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Project Title:	Electric Program Investment Charge (EPIC)
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Docketed Date:	3/3/2025

Fleet Charging with Solar Microgrids – Project Showcase Webinar

Energy Research and Development Division

February 25, 2025

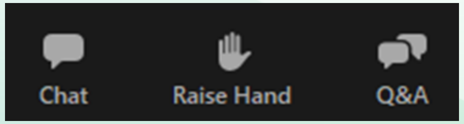
Agenda

Time	Item
1:00 - 1:05pm	**Welcome and Logistics**
1:05 – 1:20pm	**Introduction and Overview**
1:20 – 2:30pm	**Project Presentations** ➢ EPC-20-038, MOEV Inc. • *Artificial Intelligence Based Heavy-Duty Fleet Charging to enable DER Integration* ➢ EPC-20-040, LBNL • *Innovative School Bus Charging for Resilient Communities* ➢ EPC-20-042, TA Operating LLC • *TAking Charge: TravelCenters of America Ultra-Fast En-Route Charging* ➢ EPC-20-046, Sysco Riverside • *Distributed Resources for Diversified Renewable Energy Project* ➢ EPC-21-006, WattEV Inc. • *21st Century Truck Stop: 1st MD/HD eTruckStop in California*
2:30 – 2:50pm	**Fleet Charging with Solar Microgrids - Early Findings**
2:50 – 3:45pm	**Panelist Discussion with Question/Answer from Attendees**
3:45 – 3:50pm	**Closing Remarks**

Virtual Housekeeping

- This webinar is being recorded will be posted along with the presentation slide decks to the California Energy Commission (CEC) event page website: https://www.energy.ca.gov/event/2025-02/fleet-charging-solar-microgrids-epic-project-showcase

- Attendees will be muted during the presentation. Please chat your question using the Q&A window. We will leave time between speakers for any technical/clarifying questions that come in, discussion-oriented questions will be held until the end.



Introduction and Overview

Renewable Integration Team

Q/A Moderator

Eric Ritter
Renewable Integration Supervisor

Webinar Lead

Liet Le
Renewable Integration Electrical Engineer

Webinar Presenter

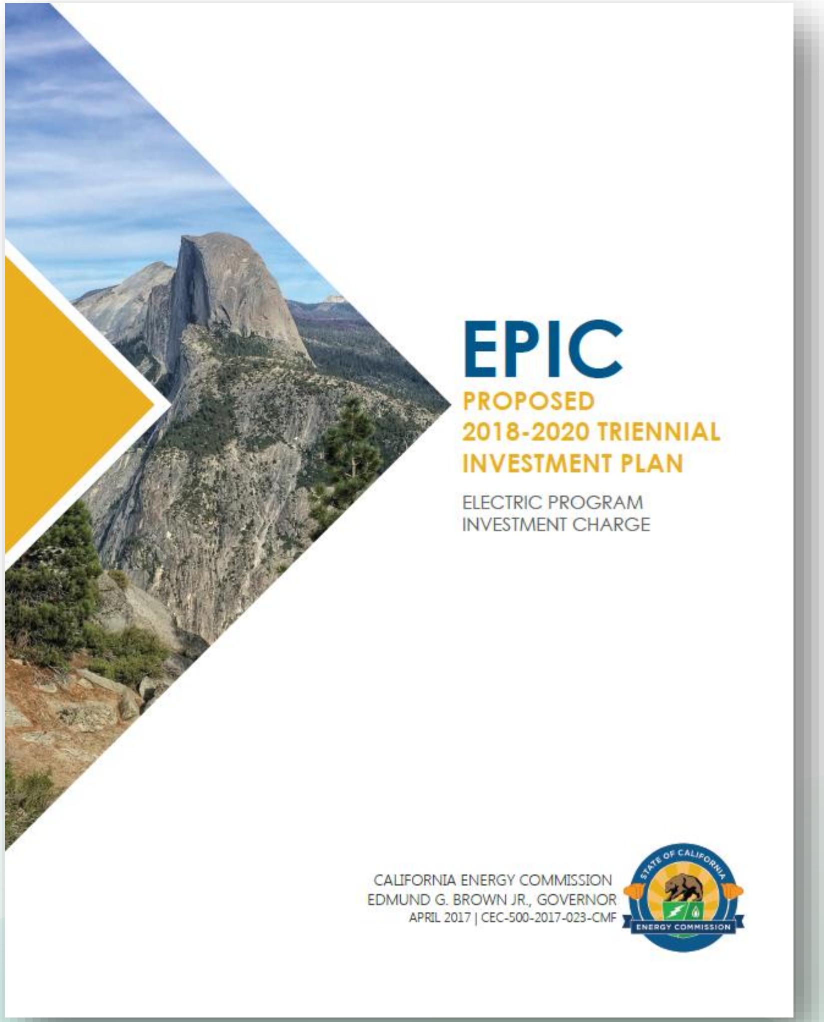
Sean Dory
Renewable Integration Specialist

Webinar Operator

Alejandra Rios
Renewable Integration Specialist

EPIC Program Background

- The Electric Program Investment Charge (EPIC) program supports research, development, and demonstration of new and emerging clean energy innovations supporting California's clean energy goals.
- Administered by the CEC with California Public Utilities Commission oversight.
- Benefit electricity ratepayers by improving safety, reliability, affordability, environmental sustainability, and equity.

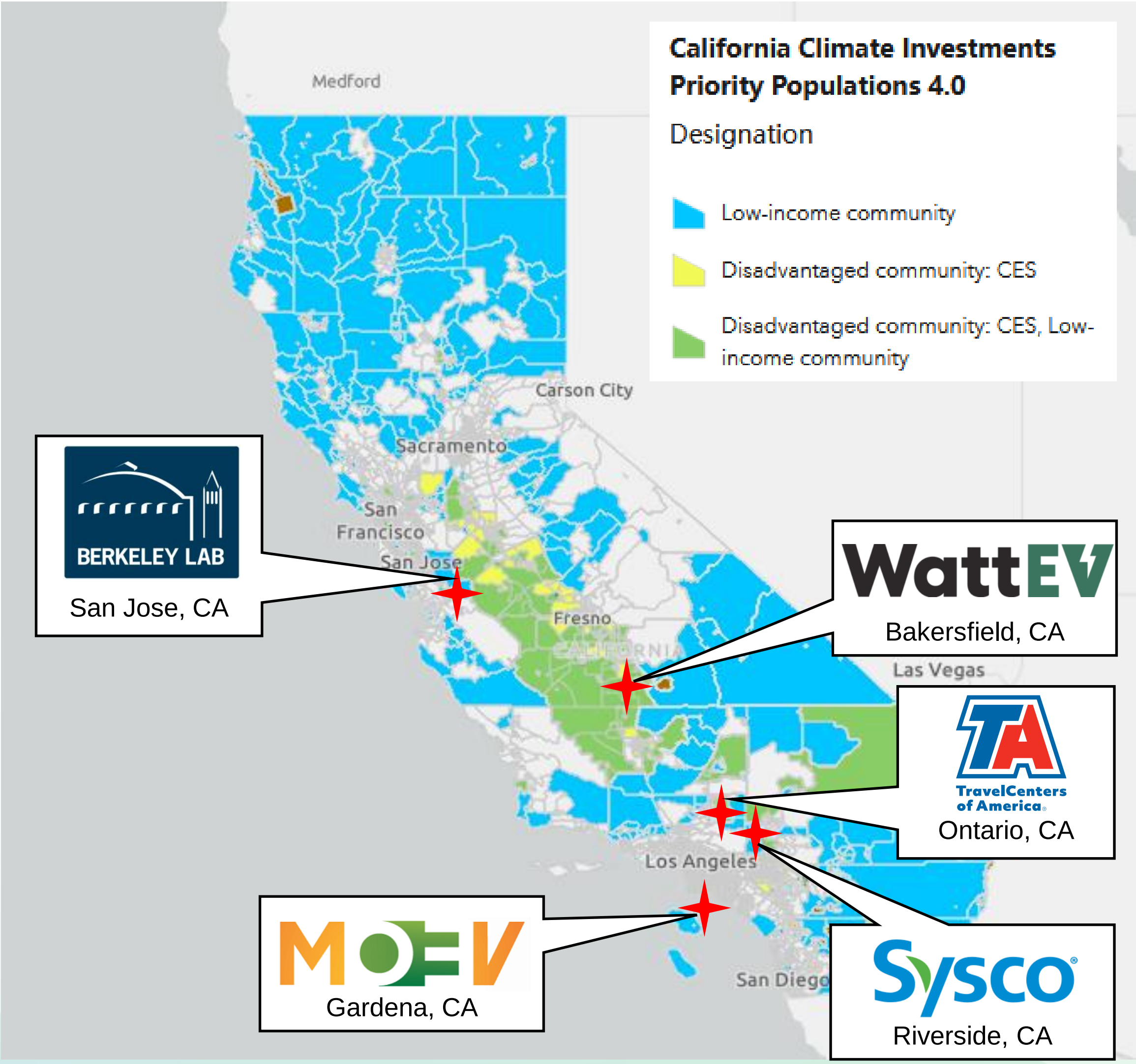


Fleet Charging Portfolio Overview

- Deploy/Demonstrate distributed energy resources (DER) technologies/strategies; benefits to medium, heavy-duty (MDHD) plug-in electric vehicles (PEVs) electrification
- Evaluate and collect cost, performance, resiliency of the system
- Advance technologies toward commercialization
- Provide technical performance metrics
- Disseminate project information

Portfolio Summary

Recipient	Types of Vehicle Supported	Funding	Designation
MOEV	Public Transit Charging *(AI Smart Charging)*	$3.3M CEC $3M Match	Disadvantaged /Low-Income Community
LBNL	School Bus Charging *(School Buses)*	$4M CEC $1.2M Match	Disadvantaged /Low-Income Community
Sysco	Distribution Hub Charging *(Food Distribution)*	$4M CEC $18M Match	Disadvantaged /Low-Income Community
TA Operating	Public En-Route Charging *(Truck Stop)*	$4M CEC $4M Match	Disadvantaged Community
WattEV	Public En-Route Charging *(Trucking-as-a-service)*	$4M CEC $6.7M Match	Disadvantaged /Low-Income Community



Project Presentations

EPIC Recipients

EPC-20-38

Rajit Gadh
Co-founder
MOEV Inc.

EPC-20-040

Vagelis Vossos
Policy Researcher
LBNL

EPC-20-042

Tony Zamora
Project Manager
TA Operating, LLC

EPC-20-046

Stephane Fosso
Director of Fleet Technology
Sysco Riverside

EPC-21-006

Emil Youssefzadeh
CTO & Co-Founder
WattEV, Inc.

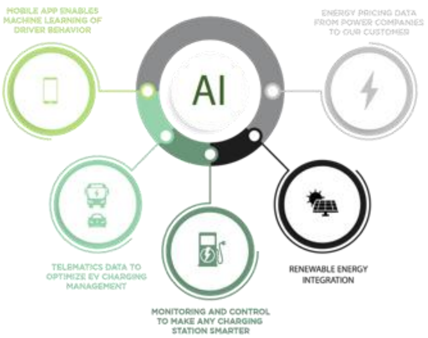
CEC GFO-20-304

Artificial Intelligence Based Heavy-Duty Fleet Charging to enable Distributed Energy Resource Integration

MOEV INC.
http//www.moev.ai

DER Equipment/components:

- Deployed AI based smart charging optimization algorithm and bill estimator for PV, BESS, and EV load



Existing PV ~130 kW
Additional PV - 1.09 MW. Annual generation ~ 1,706 MWh, Expected operation in mid 2027

Existing 2 CCW and 3 Heliox-Siemens chargers

Install 7 DC Fast Chargers (14 plugs) Expected full operation in Fall 2025

Using MOEV.AI™ for SCM deployed on existing infrastructure

Ready for deployment on the expanded infrastructure

5 CCW BEBs,
7 New Gillig BEBs acquired, in service and integrated with MOEV.AI™

2 Tesla Megapacks – 2.56 MW;
5.12 MWh of energy capacity, Expected operation mid 2027

Site Location and General Layout:

UTILITY
EASEMENT

13999 S Western Ave, Gardena, CA 90249

Project Goals:

- Reduce greenhouse gas (GHG) emissions from the bus fleet:
  - GHG emissions will be reduced by replacement of internal combustion engine (ICE) buses with BEBs in combination with using local photovoltaic (PV) generation.
- Maximize the utilization of renewable energy source:
  - By performing AI-based smart management of charging in combination with Solar PV and battery energy storage system (BESS), demonstrate maximizing utilization of PV as BEB fuel.
- Lower the overall charging costs:
  - AI and ML based approaches will lower peak load for charging BEBs, thereby lowering demand charges, and in turn reducing overall charging costs.
- Provide resiliency by demonstrating a smart charging management (SCM) platform that enables quick replicability and scalability for medium duty and heavy duty (MDHD) electric vehicle fleets
  - MOEV.AI™ software will integrate and manage DERs including EV chargers, PV and BESS, for demand response (DR) curtailment request, thus enabling the grid resiliency goals of the project.

Project Objectives:

The objectives of this Agreement are to:

- Design and deploy an AI-driven smart charging platform that:
  - Integrates DERs for charging a BEB Transit Fleet
  - Includes BESS, on-site PV, and electric vehicle chargers.
- Demonstrate and validate project benefits in:
  - Energy cost savings
  - GHG reduction
  - Peak load reduction and ensuing demand charge reduction
  - DR
  - Increase in renewables achieved with AI-based DER approach
  - Enhanced grid resilience capability.

Project Team Organizational Chart:

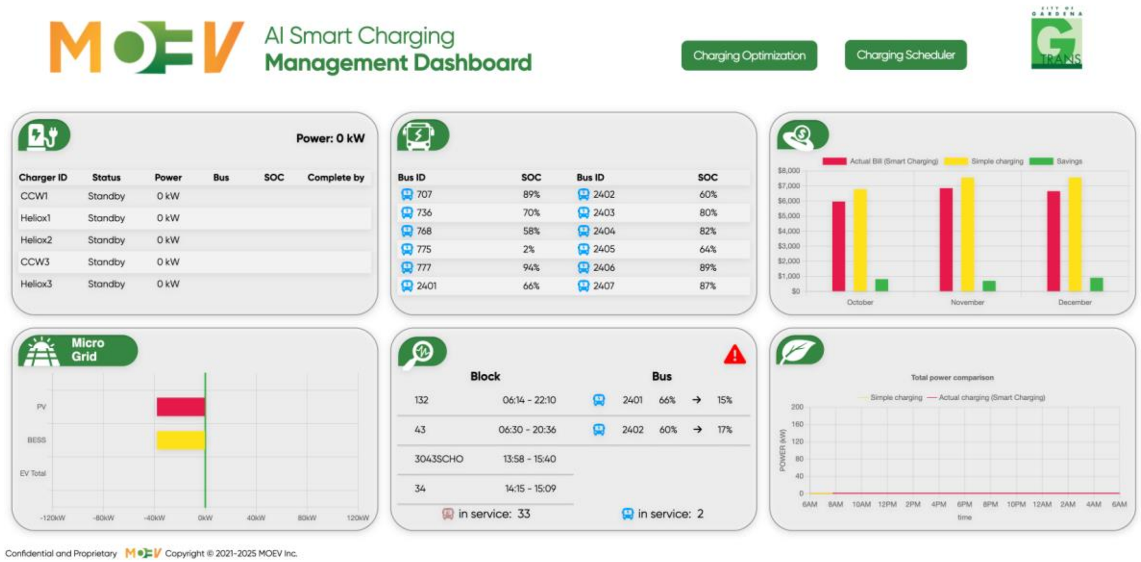
MOEV

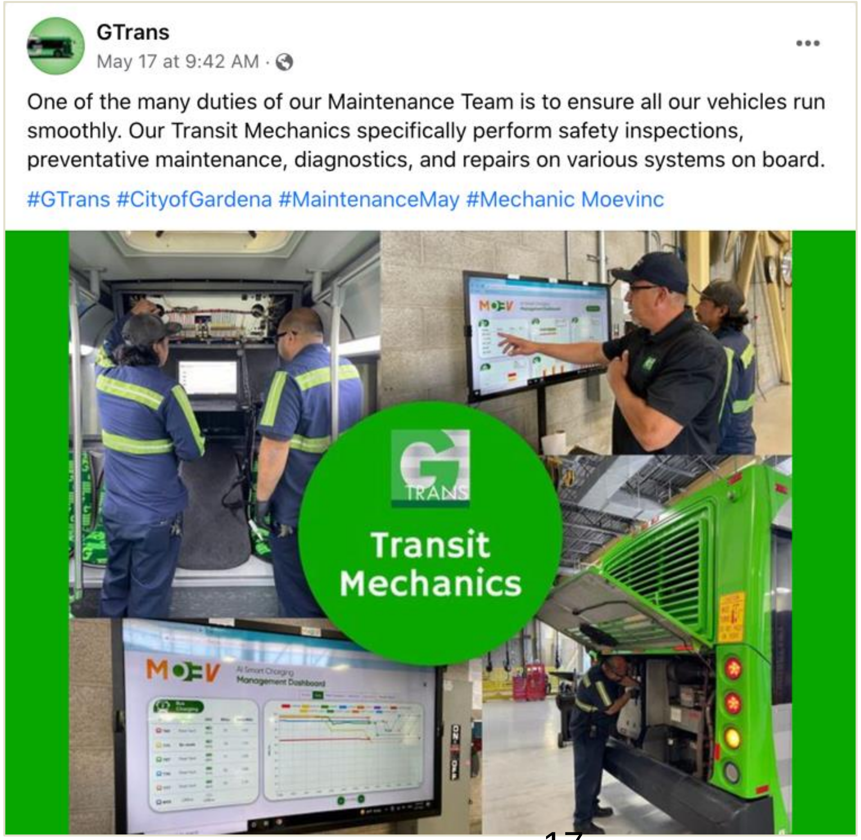
- GTrans - Transit Agency at City of Gardena, California. GTrans fleet yard is the major demonstration site.
- Lawrence Berkeley National Laboratory (LBNL) - Provide analysis on fleet energy utilization, charging infrastructure optimization and energy management.
- ETAP - Provide DER and EV energy usage simulation reports.
- South Bay Cities and IIT-SoCal - Conduct Community outreach and Education for result dissemination.
- Southern California Edison (SCE) – Provide electricity rates and demand response program information.

Current Project Progress:

AI SMART CHARGING SYSTEM - MOEV DASHBOARD FOR FLEET

- Dashboard operating on the Cloud enables management and control of charging
- Fleet customer has access to MOEV Dashboard plus analytics to help them meet their duty cycle needs, thereby reducing their stress
- AI reduces demand charges by learning about site host energy needs, fleet operational requirements, and driver behavior – and controlling charging





Preliminary Findings/Results, Expected/ Anticipated Outcome:

Early findings about EV usage-

- Range anxiety – Drivers preferred to drive non-EV
- Shorter driving range compared to non-EV – EVs take lower priority
- Challenge with reliability of charging – EVs not being assigned on their regular routes
- Non-familiarity of new technology – Uncertainty in behavior and reliability resulted in lack of utilization

=> Needed to help the Transit Agency improve utilization of EVs

Minimizing demand charges and optimizing around time of use electricity pricing

AI Smart Charging
Management Dashboard

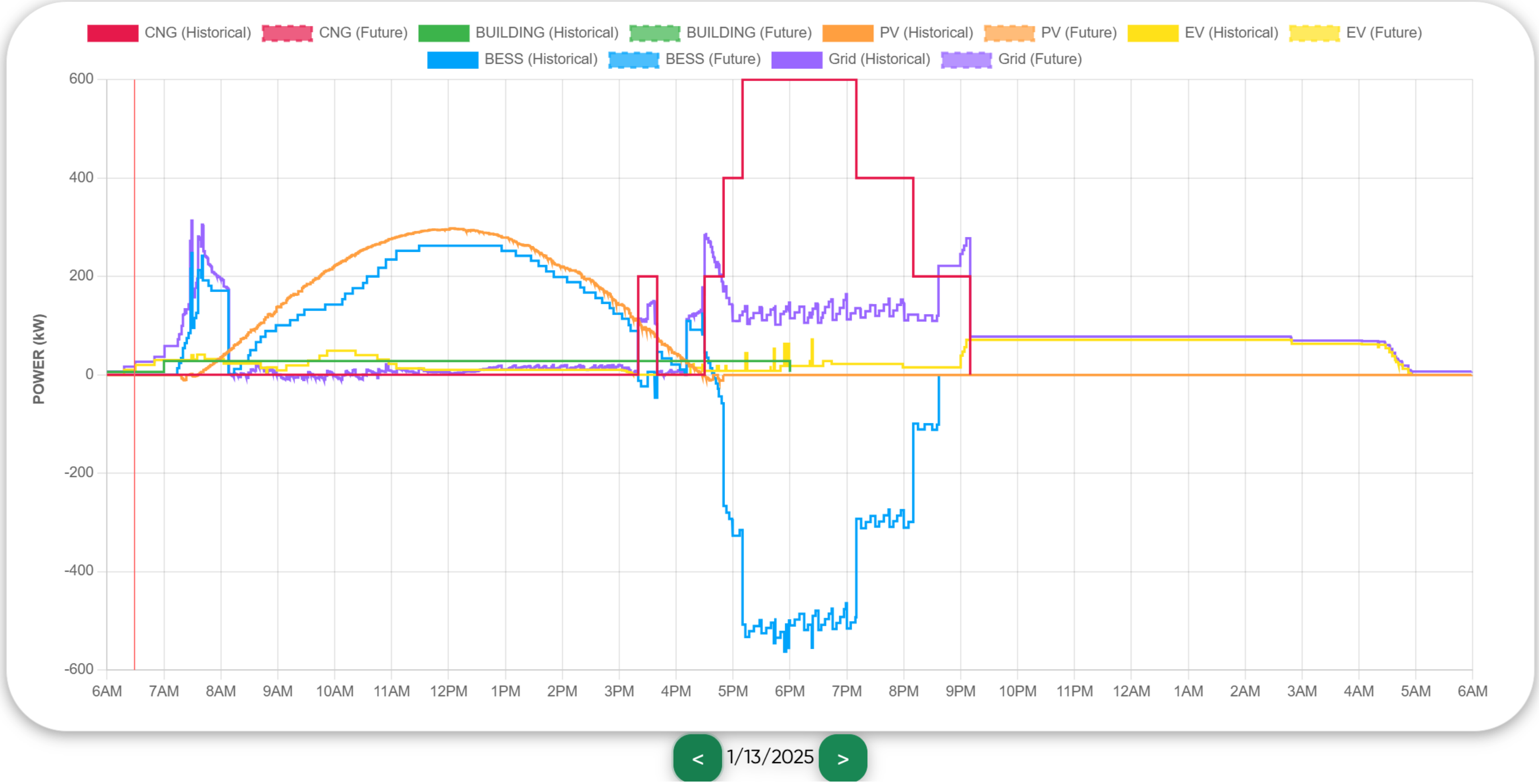
Before Smart Charging | After Smart Charging

Predict Power

		Actual Charging		Simple Charging	
		Power (kW)	Date, Time	Power (kW)	Date, Time
March, 2024	Max	*27kW*	*Mar 12, 2024, 09:18 PM*	*99kW*	*Mar 12, 2024, 05:40 PM*
	Mid-peak	*8kW*	*Mar 12, 2024, 05:41 PM*	*99kW*	*Mar 12, 2024, 05:40 PM*
February, 2024	Max	*100kW*	*Mar 11, 2024, 10:47 PM*	*99kW*	*Feb 13, 2024, 05:50 PM*
	Mid-peak	*9kW*	*Feb 19, 2024, 05:54 PM*	*99kW*	*Feb 13, 2024, 05:50 PM*
January, 2024	Max	*102kW*	*Jan 15, 2024, 09:13 PM*	*99kW*	*Jan 14, 2024, 01:14 AM*
	Mid-peak	*9kW*	*Jan 17, 2024, 05:55 PM*	*99kW*	*Jan 16, 2024, 05:27 PM*

< From 3/12/2024 to 3/13/2024 >

Microgrid management: Transitional approach



Challenges:

- Delay in installation of EV chargers
- Delay in installation of PV and BESS. Reasons:
  - City approvals
  - Utility approvals
- Delay in getting power connection from SCE’s EV Charge Ready Program

Knowledge/Tech Transfer Activities:

- ZebCon, San Diego, Sep 26, 2023
- APTA, Orlando, Oct 7, 2023
- California Transit Association Fall Conference and Expo, Pasadena.
- CALACT (California Association for Coordinated Transportation) Conference and Trade Show on March 16-17, 2024 in San Diego, CA.
- ACT (Advanced Clean Transportation) Expo at Las Vegas from 5/20/2024 - 5/22/2024.
- APTA Transform Conference, Anaheim Convention Center, CA, September 29 - October 2, 2024.
- 59th Annual Fall Conference and Exhibition, California Transit Association, San Jose Convention Center, November 20-22, 2024.

Lessons learnt to date:

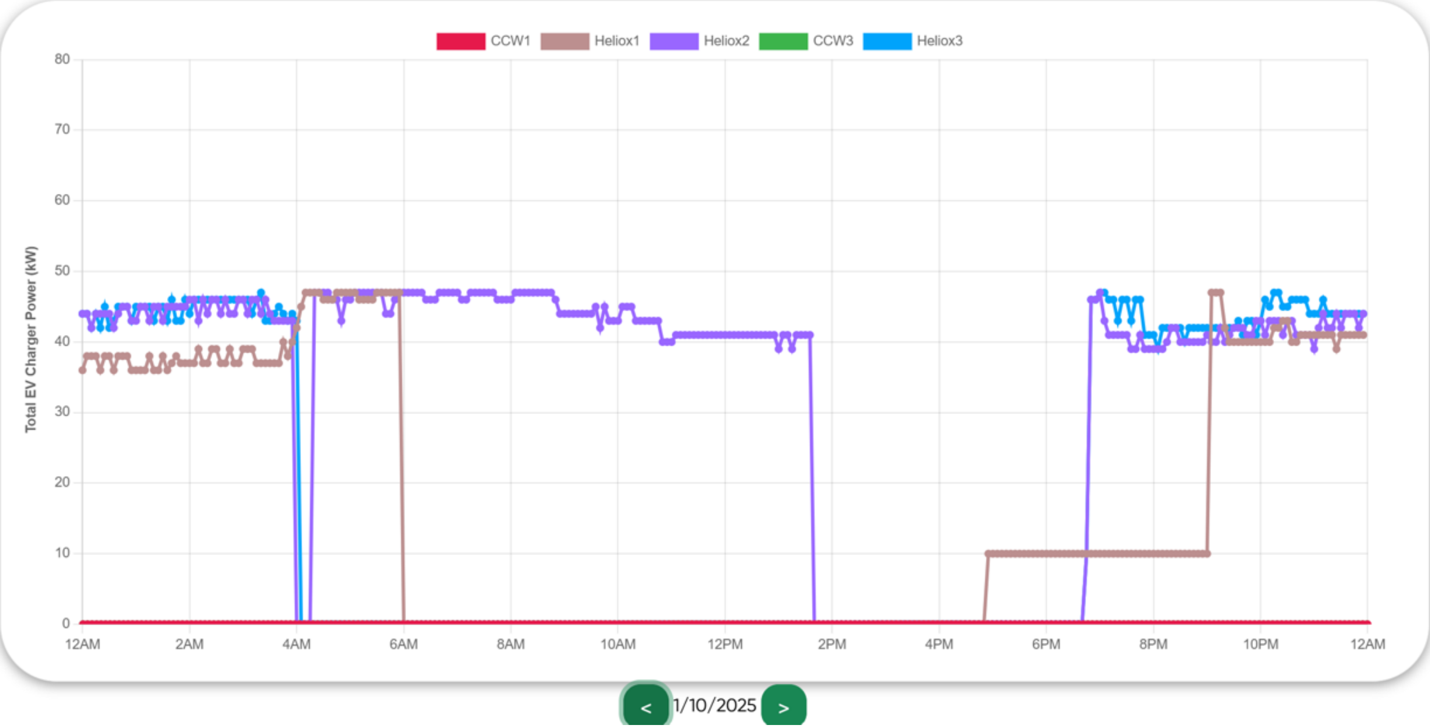
Need for Portable Chargers

Need for portable charger during transition period

- 7 Gillig Buses arrived
- Response time of charge ready program
- 2 Dual Port ABB Chargers were purchased and arrived at GTrans
- Due to timing issue for the charge ready program, agency planned to install temporary chargers on existing circuits – cost was prohibitive
- Installed portable chargers that did not require physical install, only plug-in (Heliox-Siemens) 50kW
- Challenge – Use of 3 chargers to serve 7 buses with long blocks (optimization through dynamic schedule sheet).

Operational fleet-yard change - overnight charging

- GTrans previously did not have operations after midnight for refueling.
- Based on our system, MOEV demonstrated the benefits of charging overnight i.e. to be able to charge more buses while also minimizing peak loads for mitigation demand charge.
- Now, GTrans has modified their operations to allow overnight charging with target of 4 am pull-out time.



OCPP (Open Charge Point Protocol) and chargers

- V 1.6 and 2.01 implemented by MOEV
- Major issue identified after testing multiple chargers:
  - Access to the charger configuration portal is often controlled by the manufacturer, and the customer and the software vendor therefore are unable to change the OCPP backend server used by the charger.
  - Unless the manufacturer provides the software vendor access to the configuration portal, the customer has no alternative but to use the software provided by the manufacturer.


Critical Peak Pricing Events

- MOEV’s smart charging management system is integrated with Market Informed Demand Automation Server (MIDAS) REST API portal and through this portal, MOEV software received SCE’s Critical Peak Pricing (CPP) event alerts on 11 days in July and August 2024, and there have been no further alerts since then.
- Upon receiving the alerts, MOEV's system automatically sent messages to GTrans’ maintenance management to alert them about the CPP events.
- MOEV’s smart charging algorithm then automatically reduced the peak load during the CPP event hours to save the customer money and did so during these 11 events.

Predict Power

		Actual Charging		Simple Charging	
		Power (kW)	Date, Time	Power (kW)	Date, Time
September, 2024	Max	143kW	Sep 17, 2024, 09:15 PM	145kW	Sep 19, 2024, 09:27 PM
	Mid-peak	83kW	Sep 17, 2024, 04:00 PM	93kW	Sep 17, 2024, 04:00 PM
August, 2024	Max	101kW	Sep 12, 2024, 09:12 PM	101kW	Sep 12, 2024, 12:11 PM
	Mid-peak	53kW	Sep 2, 2024, 05:39 PM	101kW	Sep 12, 2024, 04:00 PM
July, 2024	Max	53kW	Aug 12, 2024, 10:34 PM	53kW	Aug 12, 2024, 08:54 PM
	Mid-peak	49kW	Aug 13, 2024, 08:59 PM	53kW	Aug 12, 2024, 08:54 PM

EPIC Recipient: LBNL

EPC-20-38

Rajit Gadh
Co-founder
MOEV Inc.

MOEV

EPC-20-040

Vagelis Vossos
Policy Researcher
LBNL

BERKELEY LAB

EPC-20-042

Tony Zamora
Project Manager
TA Operating, LLC

TA
TravelCenters of America

EPC-20-046

Stephane Fosso
Director of Fleet Technology
Sysco Riverside

Sysco

EPC-21-006

Emil Youssefzadeh
CTO & Co-Founder
WattEV, Inc.

WattEV

Innovative School Bus Charging for Resilient Communities

EPC-020-040
Lead: Berkeley Lab, lbl.gov
PIs: Vagelis Vossos and Daniel Gerber
CEC CAM: Liet Le

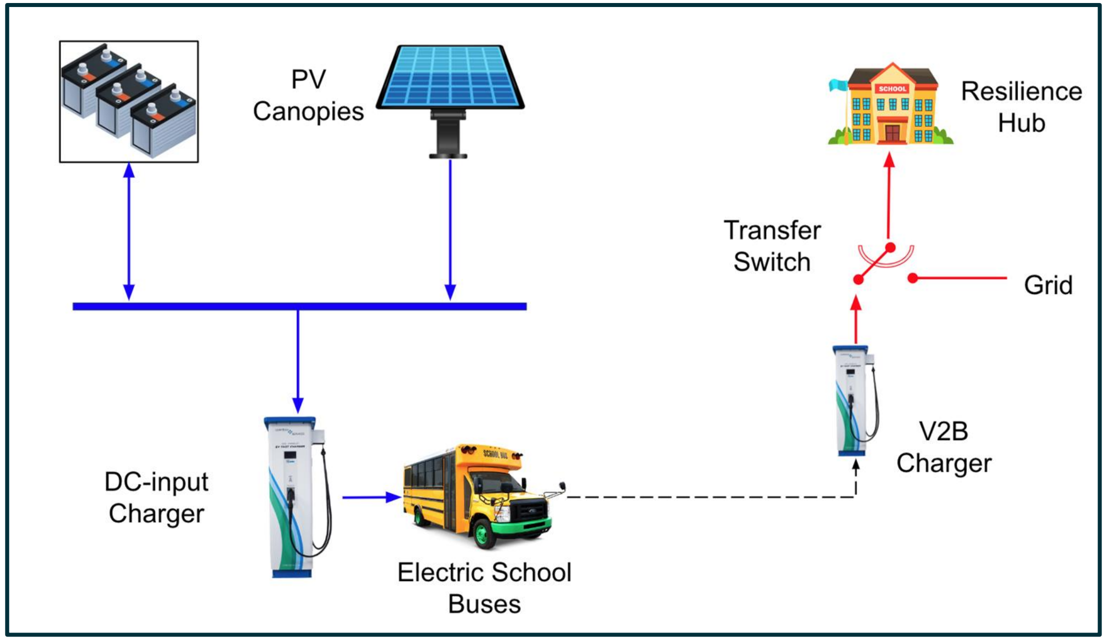
Project Team

Site Host: Franklin McKinley School District
System Design: Heila Technologies
Software Development: Microgrid Labs
Community Outreach: Breathe California

Project Overview - Concept

Develop a scalable school bus charging system designed for improved efficiency, cost, and resilience, while supporting the local community.

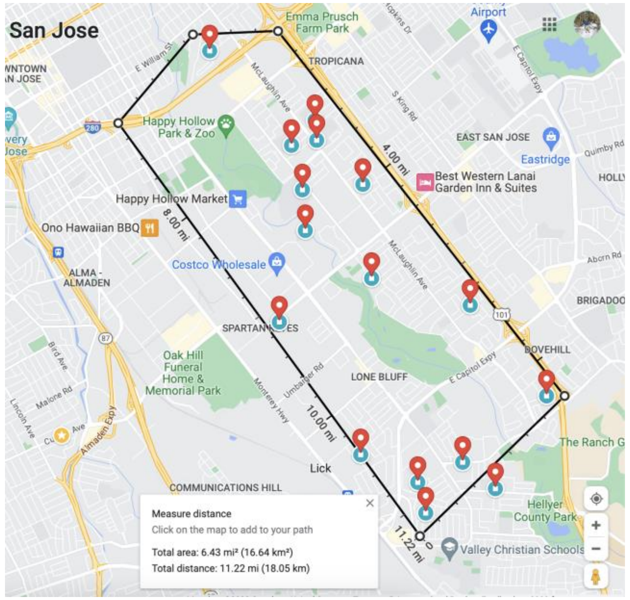
- Utilize a direct-DC connection between a solar PV system and EV chargers (no conversion from DC-to-AC-to-DC)
- Operate without grid support (offgrid)
- Charge buses from solar PV or battery storage
- Provide backup power to a resilience hub (school cafeteria) during outages
- Optimize system operation with a fleet energy management system
- Engage and educate the local community on the design and benefits of the project and resilience hub



Project Overview - Site Host

Franklin McKinley School District (FMSD):

- Services 16 schools in San Jose
- 83% of FMSD service locations are low-income
- Diverse student population
- Currently has 26 buses and vans (8 electric buses)
- Buses travel an average of 50 miles per bus per day



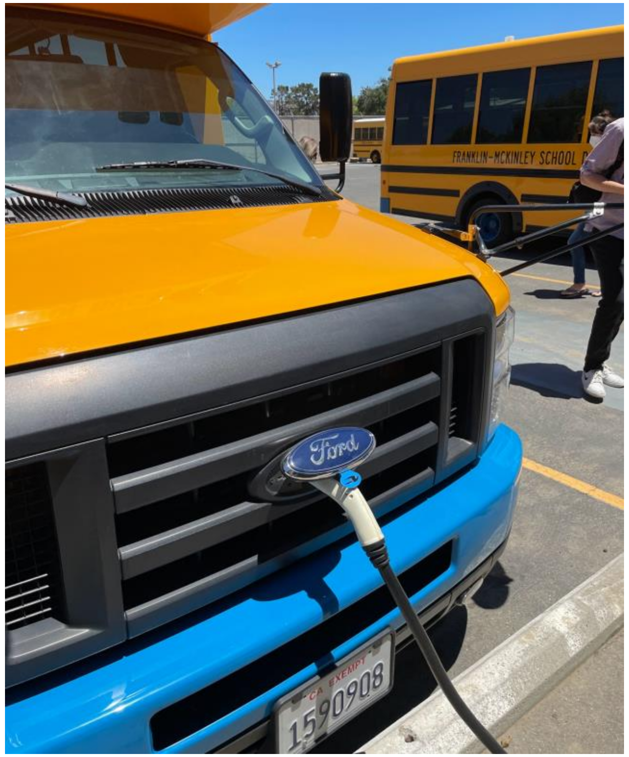
Site info:

- Bus depot is next to Franklin Mckinley Elementary School.
- Site currently has 7 level-2 chargers
- Proposed location for solar canopy can accommodate 60-100kW solar capacity
- School cafeteria (resilience hub) is accessible from the bus depot

Location: FMSD Bus Yard,
400 Tully Rd., San Jose, Ca 95111

Franklin-McKinley School District
Preparing All Children as Global Learners

FMSD - Existing e-Buses & Chargers



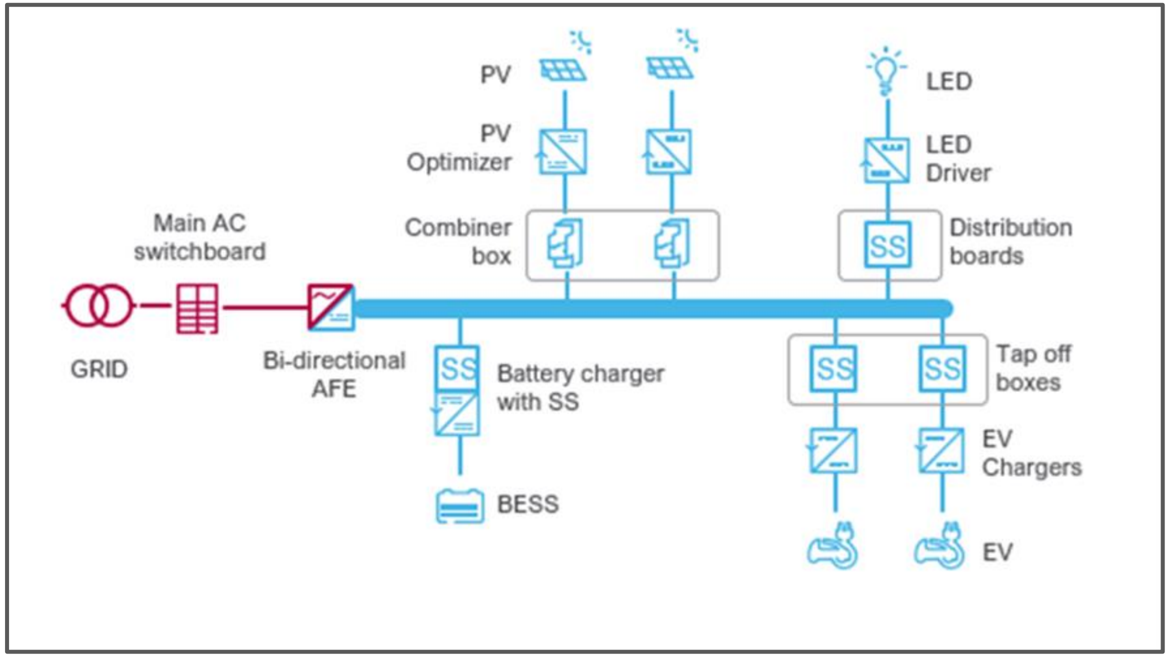
FMSD - Bus Yard

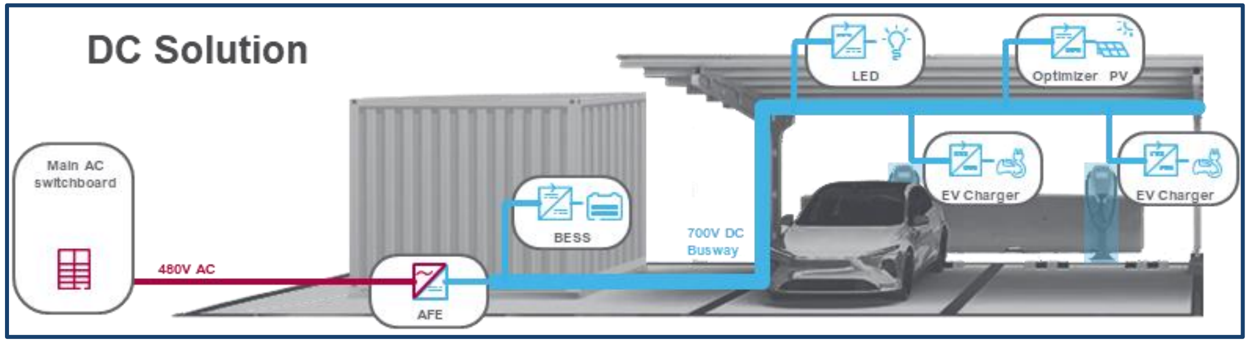
FMSD - Resilience Hub/Cafeteria

System Topology

Schneider Electric Lumaport 10 SE

- 150’L x 33.8’D
- 98.4 kW of DC Solar Output Power
- 288 kWh Battery Energy Storage
- (4) 30 kW DC Chargers
- System scalability:
  - There are three different canopy layouts.
    - Different options for the battery capacities within the columns
    - Up to 5 columns/charging ports with batteries 4 of the columns
- More information: https://world4solar.com/lumaport/



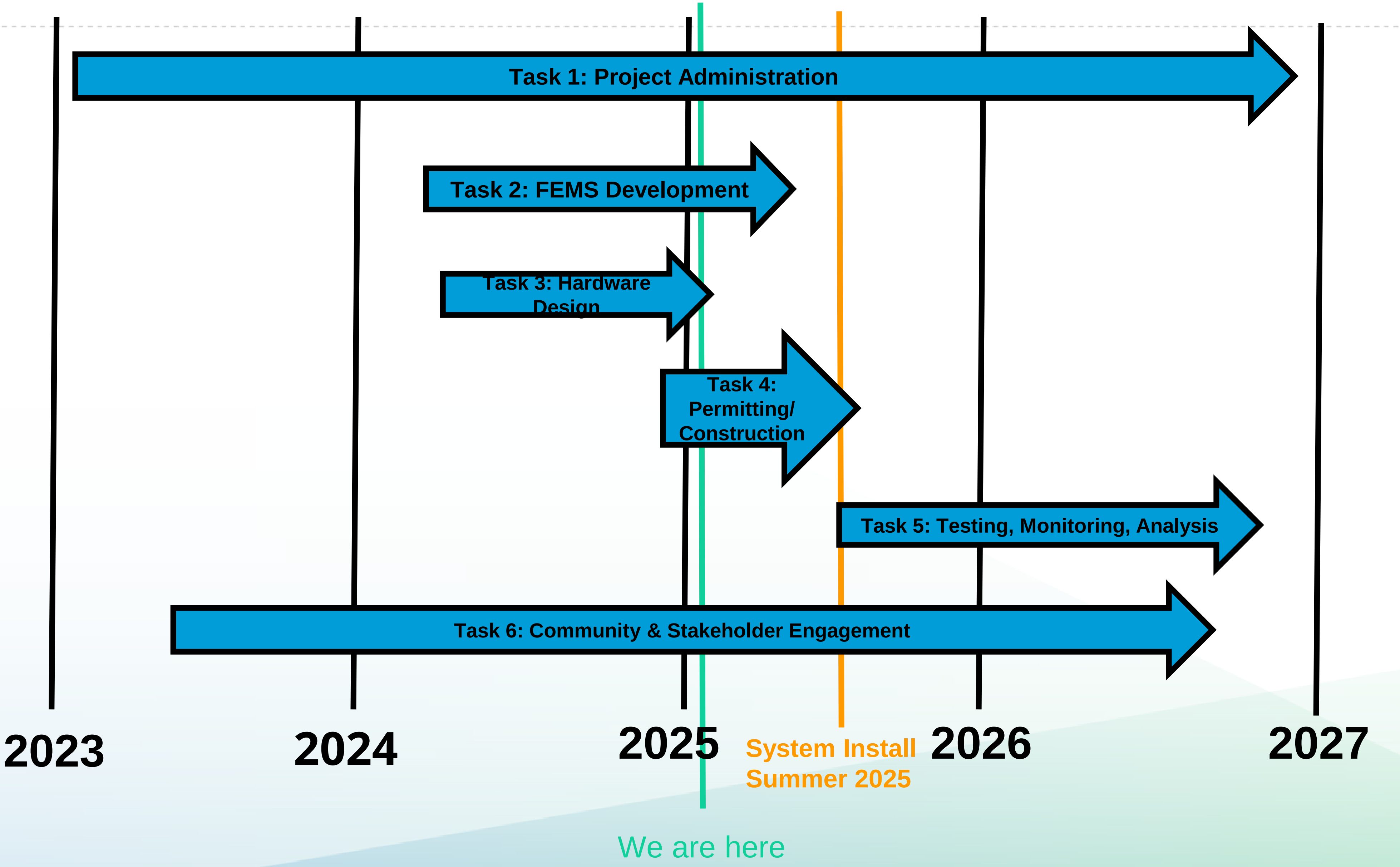


Current Status and Challenges

- We are in the process of replacing Heila, who went out of business on Feb 15th
- The Schneider Electric charging system is awaiting UL certification for the DC chargers (expected this month).
- We will soon bench test the Microgrid Labs FEMS software and submit the necessary permits for installation.
- Our goal is to install the system in **summer 2025** and have it up and running by **fall 2025**



Project Timeline



EPIC Recipient: TA Operating

EPC-20-38

Rajit Gadh
Co-founder
MOEV Inc.

MOEV

EPC-20-040

Vagelis Vossos
Policy Researcher
LBNL

BERKELEY LAB

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TA
TravelCenters of America

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Sysco Riverside

Sysco

EPC-21-006

Emil Youssefzadeh
CTO & Co-Founder
WattEV, Inc.

WattEV

TravelCenters of America
Truck Charging Station

Ontario, California

Tony Zamora
February 2025

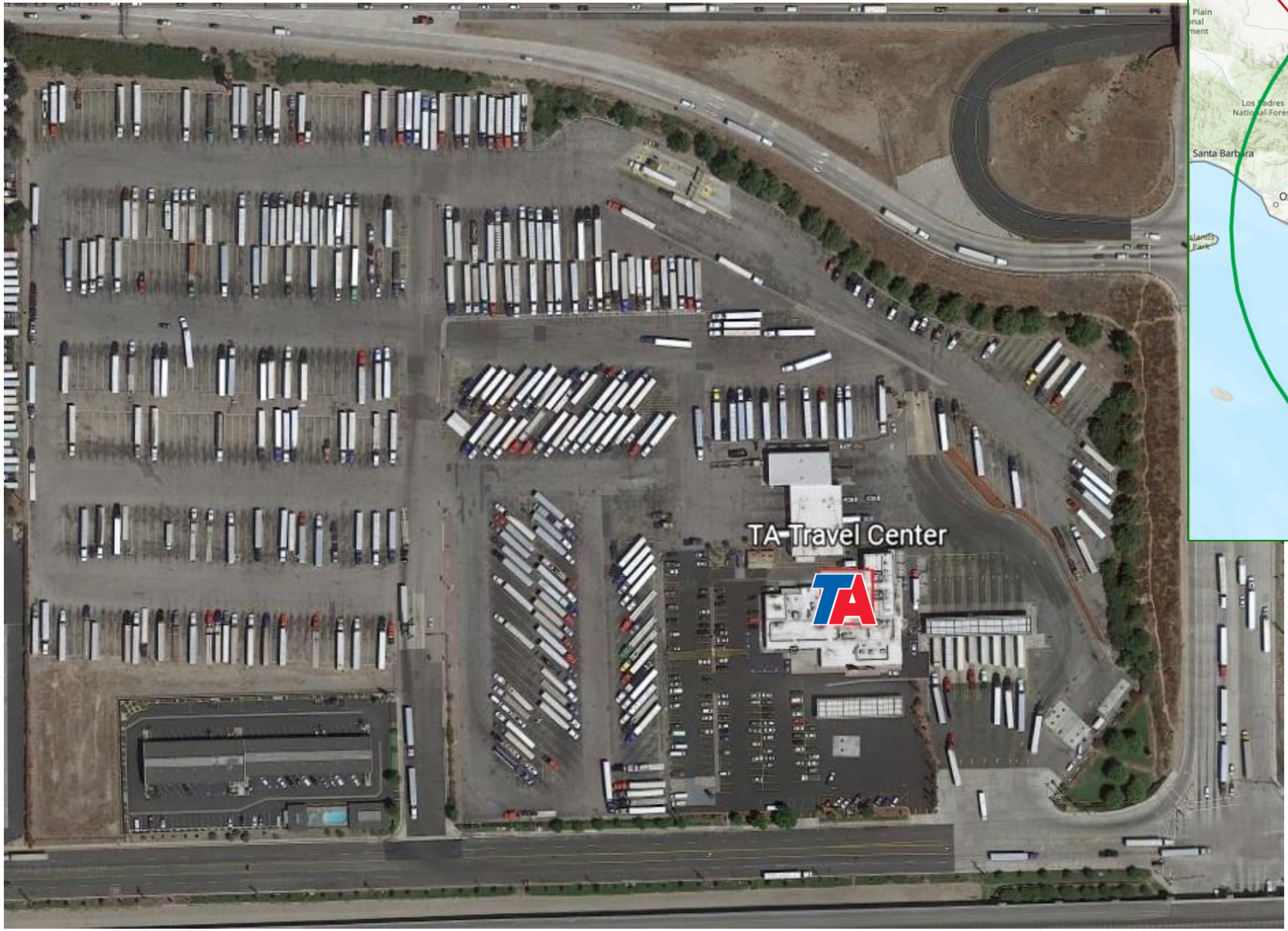
TA Truck Charging Station

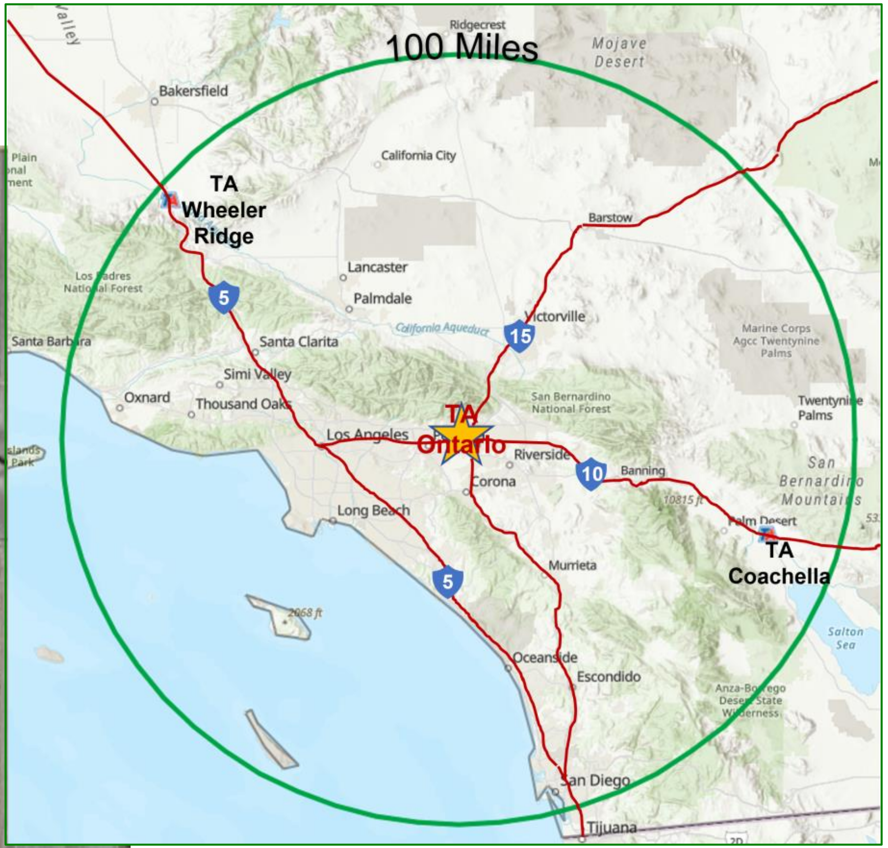
Ontario, California

A microgrid-powered electric truck charging station at TA Ontario West to demonstrate new technologies and evaluate commercial viability of public charging for heavy-duty trucks.

California Energy Commission	Grant Funding
TA	Project Development & Execution
CORE STATES ENERGY	Engineering, Procurement, Construction (EPC)
MOMENTUM	Incentive Strategy, Grant Management
EPRI	Megawatt Investment Partner
bp pulse	Operation
Southern California Edison	Utility
City of Ontario	Permitting Authority

TA Truck Charging Station Plan





TA Truck Charging Station Renderings

Questions / Comments

Tony Zamora
Tony.Zamora@bp.com
(916) 694-7513

EPIC Recipient: Sysco

EPC-20-38

Rajit Gadh
Co-founder
MOEV Inc.

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EPC-21-006

Emil Youssefzadeh
CTO & Co-Founder
WattEV, Inc.

CEC DER Integration for Medium and Heavy-Duty Fleet Electrification
Sysco Riverside

February 25th 2025

Personal Introduction

Stephane Fosso

Director Fleet Technology

Sysco Corporation

Current Focus:

- EV deployment Planning
- Technology & Performance evaluation
- Fleet Electrification
- Charging Infrastructure
- Financial estimation

Sysco Riverside, California

- Sysco Riverside has more than 450 colleague
- Our fleet consist of 113 Tractors, 132 Trailers, and 15 Small Delivery Vehicles.
- Servicing more than 4,000 customers.
- We power our warehouse equipment with hydrogen fuel cells.

Project Team
Riverside Distributed Energy Resources Partners

Sysco Riverside
- Facility and fleet operations
- Construction program management
- Procurement

SCE
- Utility upgrade
- Power feed
- Interconnection

Black & Veatch
- Engineering Design
- Solar project
- Construction
- PMO
- Procurement

In-Charge
- MV Gear
- Charging Equipment
- Warranty

BP Pulse
- Charge Management Software (CMS)
- Analytics
- Charging KPIs

STEM
- Resiliency
- Energy storage solutions
- Site Energy management
- Data Acquisition
- KPIs

Inland Empire
- Community Foundation
- Local community partner

GNA/TRC
- Project management
- Stakeholder engagement
- Grant support and compliance

Vehicle Partners

Key Performance Baselines

The DER value will be captured through optimized energy management

Charging
- 40 CCS1 connectors
- 120kW per cable
- Total Max Peak: 4.8MW or 6.0MW (incl shore power)

Onsite Energy Production
- 1.5MW DC rooftop PV
- Industry-standard roof-mounted solar photovoltaic system design

Energy Storage
- 1 MW / 4 MWh lithium-ion BESS
- 4+ hours of backup for charging at for all 40 Class 8 BEVs
- Recharge from onsite solar
- Potential partial recharge from backup genset during complete power outage

Project Benefits

- $449,800 in estimated annual electricity cost savings versus unmanaged charging baseline;
- 2,665 kW of load reduction as compared to an unmanaged, non-DER system;
- ~2,600 MWh of distributed energy production per year;
- 7.5 hours (avg.) of daytime renewable energy production shifted into evening (mid) peak TOU to offset higher-emission and cost;
- 5 hours of daily peak demand reduction (avg.) through load-shifting to DER
- 4-6 hours of off-grid “island” operation powering 40 trucks from BESS only

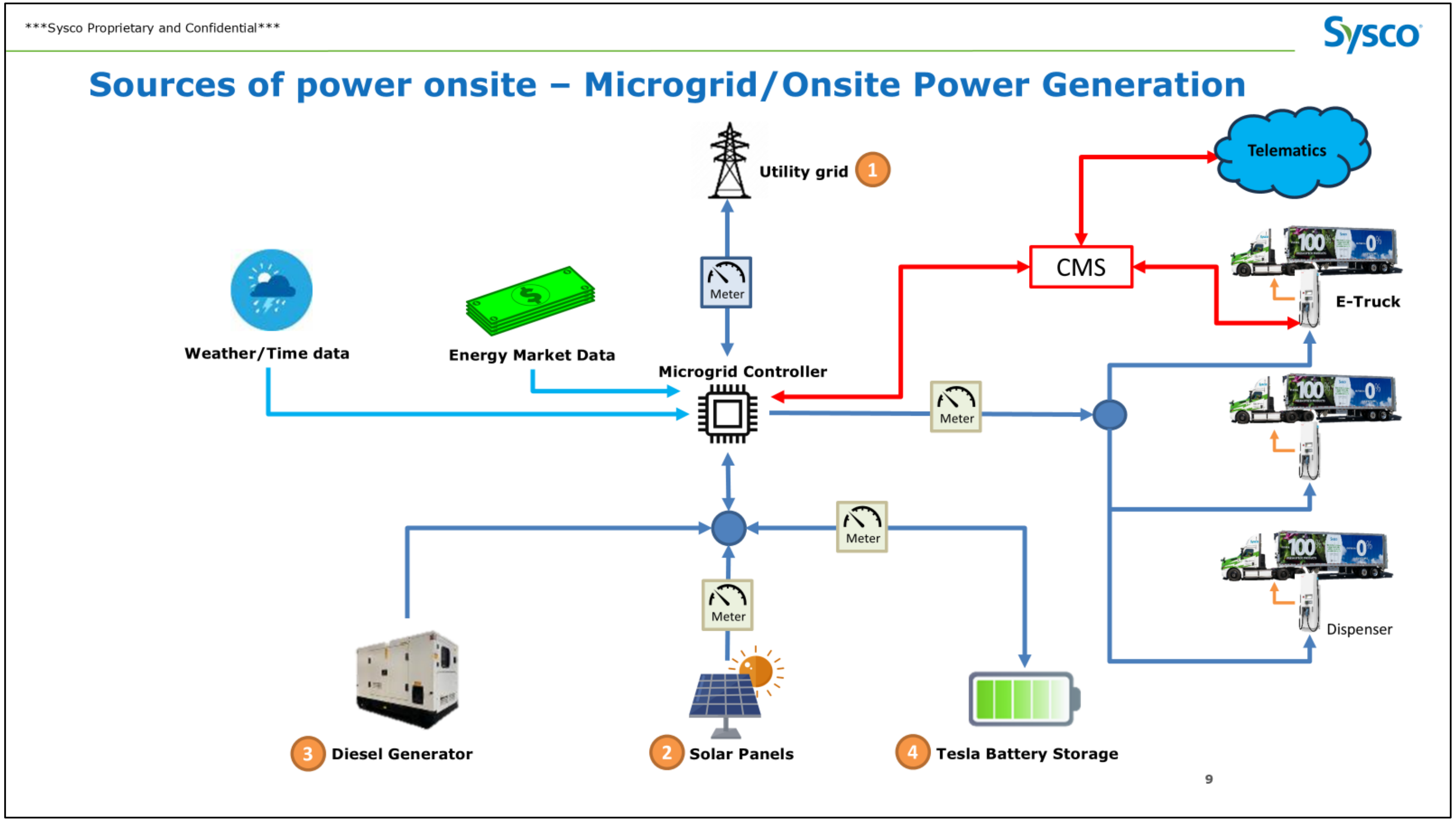
The DER project was broken down into 3-phases to leverage the assets and resources available and to accelerate our EV deployment

In-Service dates

- **Phase A** : Charging Infrastructure
  - In-service date **04/2024**
- **Phase B**: Solar Energy
  - In service date **09/2024**
- **Phase C**: Battery Storage
  - In service date: **End of 02/2025**
  - SCE service agreement under review and Permit-to-Operate (PTO) should be issued in the next few days

Main objectives of the DER

- Ensure Resilience & Business continuity
- Decreased Energy Costs
- Reduce emissions



Sysco large scale e-Hub in Riverside, CA

Riverside e-Hub

- 40 Electric Class 8 Trucks
- 40 Hybrid Electric Powered Refrigerated Trailers
- 40 Dual-Port Electric Vehicle Charging Stations
- 4.0 MWh Battery Storage
- 1.5MW Solar Power

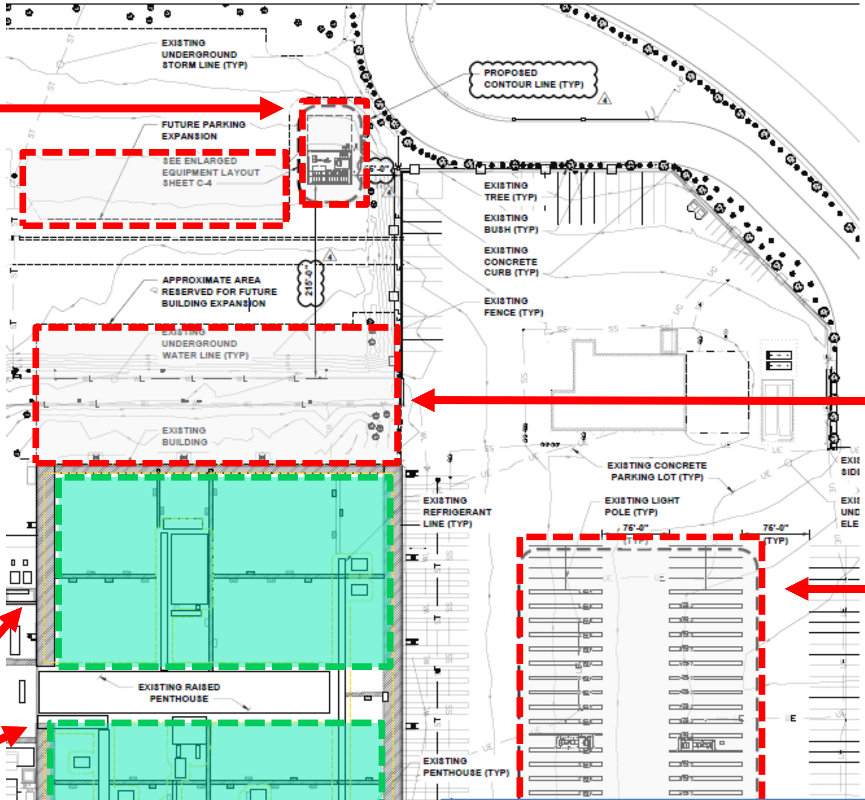
Permanent Charging Infrastructure



Tesla Battery & Utility Equipment Installation

- Utility Equipment
- Battery Storage

Additional Parking space



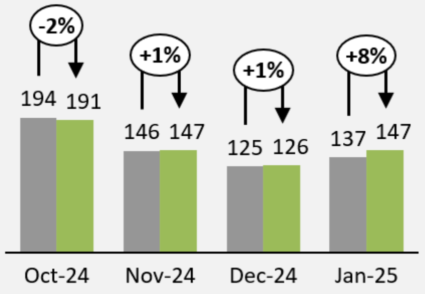
Warehouse expansion

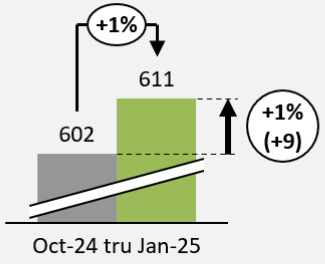
Electric Tractor & Trailers Charging Yard

Solar Panels

DER – Early Measurements - Energy Estimates

Solar Energy Estimates





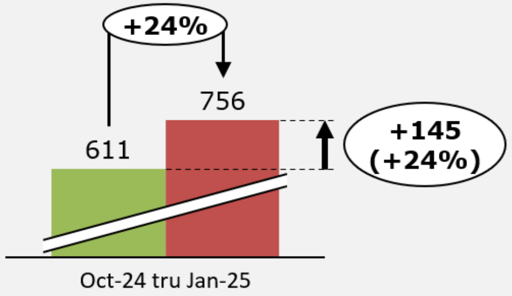
Planned Solar Energy Production [MWh]

Actual Solar Energy Production [MWh]

*Our surplus solar Energy production is equivalent to **20+ Full eCascadia** charges or **4000+ electric miles***

[all values in MWh]

Solar vs EV Energy Consumption Estimates

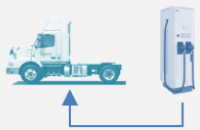


Actual Solar Energy Production [MWh]

Actual EV Energy Consumption [MWh]

[all values in MWh]

Last 4 months KPIs (Equivalent EV Recharge Energy From)

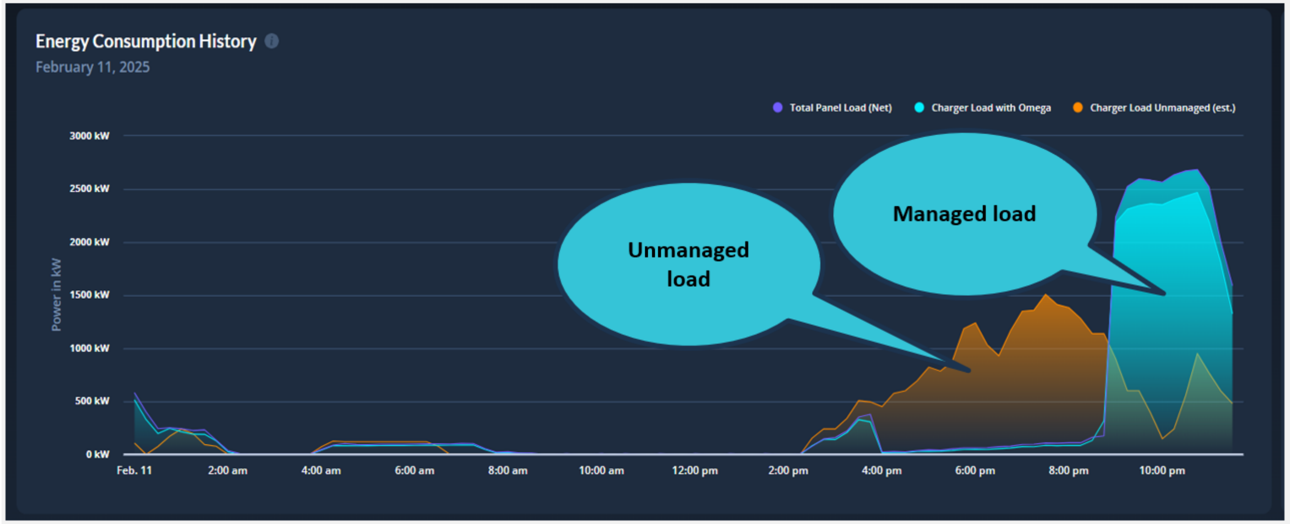


80% | 20%

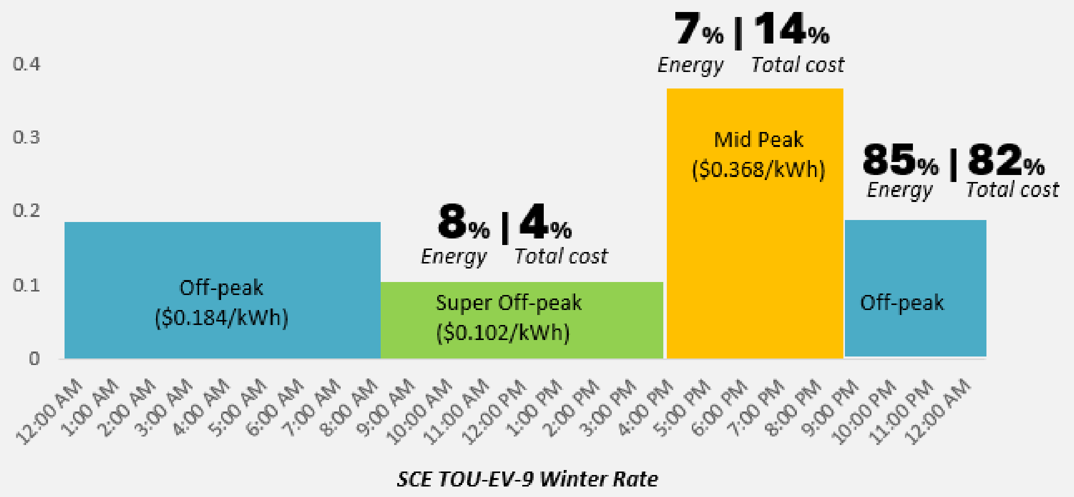
Solar Production
~ 300k EV miles equiv.

Grid Energy
~70k EV miles equiv.

Sysco EV Charge Management Software

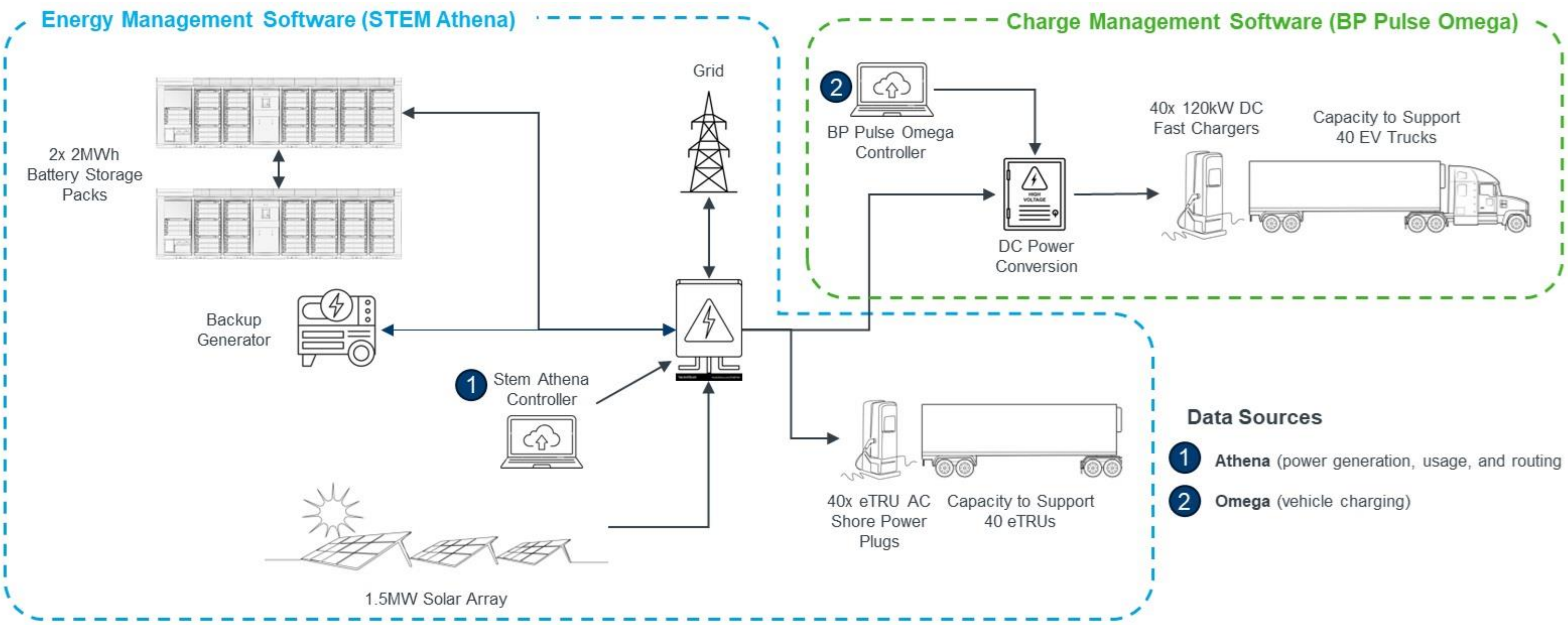


3-month winter Sysco Riverside EV Energy TOU vs Invoice Cost (excl. Solar credits)



Note: Sysco operates 40 electric class 8 Freightliner eCascadia. All energy estimates represent raw measurements and excl. energy losses

Site Energy Management & Data Collection Layout for Q&A



Source: STEM - Overview of Sysco site EMS / CMS systems and sources for data collection

EPIC Recipient: WattEV

EPC-20-38

Rajit Gadh
Co-founder
MOEV Inc.

EPC-20-040

Vagelis Vossos
Policy Researcher
LBNL

EPC-20-042

Tony Zamora
Project Manager
TA Operating, LLC

EPC-20-046

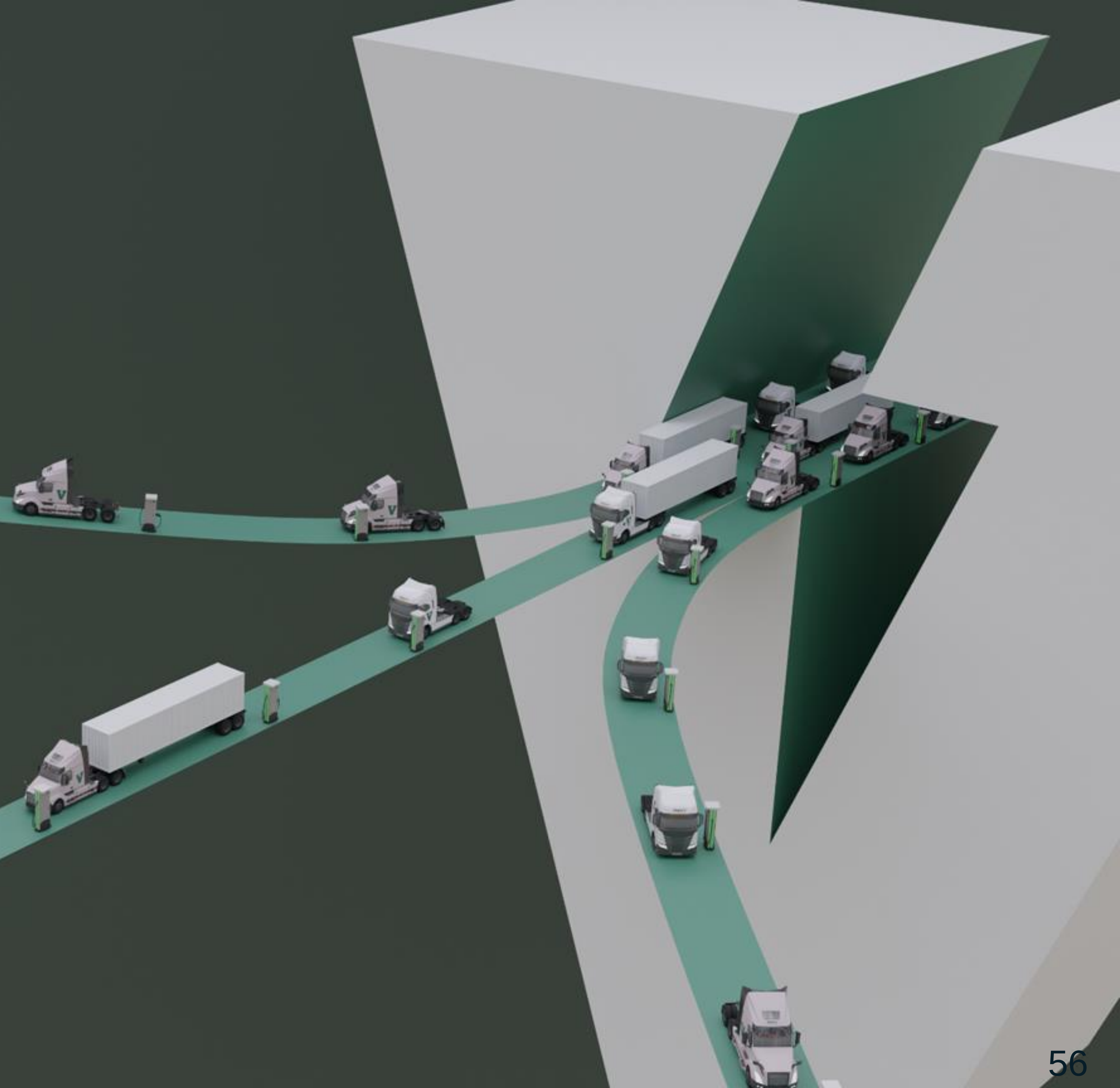
Stephane Fosso
Director of Fleet Technology
Sysco Riverside

EPC-21-006

Emil Youssefzadeh
CTO & Co-Founder
WattEV, Inc.

EPIC Showcase Workshop

February 2025



21st Century Truck Stop

1st MD/HD eTruck Stop in California
EPIC EPC-21-006

Grant Purpose and Goals

- Design, construction, and commissioning of a modular **Distributed Energy Resource (DER) package** composed of solar photovoltaics, battery energy stationary storage (BESS), and an AC/DC distribution control system at a **public access electric truck stop**
- Use the scalable DER package to provide reliable low-cost **renewable energy for a dedicated fleet of ten Class 8 battery electric trucks** as well as to support broader public access to Medium-Duty Heavy-Duty Plug-in Electric Vehicle (MDHD PEV) charging for fleets in a burgeoning trade corridor

WattEV EPIC Team

WattEV

Ihor Starepravo
Director of Software Engineering

Gordon M. Magne
Program Manager, Grants and Government Affairs

Salim Youssefzadeh
Co-founder & CEO

Sarmad Jabar
Director of Engineering, Power System

Marcelo Barros
VP Program Management

Emil Youssefzadeh
Founder & Chairman of the Board

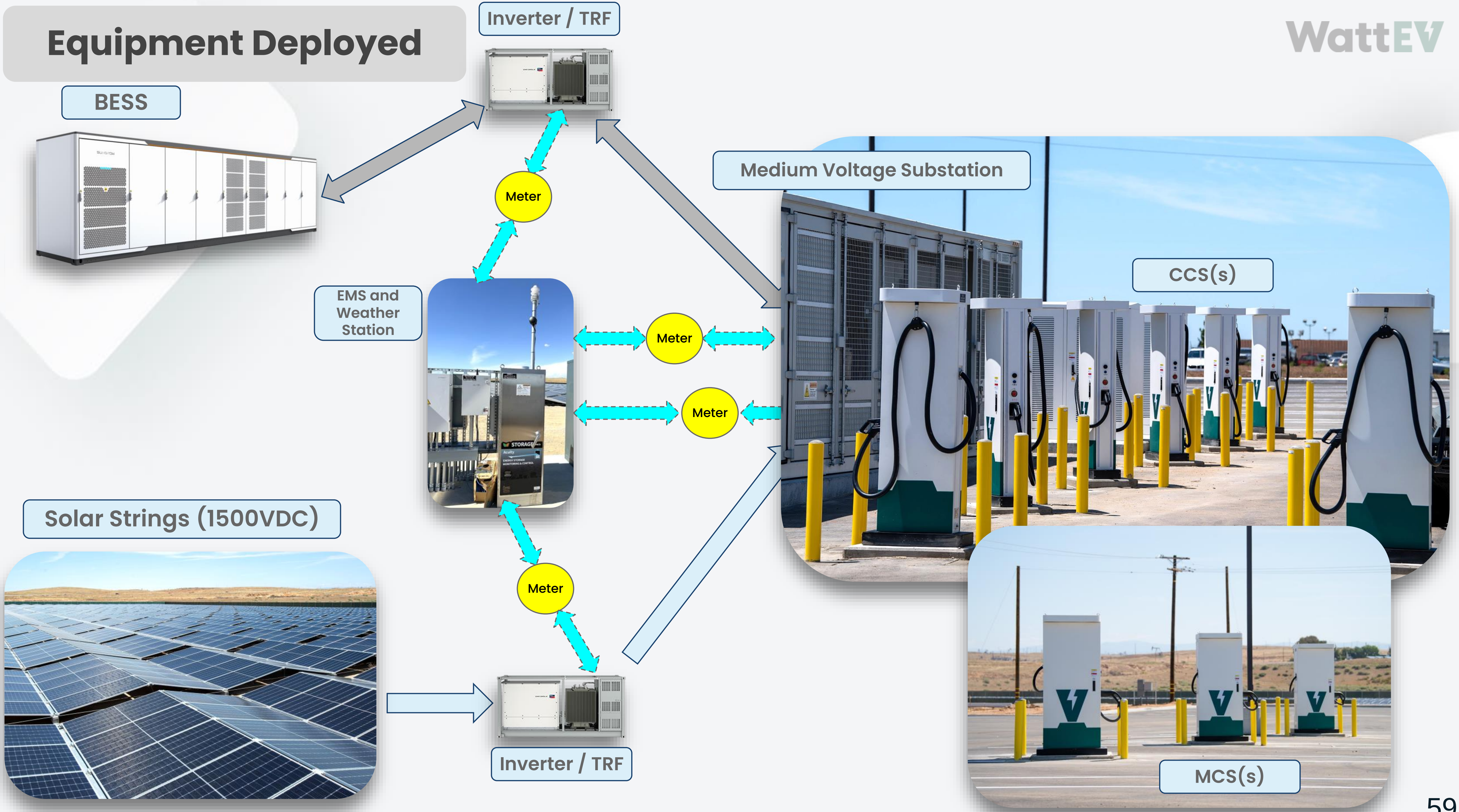
Huzeifa Badshah
Specialist - EV and Energy Infra Engineering

Mohamed Salem
Director, Construction Management - EVSE

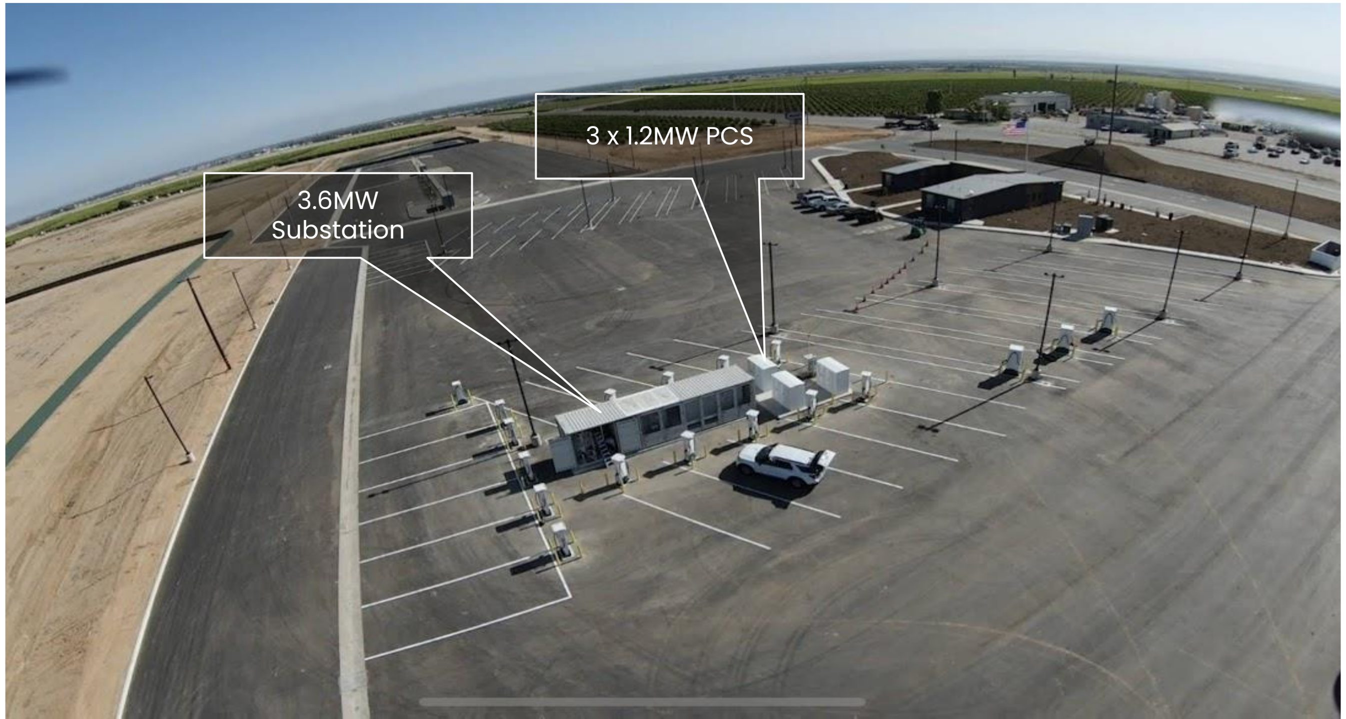
Michael Ganny
Director of Grants and Government Affairs

Equipment Deployed

WattEV



DER Chargers



Grid Chargers

WattEV

Timeline

April 2022 Site Grading

August 2022 Building Facilities

July 2023 Electrical Primary and Secondary

CONTINUES ON NEXT SLIDE

Dec 2021 Ground Break Ceremony

Jul 2022 Hwy-65 Improvements

Jan 2023 Solar System Deployment

Dec 2023 1.2 miles domestic & irrigation lines

click to see picture album

WattEV

Timeline (continue)

Jan 2024 Grid EVSEs

Feb 2024 Site Pavement

click to see picture album

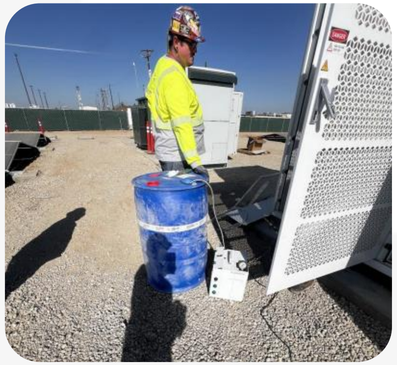
April 2024 DER EVSEs

May 2024 Site Opens to the Public

click to see picture album

Jun 2024 BESS Installation Incident

Sept 2024 BESS Installation Resumes



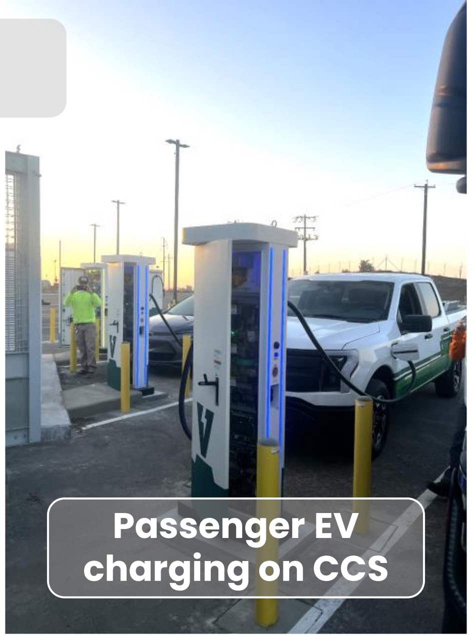
Nov 2024 BESS Replacement

Nov 2024 BESS Fire Control Panel Installation

Jan 2025 Commissioning

Equipment


Volvo Truck charging on CCS


Passenger EV charging on CCS


FEDEX Truck charging on CCS

MV Substation


PCS cabinets


Truck charging on CCS


CCS Chargers


MCS
Connector
EPO


WattEV EV
Trucks
WattEV
WattEV


Under Development
Open Location
Salem (OR)
Sacramento
Port of
Oakland
Stockton
San Jose
Gustine
Fresno
Taft
Bakersfield
Barstow
Oxnard
Los Angeles
Vernon
San Bernardino
Palm Springs
Fontana
Blythe
Gardena
Port of
Long Beach
Moreno Valley
San Diego
El Centro
Otay Mesa
80
5
99
15
40
10
8
Solar Field
5.2MWdc

Fleet Charging with Solar Microgrids: Early Findings

Solicitation Motivation: Recap

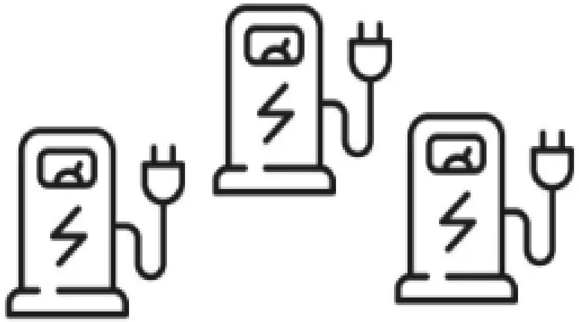
Challenges:

- MDHD EVs' have high power charging needs
- Concerns over costly demand charges and likely facility and distribution infrastructure upgrades
- Operational uncertainty during (un)planned grid outages

Hypothesis:

Integrating behind-the-meter DERs can help delay or avoid the need for expensive upgrades to distribution infrastructure. This approach not only reduces the financial burden on ratepayers but also addresses fleet owners' concerns about operational stability.

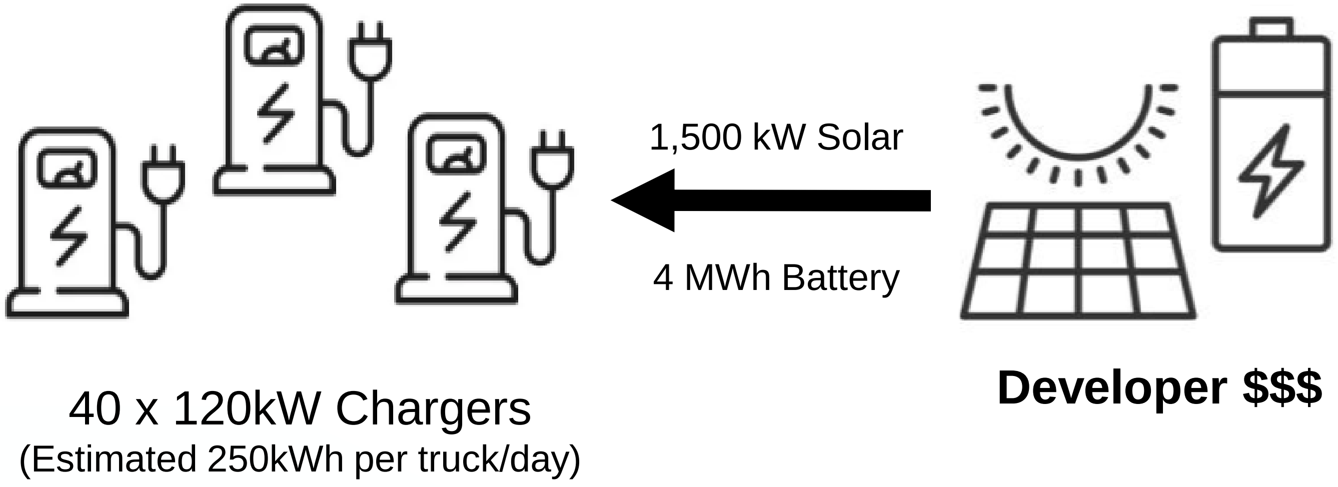
1 Incentive Issues (1)



40 x 120kW Chargers
(Estimated 250kWh per truck/day)

1. Developer interested in installing 40 x 120kW chargers to support a fleet of battery electric trucks

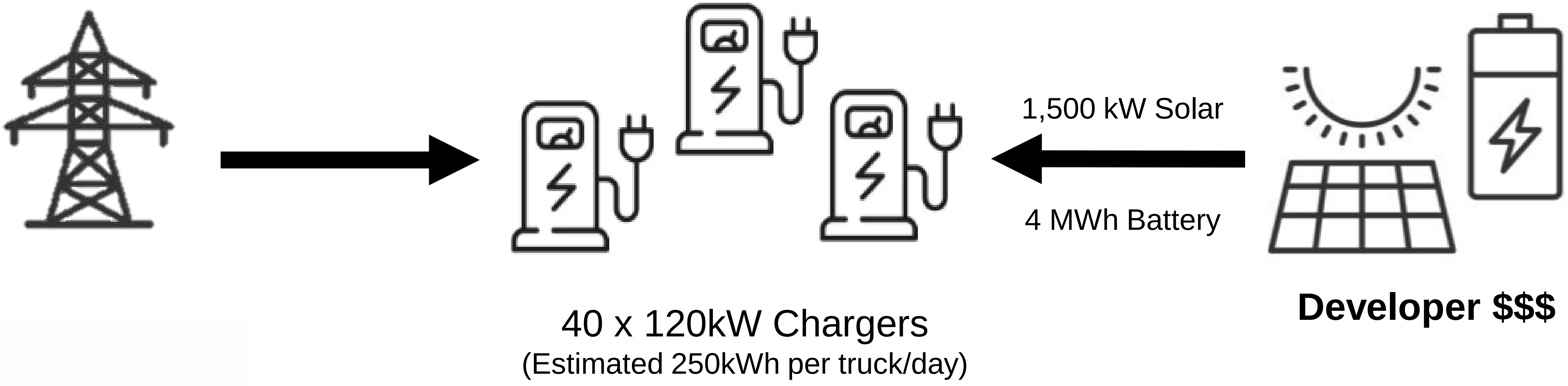
1 Incentive Issues (2)



2. Developer funds a behind-the-meter solar microgrid to support energy resiliency and cost stability

The solar and storage are sized to meet the annual energy demand of the chargers

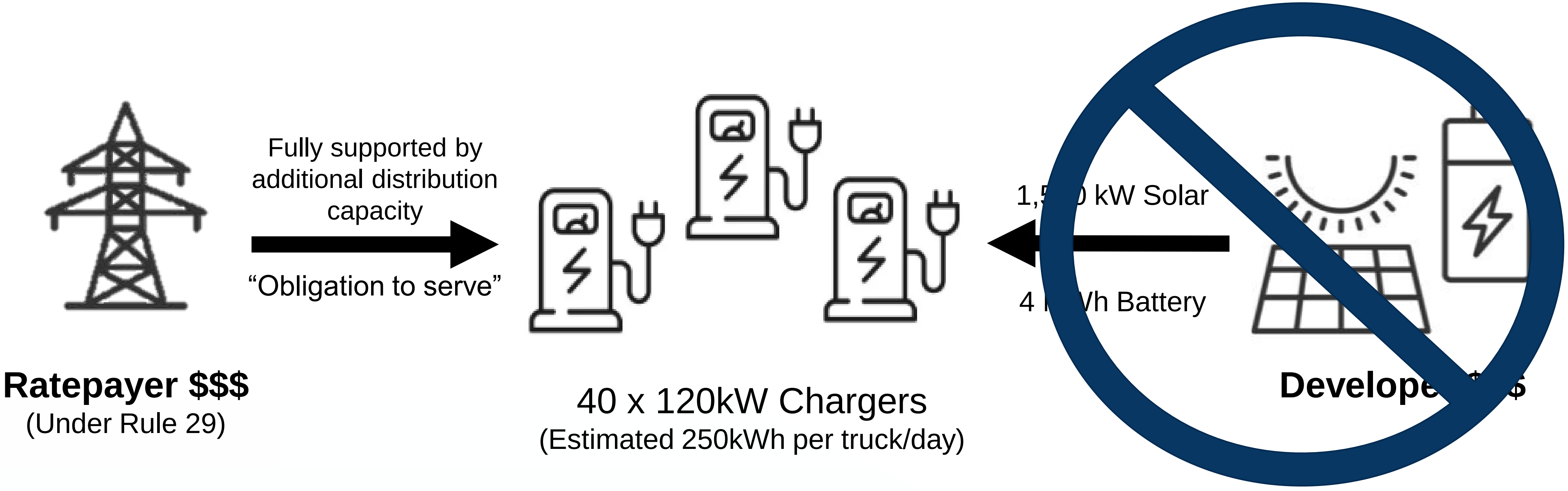
1 Incentive Issues (3)



3. Developer also energizes chargers with utility service. Existing capacity is insufficient to support the chargers, so the developers apply for a service upgrade under Rule 29

Under Rule 29, IOUs cover the cost of service extension work on the utility side of the meter.
These costs are then paid for by ratepayers

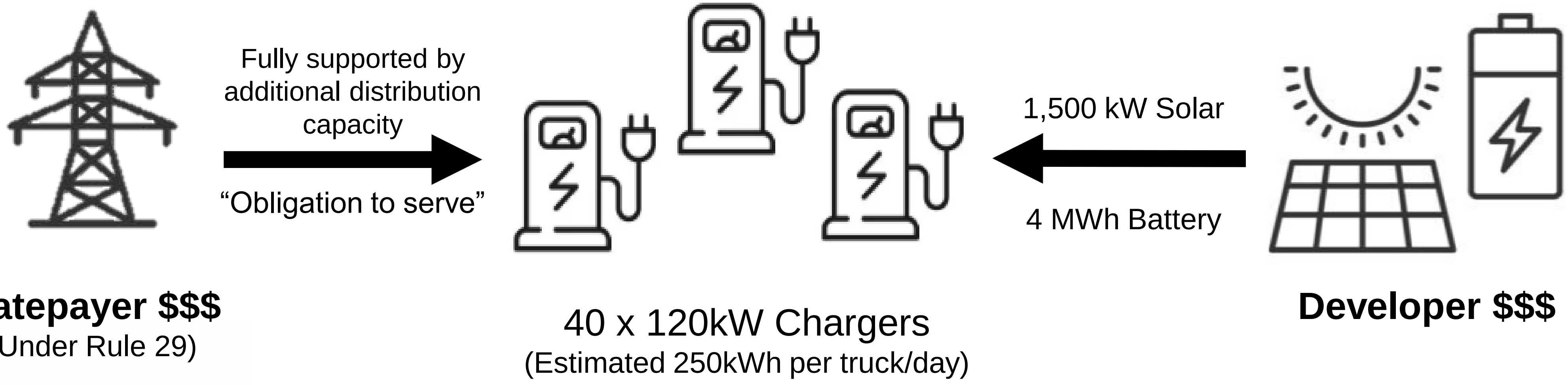
1 Incentive Issues (4)



4. The IOUs extend service to meet the full demand of the newly installed chargers.

On-site generation **NOT** considered in service extension request

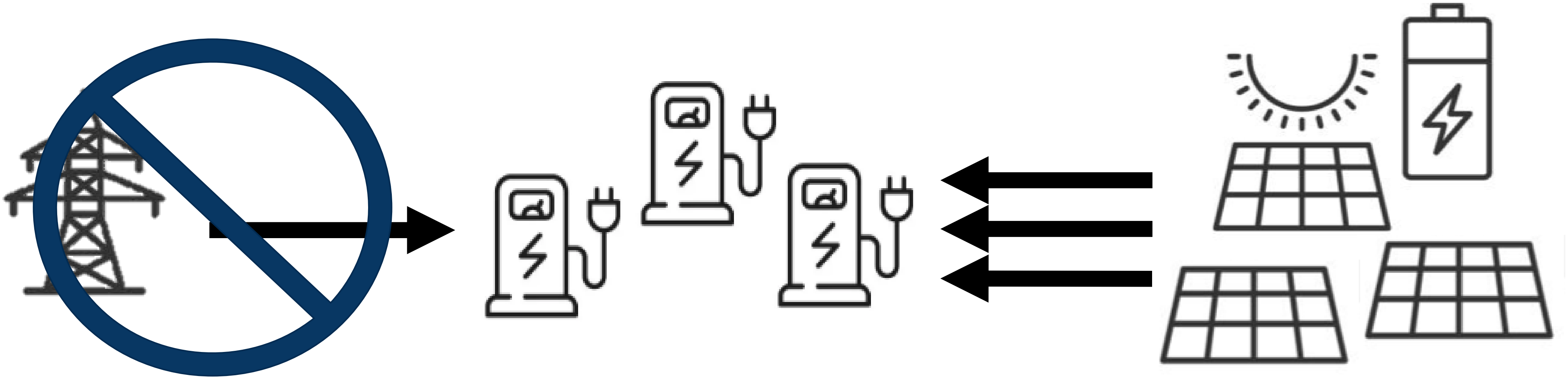
1 Incentive Issues (5)



Takeaways:

- **Neither IOUs nor developers are incentivized to consider solar microgrids as an alternative to service extensions under Rule 29**
  - Developers' EVSE are energized for "free," utilities recoup costs through the rate base
  - Risk of utility overbuild (at the expense of ratepayers)
- There is a need for additional research to consider **innovative incentive and shared savings models** to **maximize existing grid capacity** while **thoughtfully considering the value of on-site generation**

2 Off-Grid Possibility

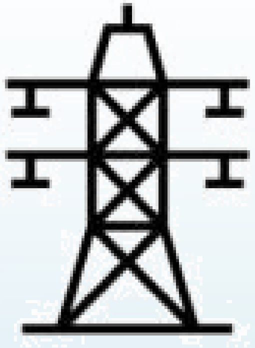


- Solar microgrids create the possibility for off-grid operations
  - Demonstrated by WattEV
- Useful case-by-case, but social benefit at scale is unclear
  - Grid defection lowers utility demand and may drive up rates
- High utilization becomes a priority for developers to recoup infrastructure investments

3 Industry Immaturity

- The purchase cost of MDHD EVs is roughly 2-3x that of their diesel counterparts
- Techno-economic analysis from these projects will yield more information on total cost of ownership

- Complexity of solar microgrids yields unpredictable and often lengthy energization and interconnection timelines



- Flexible interconnection/energization models are still in the pilot phase and lack standardized operations and technologies

4 Bright Spots

Enhanced Resiliency

- Charging through temporary grid outages
- Opportunity for community “resilience hubs”

Cost Stability

- Leverage load management strategies (e.g. peak shaving)
- Reduce burden of demand charges

Organizational Improvements

- Improved understanding of organizational needs and roles
- Learnings from utility/AHJ engagement

Summary

Hypothesis:

Integrating behind-the-meter DERs can help delay or avoid the need for expensive upgrades to distribution infrastructure. This approach not only reduces the financial burden on ratepayers but also addresses fleet owners' concerns about operational stability.

1. **Incentive Issues**
   - No systems in place to value of microgrids as alternatives to distribution upgrades
2. **Off-Grid Possibility**
   - Integrating solar microgrids creates possibilities for grid defection
3. **Industry Immaturity**
   - High upfront costs, supply chain issues, and permitting timeline uncertainties
4. **Bright Spots**
   - Integrating DERs bolsters resiliency and stabilizes rates

Panel and Q/A Discussion

Panel Discussion

Moderator

Eric Ritter
RI Supervisor
CEC

Panelist

Rajit Gadh
Co-founder
MOEV Inc.

Panelist

Vagelis Vossos
Policy Researcher
LBNL

Panelist

Tony Zamora
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TA Operating, LLC

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Director of Fleet Technology
Sysco Riverside

Panelist

Emil Youssefzadeh
CTO & Co-Founder
WattV, Inc.

Energize Innovation

- EPC-20-038, MOEV Inc.
  https://www.energizeinnovation.fund/projects/artificial-intelligence-based-heavy-duty-fleet-charging-enable-distributed-energy-resource
- EPC-20-040, LBNL
  https://www.energizeinnovation.fund/projects/innovative-school-bus-charging-resilient-communities
- EPC-20-042, TA Operating LLC
  https://www.energizeinnovation.fund/projects/taking-charge-travelcenters-america-ultra-fast-en-route-charging
- EPC-20-046, Sysco Riverside
  https://www.energizeinnovation.fund/projects/distributed-resources-diversified-renewable-energy-project
- EPC-21-006, WattEV Inc.
  https://www.energizeinnovation.fund/projects/21st-century-truck-stop-1st-mdhd-etruckstop-california

https://www.energizeinnovation.fund/

Thank You!

Please let us know if you have additional questions.

For Webinar Information:
https://www.energy.ca.gov/event/2025-02/fleet-charging-solar-microgrids-epic-project-showcase

CEC Upcoming Events:
https://www.energy.ca.gov/events

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