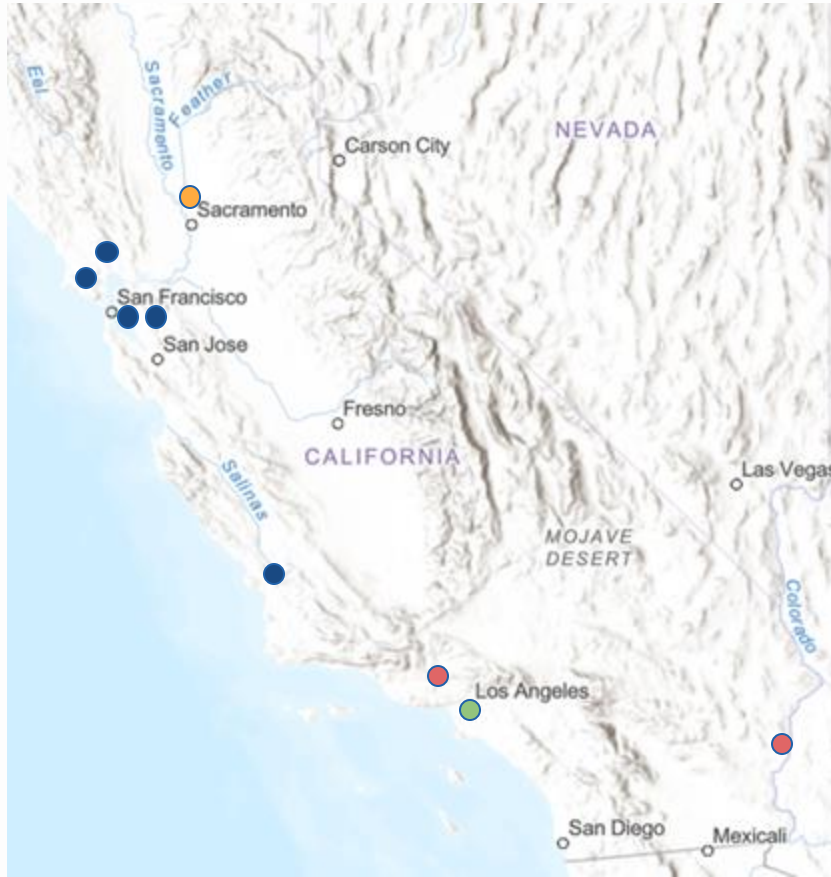
REDWDS Phase 1 Scope

Phase 1 – Develop and deploy fleet planning & advanced charge management products that helps with modeling, contracting and then delivering load management programs.

- ❖ BetterFleet has teamed up with EPRI, CAISO, and SMUD
- ❖ Product development scope:
 - Planning tool that enables forecasting and visualization of impacts of responding to grid signals
 - Charge Management system integrated with vehicle telematics



REDWDS Phase 1 - Fleets



Utility Service Area: PG&E
City of Oakland
Sonoma County
Alameda County
Santa Rosa Transit
San Luis Obispo County

Utility Service Area: Roseville Electric
City of Roseville (Transit, PW)

Utility Service Area: SCE
Riverside County
Santa Clarita Valley Water District

Utility Service Area: LADWP
City of Los Angeles (Transit)

Prospective fleets are located across state in POU and IOU territories, including in disadvantaged and low-income communities. Fleet types vary and include HD transit fleets, and LD vehicles of county/municipal fleets. *At least 35% of deployments must be with customers who enroll in a dynamic or transactive energy rate. All remaining deployments must be with customers enrolled in a time varying rate, like TOU.*

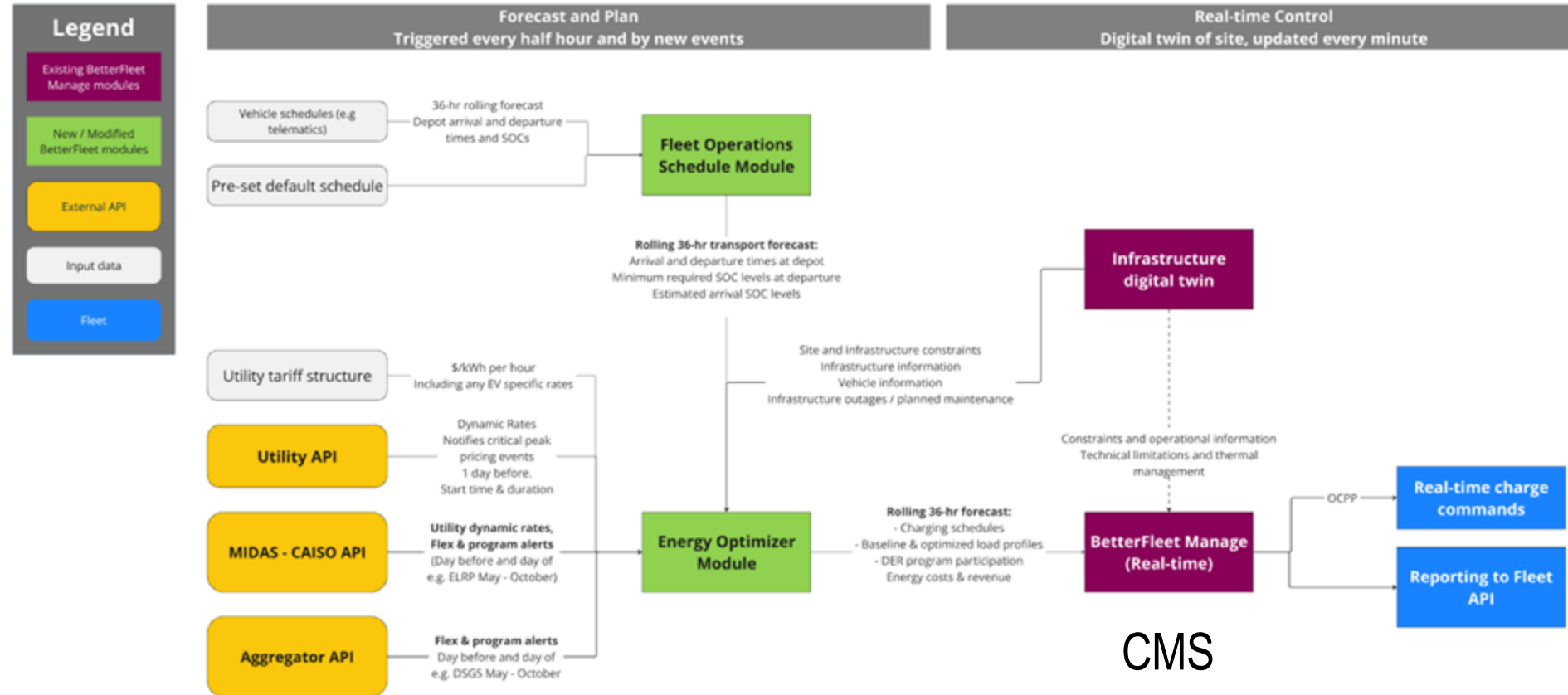
Project Implementation Strategies

- ❖ Provide customers with a **what-if decision support** planning tool that demonstrates the potential benefit of responding to grid signals
- ❖ Establish baseline bill & resilience result for customers without the product
- ❖ **Automate responses** where possible based on pre-agreed load management strategies, or use SMS to authorise strategies in real-time
- ❖ Provide limited off-bill tariff enhancements such as surge pricing
- ❖ Run the program for a 12-month bill cycle using the full gamut of potential load-modifying programs and dynamic signals to be evaluated and compare each against the established 'baseline' bill outcome
- ❖ Estimate **multiple "shadow" bills** that demonstrate the savings and resilience benefits under each option (where options are stackable)
- ❖ Share outcomes & leverage in marketing campaigns for Phase 2, solidify product financing arrangements



Phase 1 Communications Strategy

Phase 1 scope



Nate Underwood, **ev.energy**

Contact: nate.underwood@ev.energy



Mission

We are building the world's largest virtual power plant

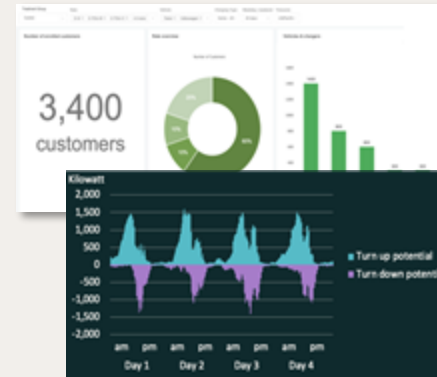
Delight Customers



Scale Fast



Drive Savings



185,000

EVs under managed charging

55+

Managed Charging Programs Globally

+200GWH

Managed Load

96.3%

CSAT Score



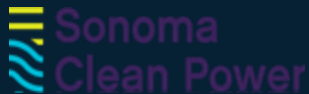
ChargeWise California Scope

Driver recruitment

- Underway

Partners

- Additional partners coming to enroll 300,000 additional drivers (ChargeWise CA target)



Scope

- V1G active managed charging
- Dynamic hourly rewards
- V2G expansion
- ~95% of drivers covered via vehicles and chargers

Selected new features

- CAISO hourly price signal
- Dynamic Rewards managed charging program tier with incentives based on hourly price signal



Recruitment and communications

Customer recruitment

- Email, digital, and survey option to participate in dynamic rewards for existing CCA customers

Customer engagement

- In-app charging insights tab
- Monthly charging insights emails, including explanation of dynamic rewards
- Off-bill payments



ev.energy optimization and dispatch via telematics and networked chargers

Dynamic rate signal



ev.energy scheduling engine



Charging Schedule



- Wholesale market price data
- Hourly rates updated a day ahead
- Collected via CAISO API

- Utilizes dynamic rate in schedule generation
- Factors in user settings (e.g., ready by time)
- Applies secondary signals (GHGs, DR events)

- Driver charging optimized for dynamic rate tariff
- Otherwise Applicable Tariff (OAT) and counterfactual scheduled stored for savings calculation

Frances Bell, **Bidirectional Energy**

Contact: frances@bidirectional.energy



Value Proposition for EV owners

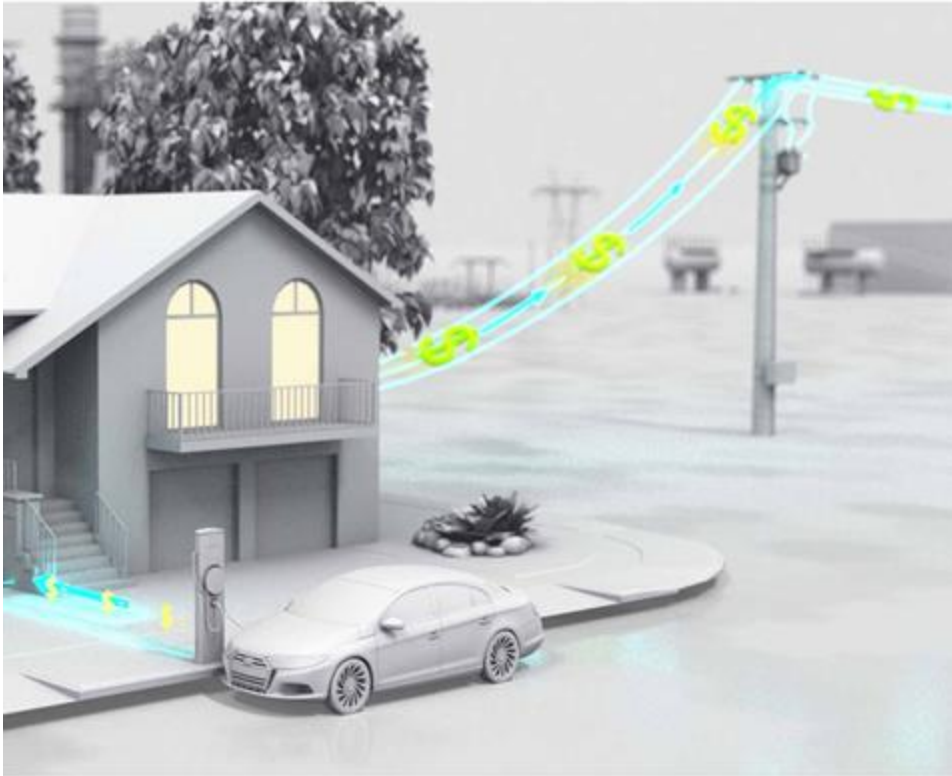
We provide a mobile app and charger installation service that lets EV owners earn money by selling energy from their EVs back into the grid.

↔ Bidirectional Energy



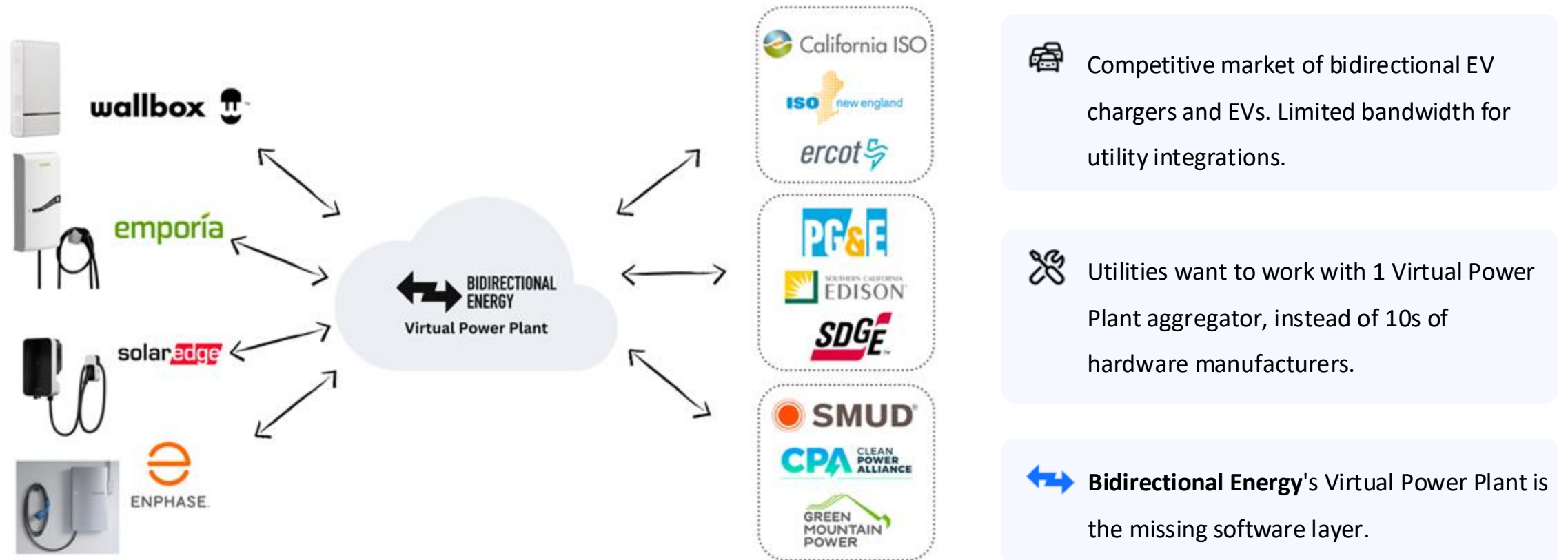
Value Proposition for Utilities

↔ Bidirectional Energy



We provide a Virtual Power Plant (VPP) consisting of consumer EVs that gives utilities easily dispatchable power to reduce electricity load on the grid, helping them meet their **capacity planning** and **carbon reduction** goals.

Bidirectional EVs as grid batteries is a software problem



How Bidirectional Energy works



- 01** Alice, an EV owner, signs up with Bidirectional Energy
Bidirectional EV chargers offer **5X** the capacity of a Tesla Powerwall at **half the price**:
- home backup during blackouts
 - earn more from their solar
 - sell energy back to the grid

- 02** Our partner installs a bidirectional charger at Alice's home
A trained installer works with Alice to develop a quote then come to her home to install the V2G charger.

- 03** Alice simply leaves her EV plugged in at home, and starts earning with our mobile app
Today, utilities and grid operators pay such that Alice has a payback time of **4.5 years** vs solar payback time of 6-10 years.



Install partner

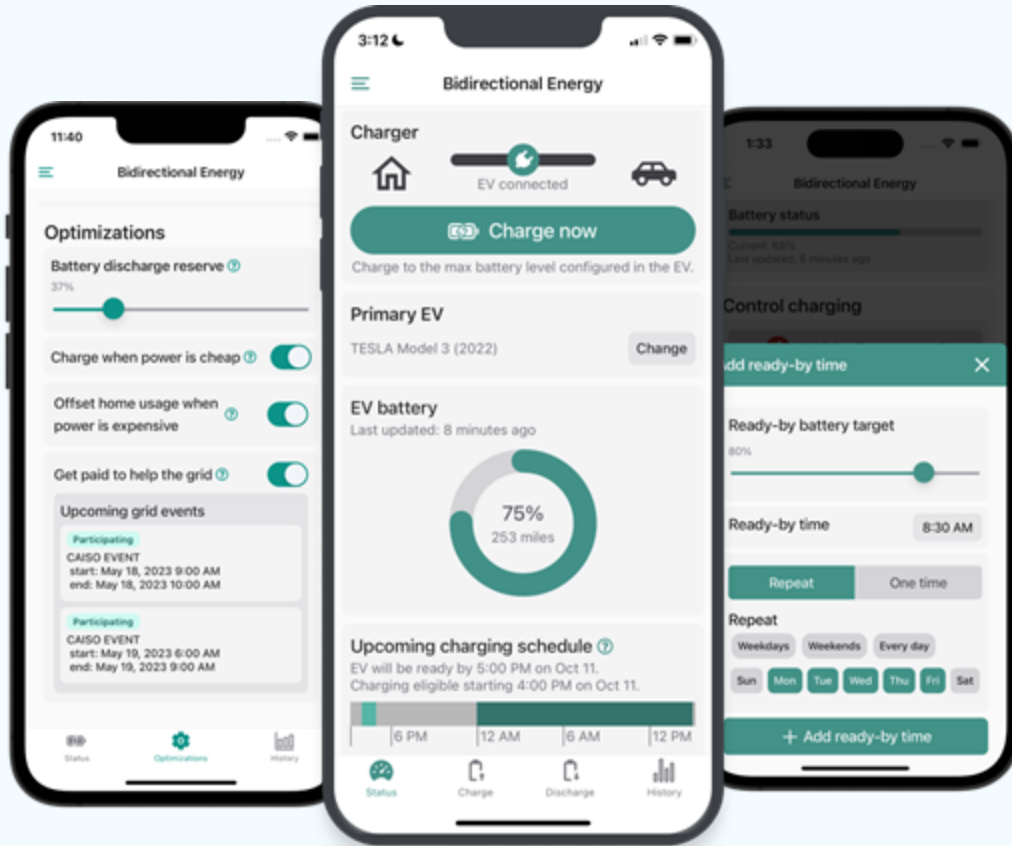


Actual charger

↔ Bidirectional Energy

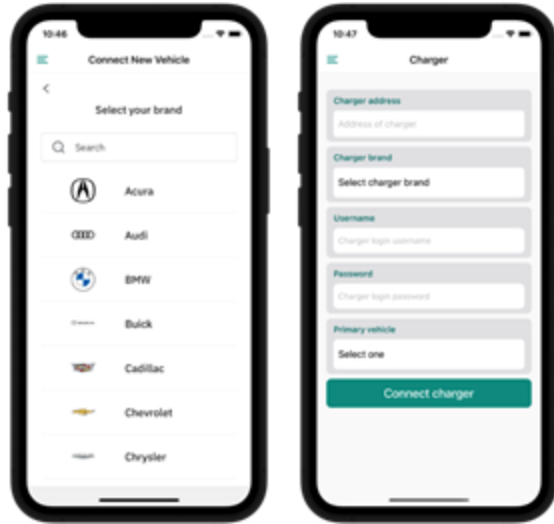
We obsess over the EV owner's experience

- UX that starts with charger selection
- 1 click enrollment process to start selling energy into the grid
- Easy-to-use mobile app to give EV owners insight into why their EV is charging/discharging and the benefits
- Motivated audience of 1000 EV owners as early adopters and testers



Screenshots from our mobile app.
Live on both Apple App store and Google Play store.

↔ Bidirectional Energy



We obsess over the EV owner's experience

We provide end-to-end customer service, including installation

A big blocker is just getting more V2X chargers in homes. We mitigate that by being a one-stop-shop for EV owners.



- Partner with local dealerships educate about V2X chargers at EV point of sell
- Multi OEM support.
- Simple, streamlined installation and permitting process
- Initial setup and grid program enrollment as part of the installation

Casey Donahue, **Optiwatt**

Contact: casey@optiwatt.com

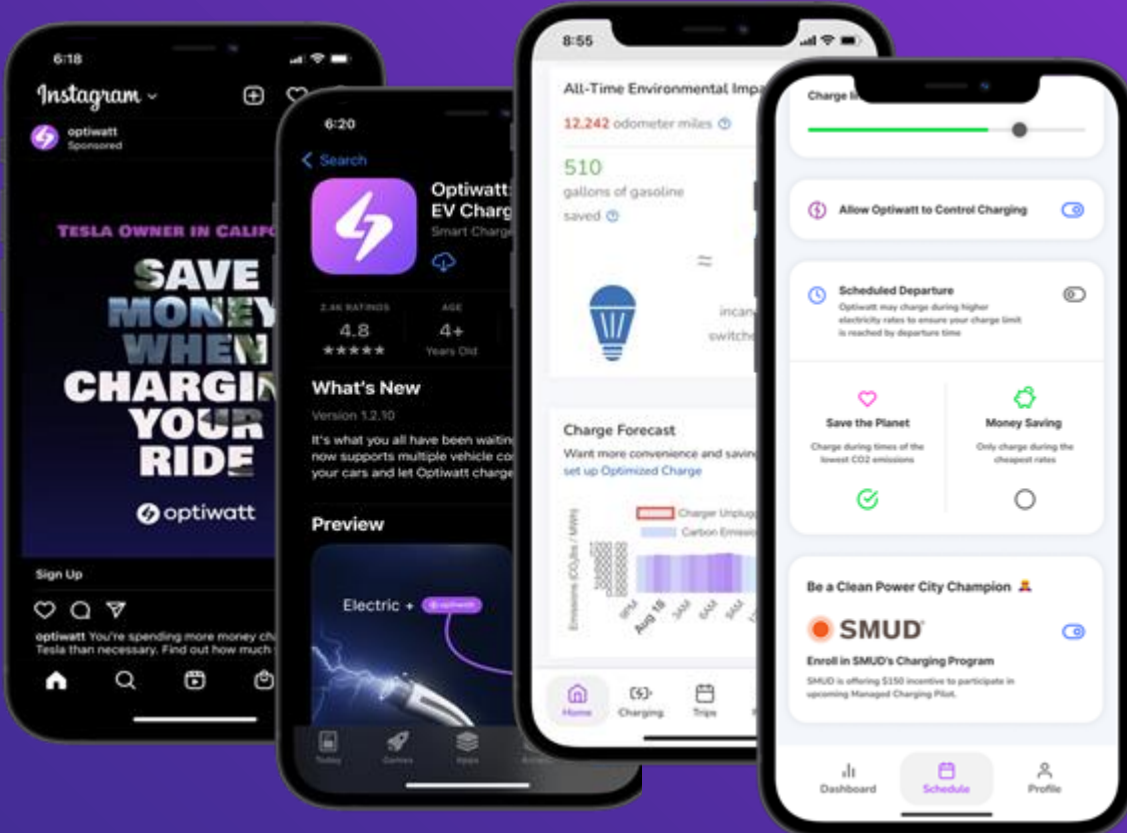


Savings focused whole-home energy platform



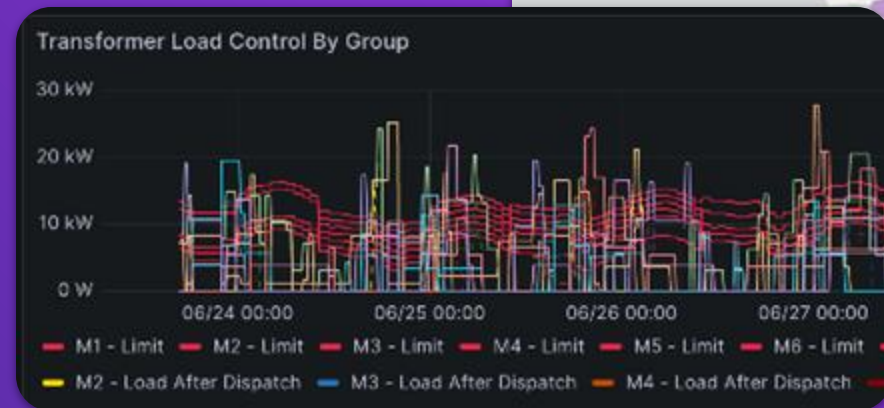
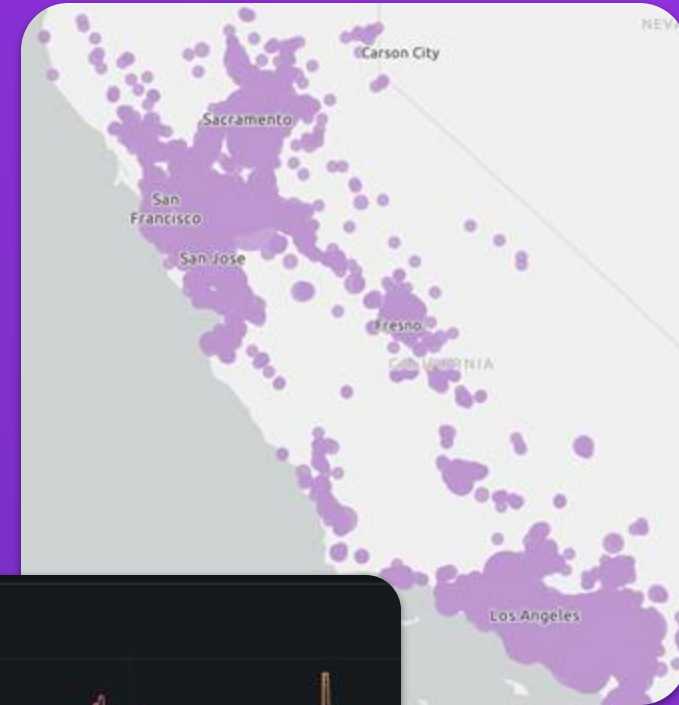
Save Money > Better Manage > Better Understand > Reduce Impact

Highest Rated Residential EV App (4.8 Stars)
Mobile and desktop support



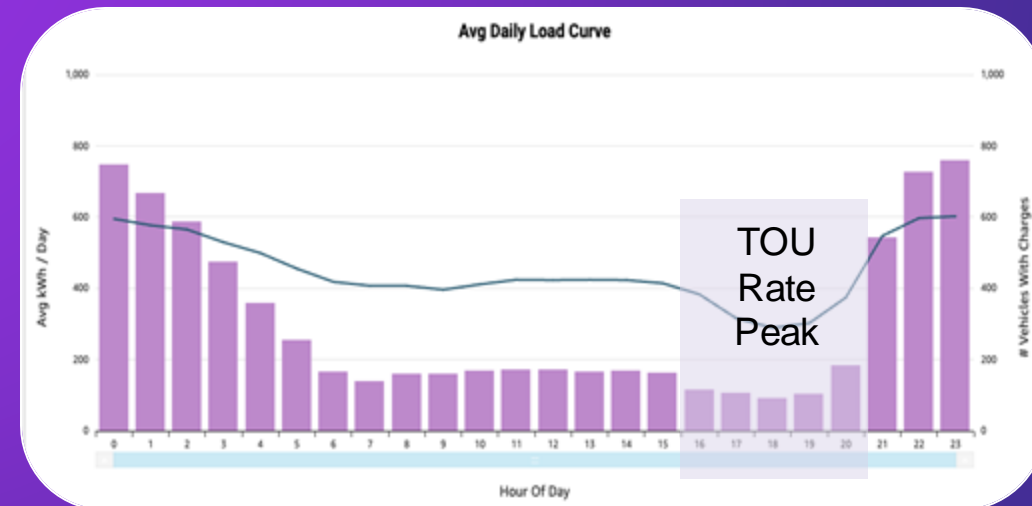
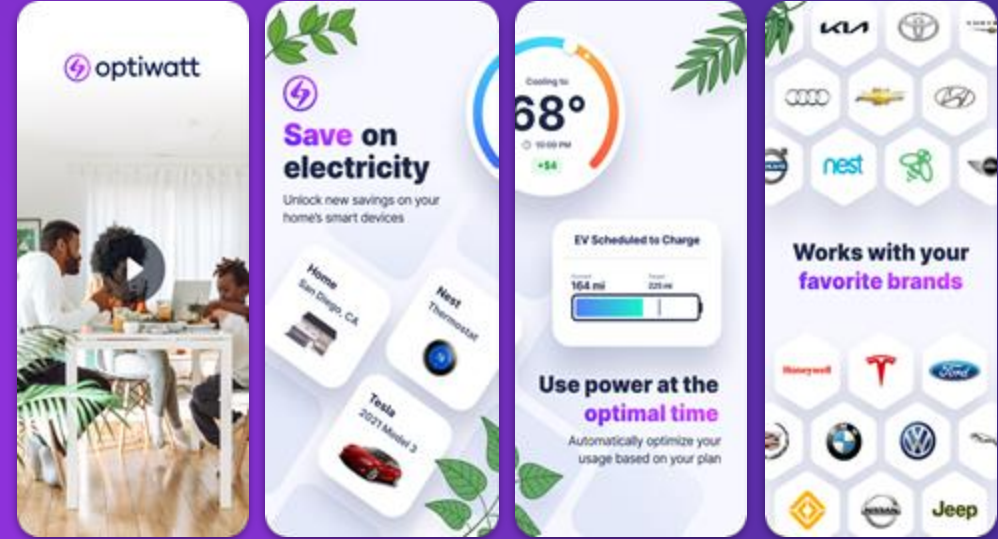
Scalable Load Flexibility Solutions that optimize load to any outcome

- 80k+ EVs
- 30+ Utility Partners

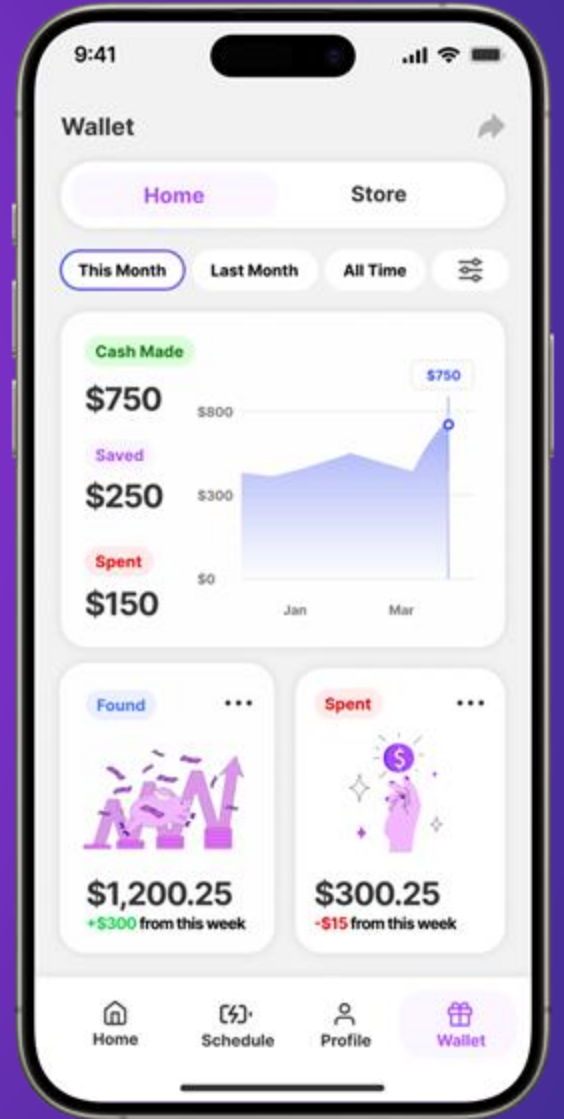
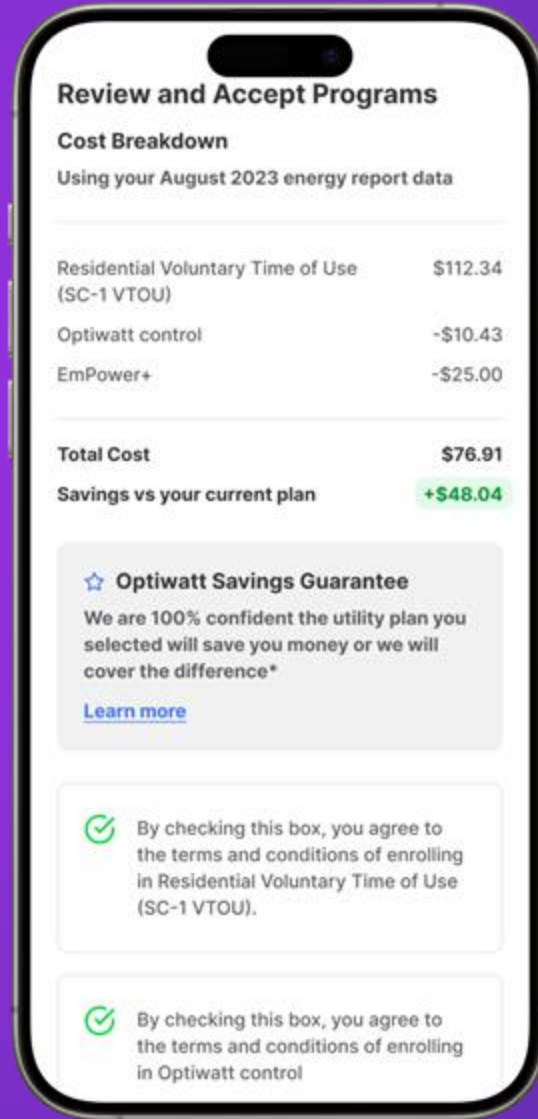
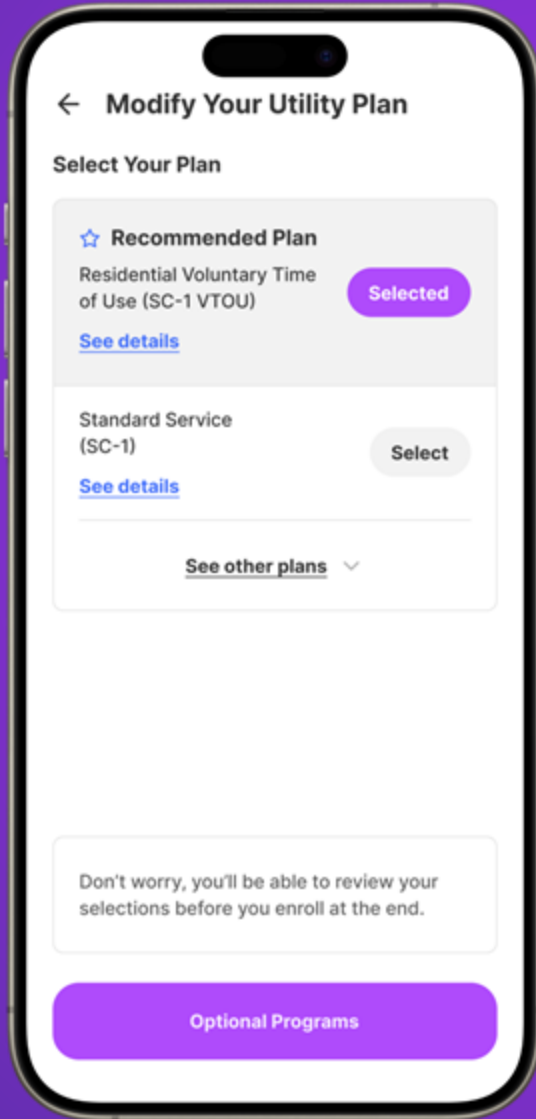
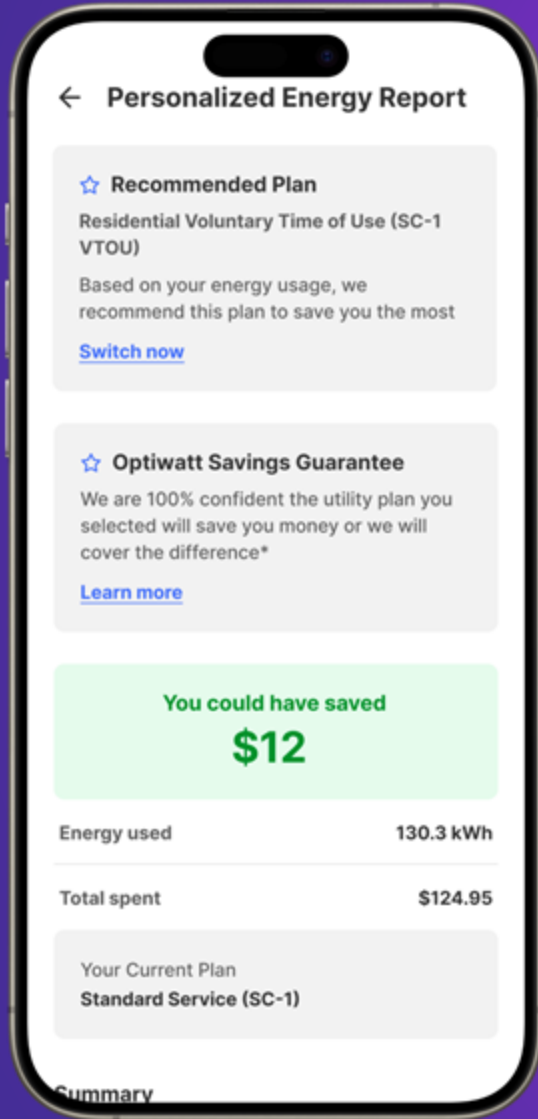


Scale Grid-Connected, Rate Optimized EV/EVSE Deployments

- *Goal: 100,000+ Deployments across all CA*
 - *50,000 LMI customers*
- *Actual to date:*
 - *11,500+ Deployments already (4,500 LMI deployments ~40%)*
 - *6MW+ Virtual Power Plan*
- *Drive dynamic rate enrollments*



Connecting DER management to personalized savings

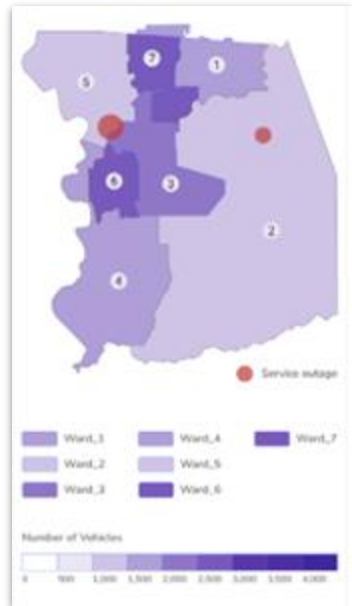


Optiwatt's REDWDS EV/EVSE Dynamic Rates Solution

Identify & Reach

Target LMI Customers

- 22,000+ Pre-enrolled EVs in California using Optiwatt
- EV detection analytics & propensity modeling



Enroll & Scale

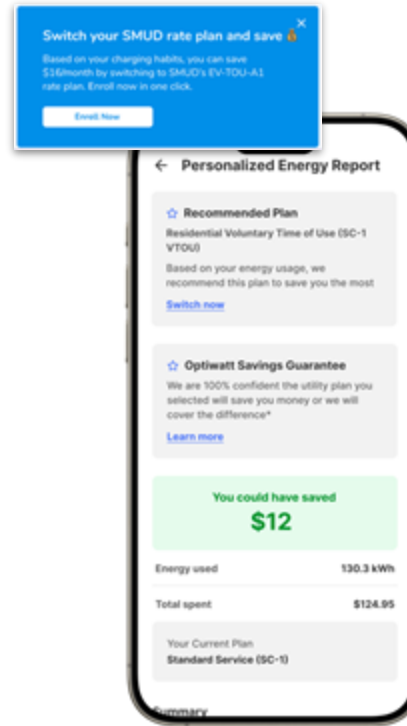
Personalized Rate Savings

- Push notifications & in-app Promotions
- Prioritize biggest savers



Educate & Enroll

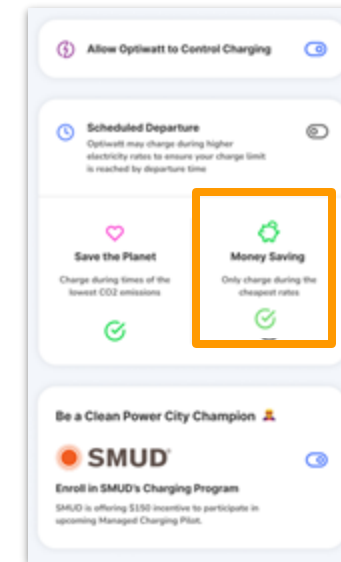
- Rate Impact Calculator and/or Integration



Optimize

EV Managed Charging

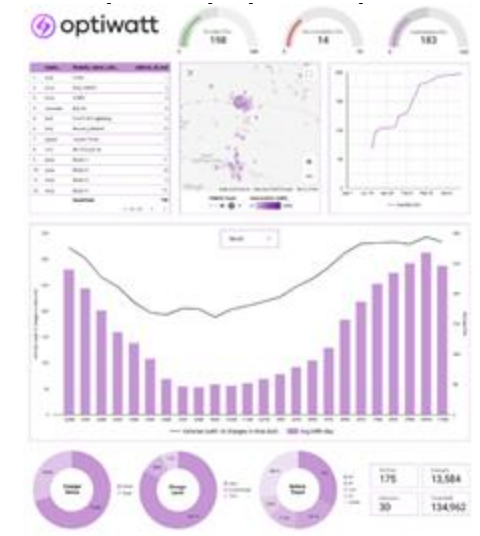
- 'No-cost' rate-optimized EV-managed charging
- Direct load control optimized to dynamic pricing



Understand

EV Load & Rate Dynamics

- EV Data, Analytics & Insights & Rate Impact Sandbox for Experiments
- Customer: Personalized EV insights, tips, tools, & analytics via in-app &



PANEL DISCUSSION



Thank you!

Contact: jingjingliu@lbl.gov

