DOCKETED	
Docket Number:	19-TRAN-02
Project Title:	Medium- and Heavy-Duty Zero-Emission Vehicles and Infrastructure
TN #:	258370
Document Title:	Presentation - Innovative Strategies for Accelerating MDHD Site Energization in POU Territories
Description:	Presentation slides that were presented at the Innovative Strategies for Accelerating MDHD Site Energization in POU Territories staff workshop on July 31, 2024.
Filer:	Michelle Vater
Organization:	California Energy Commission
Submitter Role:	Energy Commission
Submission Date:	8/7/2024 11:57:44 AM
Docketed Date:	8/7/2024

California Energy Commission

Innovative Strategies for Accelerating MDHD Site Energization in POU Service Territories

July 31, 2024

Housekeeping

- Meeting is being recorded
- Virtual participation possible through Zoom or telephone
- Meeting event webpage: https://www.energy.ca.gov/event/workshop/2024-07/workshop-innovative-strategies-accelerating-mdhd-site-energization-pou
- Docket location: https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-TRAN-02
- Submit written comments to Docket 19-TRAN-02 and “Accelerating Medium- and Heavy-Duty Site Energization”

Deadline for comments: Tuesday, August 16, 2024, 5:00 P.M.

Meeting Agenda

- Welcome and Housekeeping
- Overview of the Clean Transportation Program
- Projections of EV charger needs in POU service territories
- POU perspectives on charger deployment needs, trends in applications, and innovative approaches to swift energization
- Technology solutions to accelerate energization of large TE loads
- Case Study – 9MW in 5 months – Prologis, LADWP, and Mainspring Collaboration at Denker Avenue Microgrid
- Public comment
- Closing remarks/Next Steps

Overview of the Clean Transportation Program

July 31, 2024

Kate Reid, Air Resources Engineer

Truck, Bus, and Goods Movement

California's Electric Vehicle Goals 2025 – 2045

2025

1.5 MILLION
EV'S SOLD

INCLUDING 10,000 FAST CHARGERS

250,000
CHARGERS INSTALLED

200 OPEN
HYDROGEN STATIONS

2030

5 MILLION
EV'S SOLD

2035

100%
ELECTRIC SALES FOR NEW PASSENGER VEHICLES

100%
ELECTRIC OPERATIONS FOR DRAYAGE TRUCKS AND OFF-ROAD VEHICLES & EQUIPMENT

2045

100%
ELECTRIC OPERATIONS FOR MEDIUM- AND HEAVY-DUTY VEHICLES

Origins of the Clean Transportation Program

- Transportation pollution burdens vulnerable and disadvantaged communities most
- AB 118 (2007) created Clean Transportation Program
- Up to $100 million per year
- AB 126 (2023) reauthorized through July 1, 2035

Assembly Bill No. 8

CHAPTER 401

An act to amend Sections 41081, 44060.5, 44125, 44225, 44229, 44270.3, 44271, 44272, 44273, 44274, 44275, 44280, 44281, 44282, 44283, 44287, 44299.1, and 44299.2 of, to add and repeal Section 43018.9 of, and to repeal Section 44299 of, the Health and Safety Code, to amend Sections 42885 and 42889 of the Public Resources Code, and to amend Sections 9250.1, 9250.2, 9261.1, and 9853.6 of the Vehicle Code, relating to vehicular air pollution, and declaring the urgency thereof, to take effect immediately.

[Approved by Governor September 28, 2013. Filed with Secretary of State September 28, 2013.]

LEGISLATIVE COUNSEL'S DIGEST

AB 8, Perea. Alternative fuel and vehicle technologies: funding programs.

(1) Existing law establishes the Alternative and Renewable Fuel and Vehicle Technology Program, administered by the State Energy Resources Conservation and Development Commission, to provide to specified entities, upon appropriation by the Legislature, grants, loans, loan guarantees, revolving loans, or other appropriate measures, for the development and deployment of innovative technologies that would transform California's fuel and vehicle types to help attain the state's climate change goals. Existing law specifies that only certain projects or programs are eligible for funding, including block grants administered by public entities or not-for-profit technology entities for multiple projects, education and program promotion within California, and development of alternative and renewable fuel and vehicle technology centers. Existing law requires the commission to develop and adopt an investment plan to determine priorities and opportunities for the program. Existing law also creates the Air Quality Improvement Program, administered by the State Air Resources Board, to fund air quality improvement projects related to fuel and vehicle technologies.

This bill would provide that the state board has no authority to enforce any element of its existing clean fuels outlet regulation or other regulation that requires or has the effect of requiring any supplier, as defined, to construct, operate, or provide funding for the construction or operation of any publicly available hydrogen-fueling station. The bill would require the state board to aggregate and make available to the public, no later than June 30, 2014, and every year thereafter, the number of hydrogen-fueled vehicles that motor vehicle manufacturers project to be sold or leased over the next 3 years, as reported to the state board, and the number of hydrogen-fueled vehicles registered with the Department of Motor Vehicles through April 30. The bill would require the commission to allocate $20 million annually,

Three Ways CEC is Advancing the ZEV Transition

- ZEV infrastructure planning and analysis
- Regulations and charging standards
- Funding programs for ZEV charging and refueling infrastructure, manufacturing, and workforce development

Photo credit: CEC

Projections of EV Charger Needs in POU Service Territories

July 31, 2024

Adam Davis, Air Pollution Specialist

Infrastructure Modeling and Assessment

Goals used for the AB 2127 Assessment

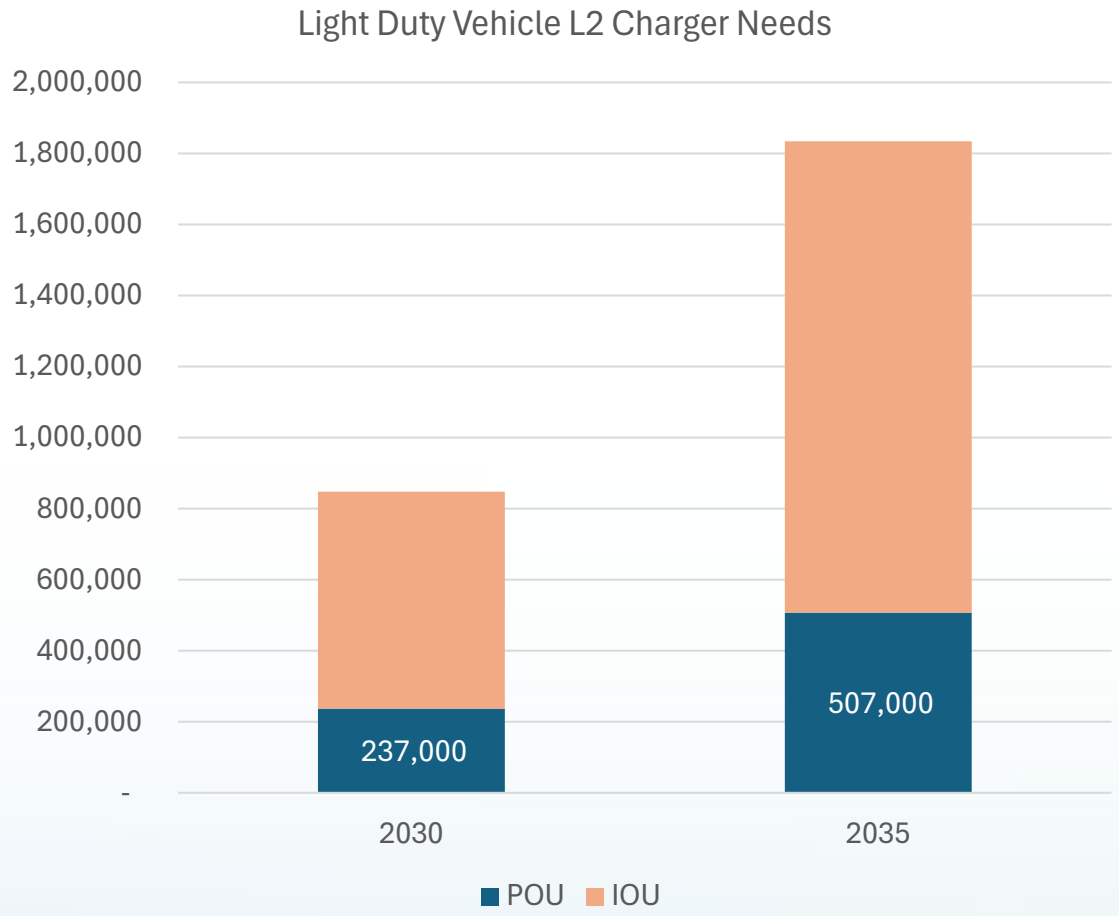
Source: CEC

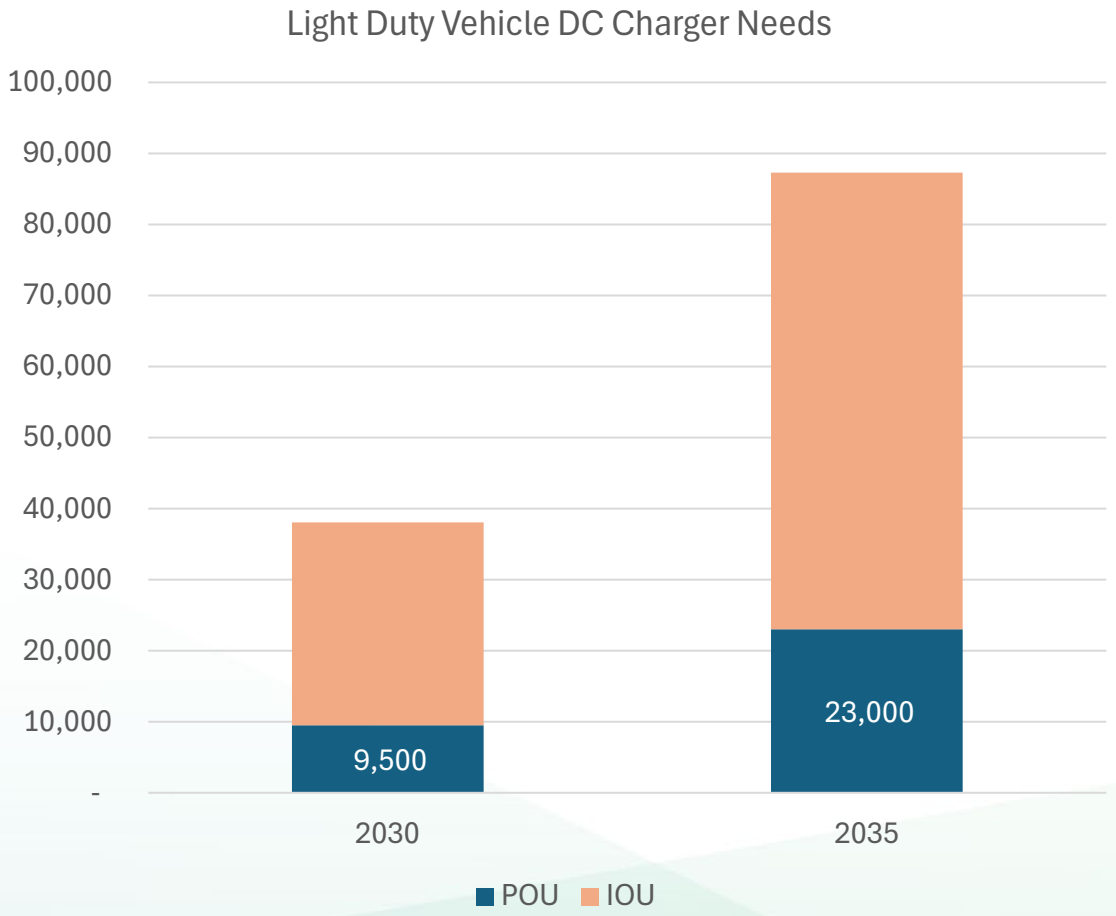
- 2035: 100% ZEV light-duty sales

Source: CEC

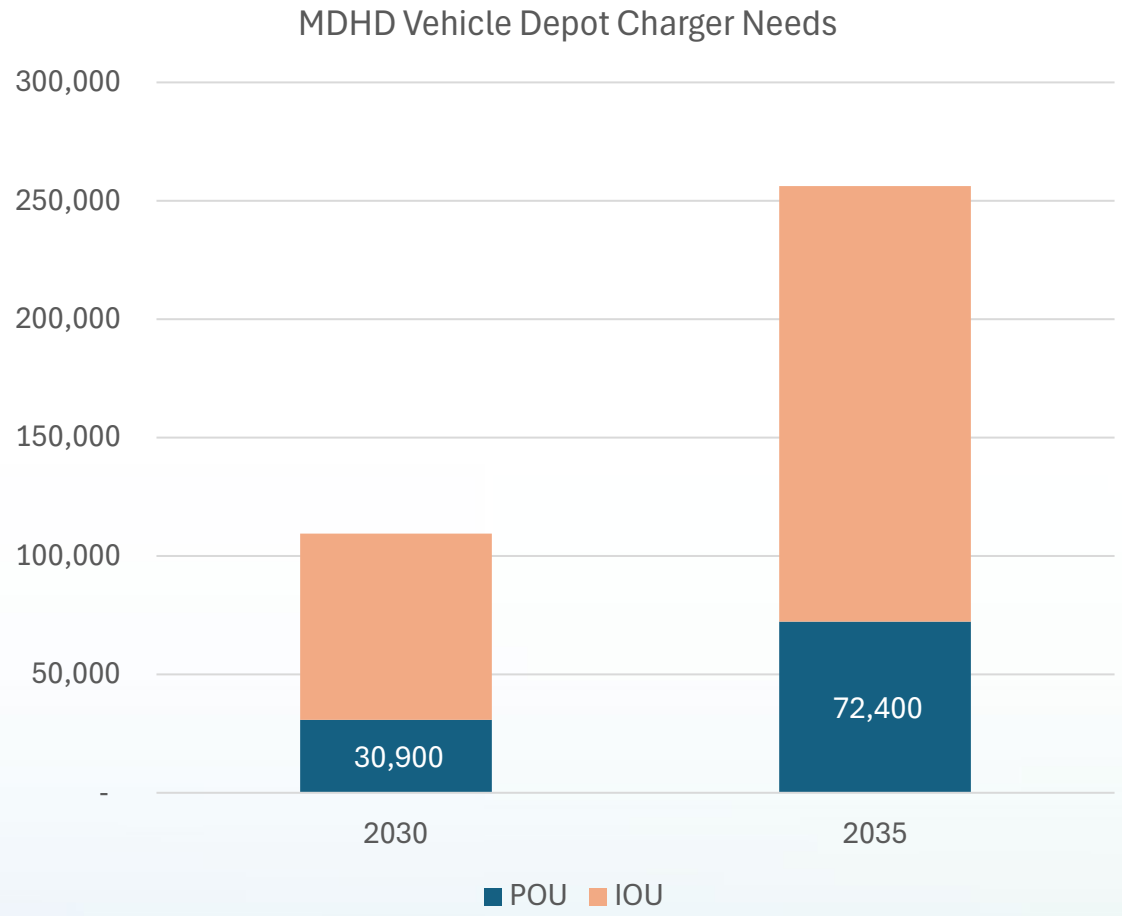
- 2035: 100% ZEV operations for drayage trucks
- 2035: 100% ZEV off-road vehicles and equipment, where feasible
- 2045: 100% ZEV operations for medium- and heavy-duty vehicles, where feasible.

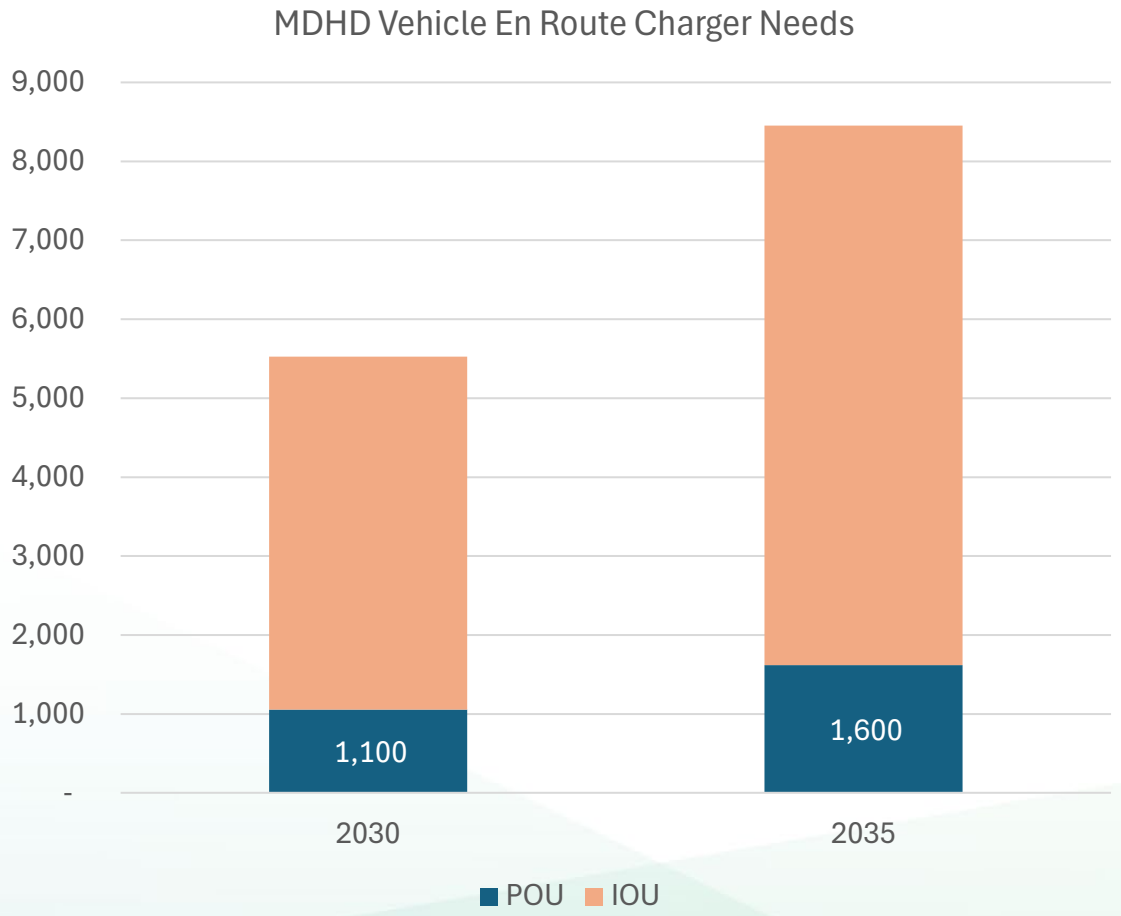
Statewide infrastructure needs (Light Duty)



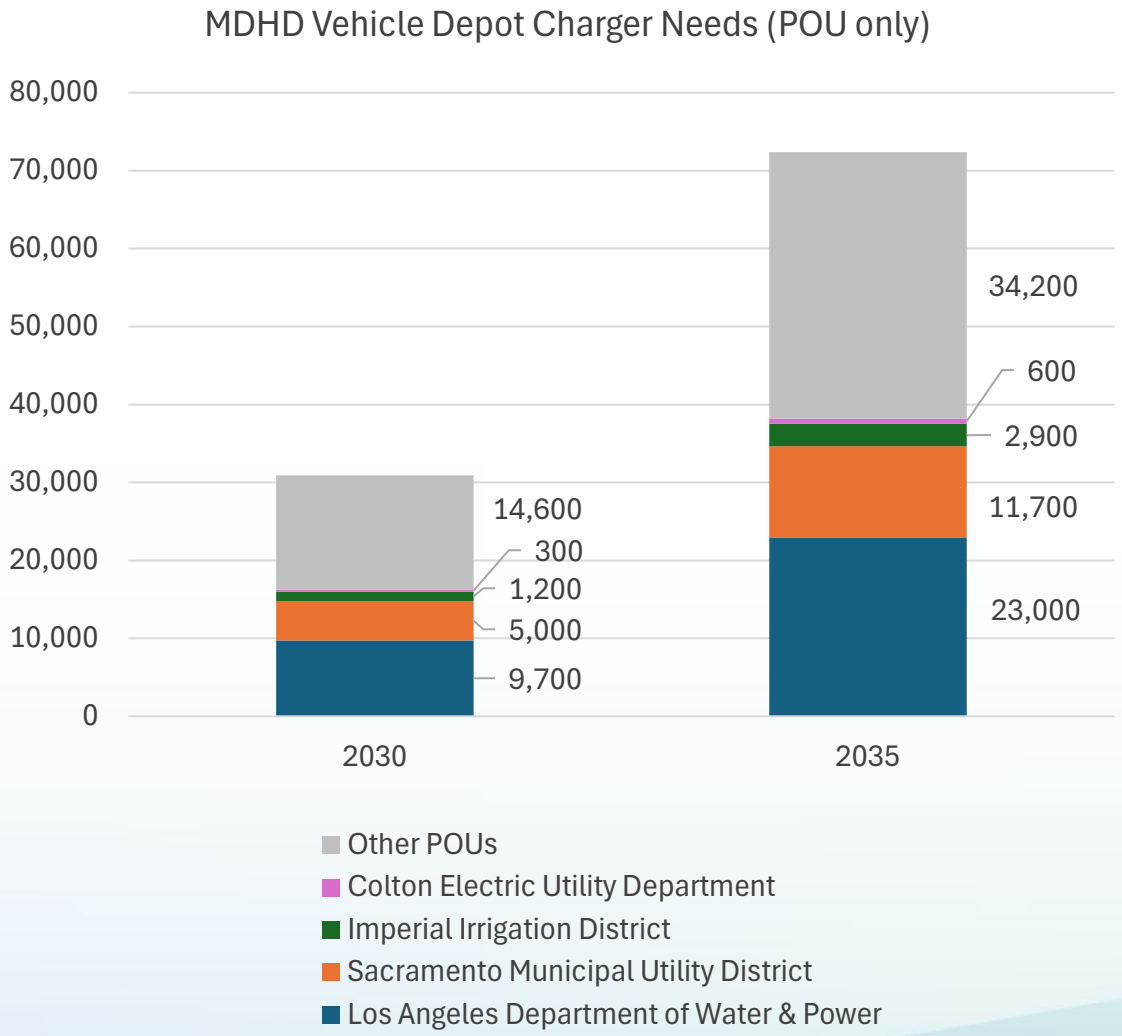


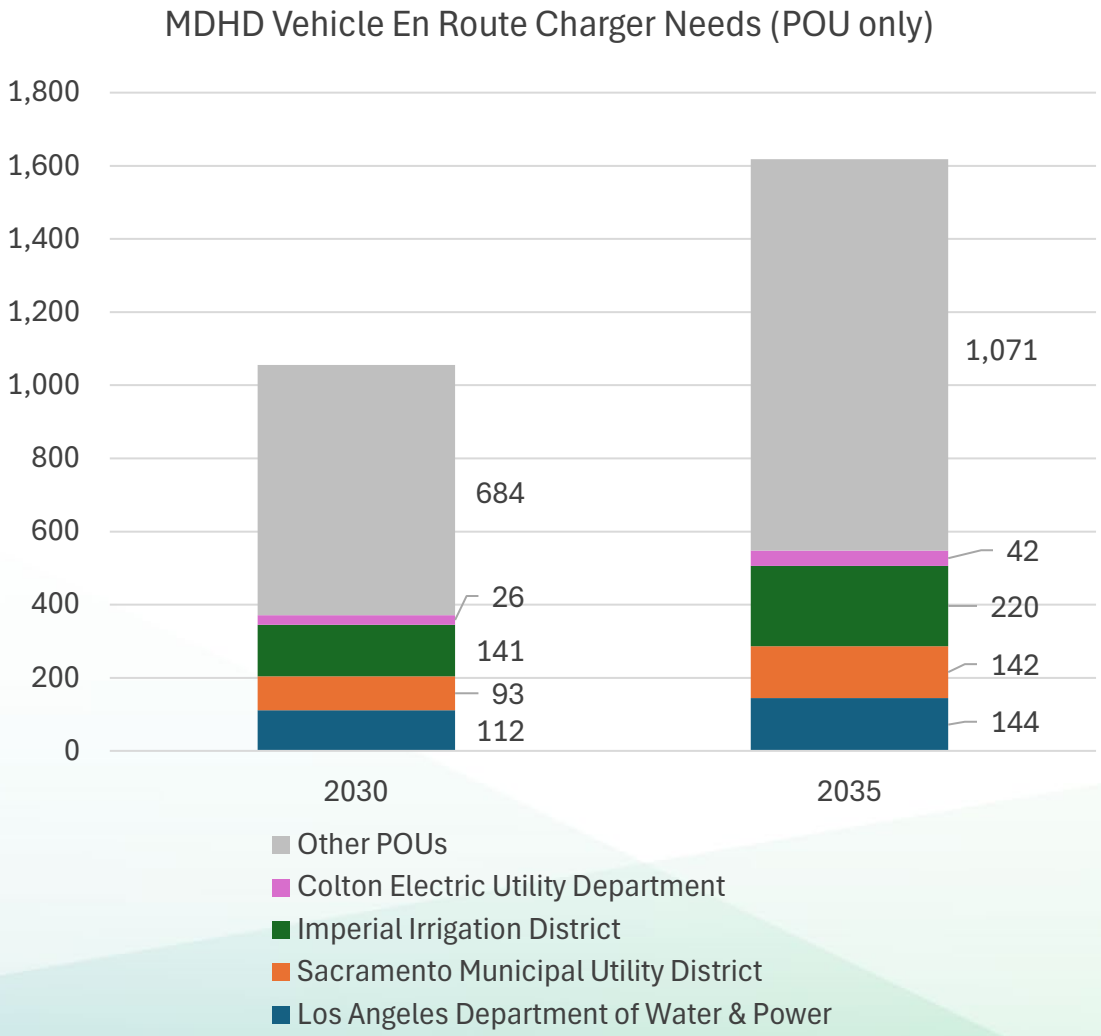
Statewide infrastructure needs (MDHD)





Different POUs will have different needs





AB 2127 Feedback

We are currently developing the scenarios for the AB 2127 Third Electric Vehicle Charging Infrastructure Assessment

Please contact us if you would like data from the second assessment (including breakouts for your territories) or suggestions for the third assessment.

- Adam Davis adam.davis@energy.ca.gov
- Fuad Un-Noor fuad.unnoor@energy.ca.gov

Publicly Owned Utilities

Panel Discussion

POU Panel Participants

- Paul Rodriguez, Imperial Irrigation District
- Harry Marks, Sacramento Municipal Utility District
- Jessica Sutorus, City of Colton Electric Utility

POU Panel Discussion

- What trends are you seeing in applications for serving large EV charging sites such as medium- and heavy-duty truck depots?
- How long does it take to provide service to large multi-MW customers and what are the slowest steps in the process?
- Have applications to serve large EV charging deployments required larger capacity projects to serve them?
  - If additional larger capacity projects are needed, how much time does this/could this add to a project?
- Have you used or considered temporary power solutions or flexible connections to energize sites while permanent infrastructure is constructed?
- Do you feel that you have a good estimate of how many chargers you will need in your region by 2025, 2030, and beyond to serve MDHD vehicles?
- What are the technical, policy, or procedural barriers to use of temporary power, flexible service agreements, or other innovative bridging solutions?
  - How can CA state agencies help you energize projects sooner?
  - What should the CEC consider modifying in our funding programs to help support temporary power solutions or flexible connections options by MDHD site hosts?

POU Panel Participants

- **Paul Rodriguez, Imperial Irrigation District**
- Harry Marks, Sacramento Municipal Utility District
- Jessica Sutorus, City of Colton Electric Utility

IID
A century of service.

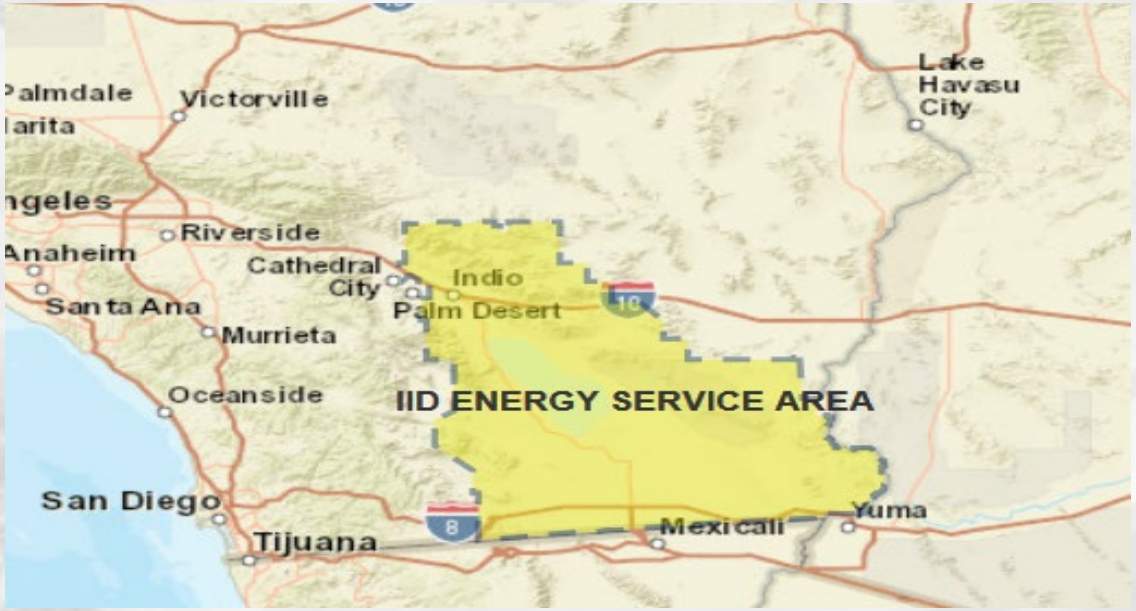
Imperial Irrigation District

CEC: Innovative Strategies for Accelerating MDHD Site Energization in POU Territories

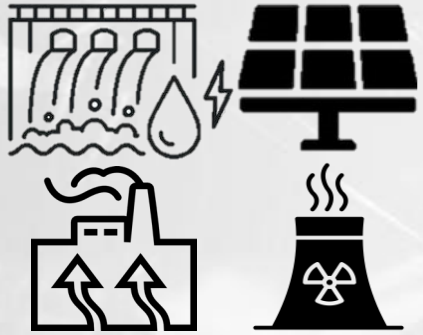
Paul Rodriguez, P.E.
Deputy Manager Power Department
July 31, 2024

Background

- The Imperial Irrigation District (IID) was established in 1911 and entered the power business in 1936. Serving Imperial and Coachella Valleys and a small portion of San Diego County, IID has a service area of **6,471 square miles with over 161,000** residential and commercial customers.



Service Territory



- Historic peak: **1,152MW**
  - *Average load:* ***410MW***
- Transmission Lines: **1,780mi**
  - ***Voltage:230,161,92,34.5 kV***
  - ***Six Interconnecting lines: 1-230kV SDG&E; 2-230kV SCE; 2-161kV WAPA; 1-161kV APS***
- Distribution Lines: **5,004 mi**
  - ***Voltage:13.2kV***
- Distribution Substations: **67**

- Divers Resource portfolio:
- Connected Generation Capacity of over 2,200MW
  - ***Hydro, Geothermal, Solar, Nuclear, Biomass and Thermal Units***

- Over **132MW** of rooftop solar and **140MWh** or Grid Battery Storage.

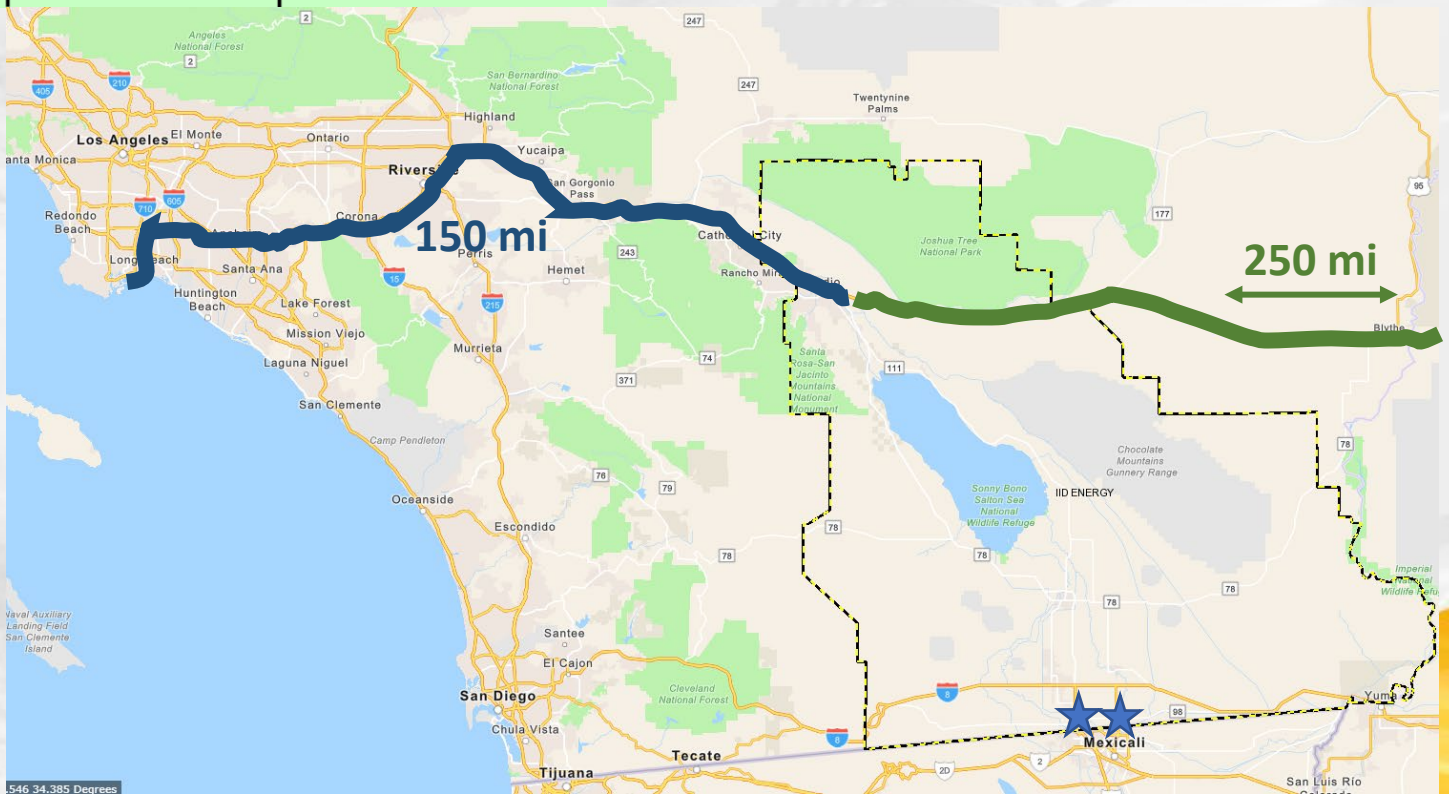
*Biomass possibly will be decommissioned

Corridors for MDHD Sites

- Two major interstates run through IID's service territory the I-8 and I-10
- The Imperial County freight highway system enables goods to move from the international border with Mexico through the Calexico West and Calexico East POEs.
- The Coachella Valley has the I-10 corridor that connect long beach port and Inland Empire hubs to the greater Phoenix area.

Freight Range

Model	Range miles (mi)	Charging Time minutes (mn)	Battery Capacity kilowatt hour (kWh)
Kenworth T680E	150 mi	125mn (80%)	396 kWh
Peterbilt 579EV	150 mi	120mn (90%)	400 kWh
Freightliner eCascadia	150-230 mi	90mn (80%)	291 - 438 kWh
Volvo VNR Electric	275 mi	90mn (80%)	565 kWh
Nikola Tre BEV	330 mi	160mn (80%)	733 kWh
Tesla Semi	500 mi	30mn (70%)	500 - 1,000 kWh



Interconnection Request

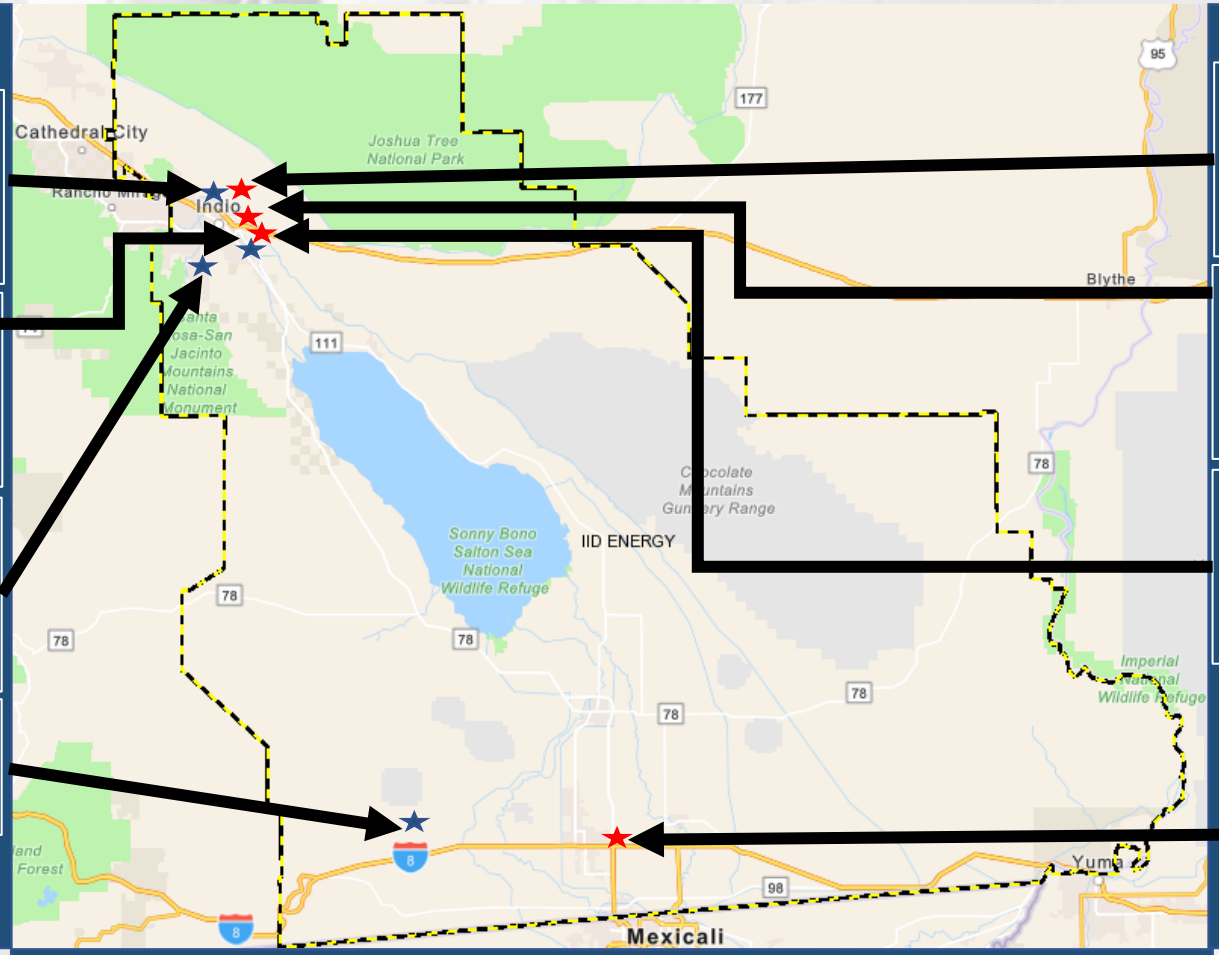
Private

MDHD: **1-2MW** at 13.2kV

MDHD: **3.8MW** at 13.2kV

IID Fleet: **3.4MW** at 13.2kV

MD: **2.5MW** at 13.2kV



Public

MDHD: **18MW** at 92kV

MDHD: **40.7MW** at 13.2kV

MDHD: ★ **2.5MW** at 13.2kV

HD 1 Public: **20.4MVA@** 92kV

- Increase of **93MW**
- Equivalent to **23%** of IID current average load

MDHD Electrification Challenges for IID

Grid Constraints

- Distribution substations have reached full capacity.
- MDHD Charging stations required locations near major freight routs.

Operational Complexity

- The unknown load profiles for these charging stations complicate the time-of-use structure.
- Exploring connecting directly to 161kV voltage class for distribution substations.

Upfront Cost

- Construction of distribution substations has significantly increase in the last 4 years.
- Distributions transformers and breakers have doubled in cost

Equipment Lead Times

- In the past years Breaker lead times have gone from 12 wks to 110-204wks
- Transformers from 26wks to 54-130wks
- Customers are struggling with switchgear procurement

Equipment Regulation

- CARB action to phaseout SF6 complicates building of new substations. Alternate equipment cost 3 times more.
- Electrification of IID fleet is extremely challenging. Specifically Heavy equipment (lineman trucks)

Overall Capital Risk

- Given the challenges with current EV charging vehicles the possibility of stranded assets is a true risk for POUs.
- Large investment in infrastructure without expected energy usage can create financial hardships on POUs

Solutions

Joint Powers Authority (JPA)

- In collaboration with the City of Indio, a JPA was formed to fund the construction of new electrical infrastructure in the city of Indio
- This will address substation capacity issues and facilitate the desired growth within the city.

Energy Infrastructure Partnership

- The partnership is open to public and private entities seeking will-serve letters for areas that have exceeded distribution capacity.
- Pro-rata approach for allocating capacity and costs for new distribution substations.

Solution

Planned changes to Engineering Criteria

- Substation Criteria to accommodate 40-50MVA Banks
- Larger conductor and cable for substation getaways
- Procuring outside USA for long lead equipment (xfrm/Breakers)

*Possible Biomass to be offline

Solutions Cont.

Micro Grids

- Several customers have explored microgrid solutions to address capacity issues.
- A notable example of a successful microgrid deployment is Imperial Western Products (IWP).
  - *IWP is located in the city of Coachella*
  - *The project offset 1.2 MW from a distribution circuit freeing capacity*

Electrification Workshops

- IID has hosted two electrification workshops, inviting cities, counties, school districts, and the general public to learn about the challenges and initiatives IID is undertaking to prepare for the electrification of vehicles and homes.
- IID emphasizes the importance of early planning and outreach to our customer service department to initiate applications and studies for increased loads.

Grant Funding

- IID is actively pursuing grants to support grid electrification
- Most recent grant is for the boarder region via the EPA Climate Pollution Reduction Grant.
- This funding can potentially aid in developing fueling infrastructure, including substations.

*Possible Biomass to be offline


IMPERIAL
DISTRICT
WATER
POWER
IID
A century of service.
WWW.IID.COM

POU Panel Participants

- Paul Rodriguez, Imperial Irrigation District
- **Harry Marks, Sacramento Municipal Utility District**
- Jessica Sutorus, City of Colton Electric Utility

Energization of Large EV Charging Sites

July 31, 2024

Powering forward. Together.

SMUD®

SMUD's Zero Carbon Plan: A flexible road map

Natural gas generation repurposing

Replace 2 power plants with renewable and storage resources and retool remaining 3 to minimize emissions

Proven clean technology

Expand SMUD's renewable and battery storage resources by 3.5x

>3,000 MW of new renewable energy & storage – equivalent to energy needs of more than 600,000 homes

Support customer resources

Growing rooftop solar and batteries

90% reduction of greenhouse gas emissions

~$2.5 billion investment

~$2 billion investment

New technology & business models

Pilot & scale new projects and programs

- 2x savings from energy efficiency & building electrification
- Education & demand flexibility
- Virtual power plants & vehicle-to-grid technology
- New grid-scale technologies

Financial

- Pursue grants & partnerships
- Limit rate impacts to rate of inflation

Maximize community benefits

- Keep affordable rates & reliable power
- Improve local air quality & overall community health
- Reduce regional impacts of carbon – drought, wildfires & extreme weather
- Create regional clean tech jobs
- Strengthen all communities
- Support under-resourced communities
- Involve our customers & community in this transition

Goal:

Eliminate CO_2 from SMUD's power supply

CO_2

100%

Zero carbon by 2030

Thousands of new regional clean tech jobs

SMUD®

Electric Vehicle Strategy – 6 Objectives

Grid & Charging Infrastructure

Align grid and charging infrastructure to achieve 2030 electric vehicle goals

Customer Education & Experience

Customers contact SMUD first as their trusted advisor and partner to seamlessly transition to electric mobility

New Technology/ Innovation

Embrace innovation to optimize customer investments that increase value for customers and the grid

Equitable Access

Provide equitable access to affordable clean mobility

Workforce

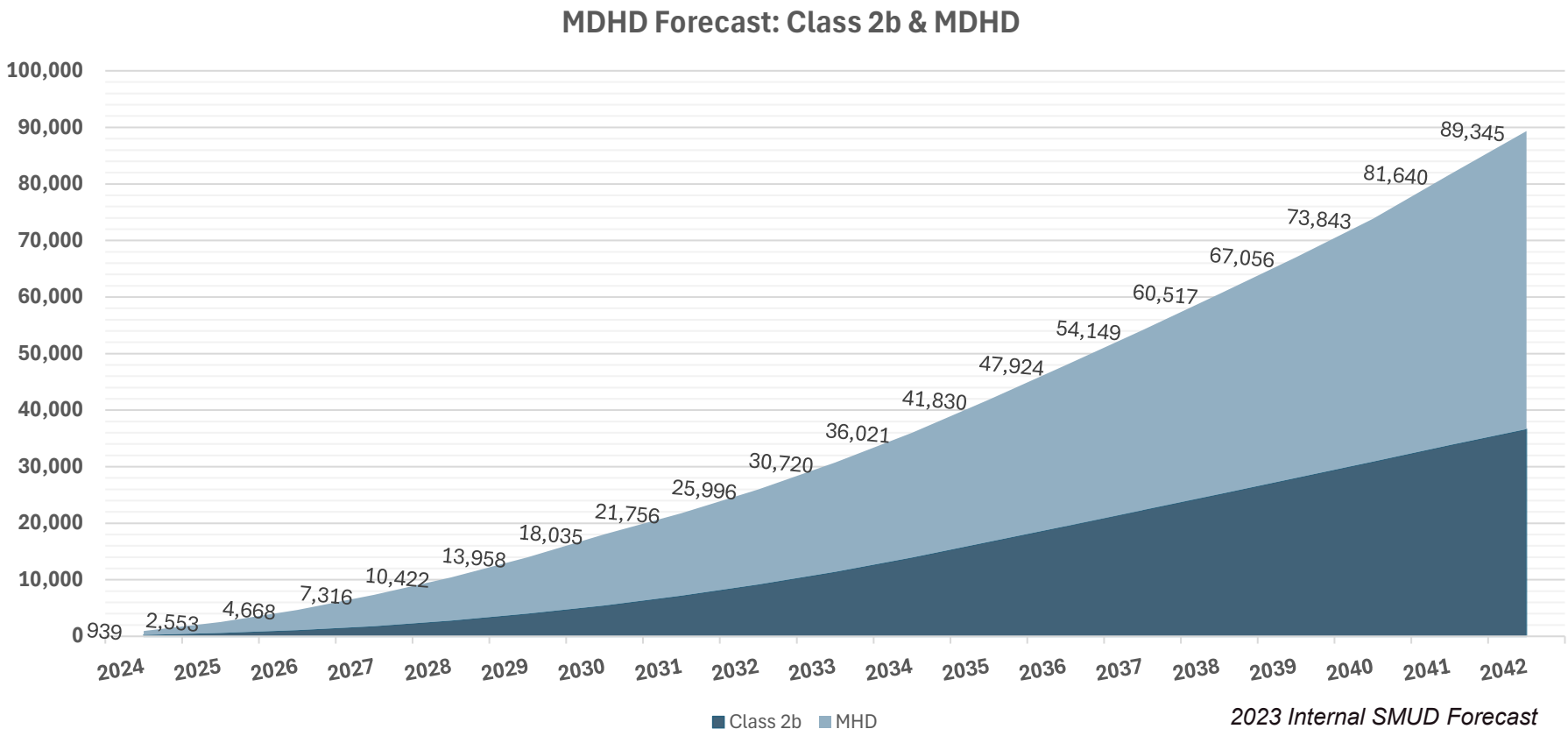
Robust workforce development supporting equity job creation

Regional Collaboration & Investment

Work with regional partners to secure new investments and grants

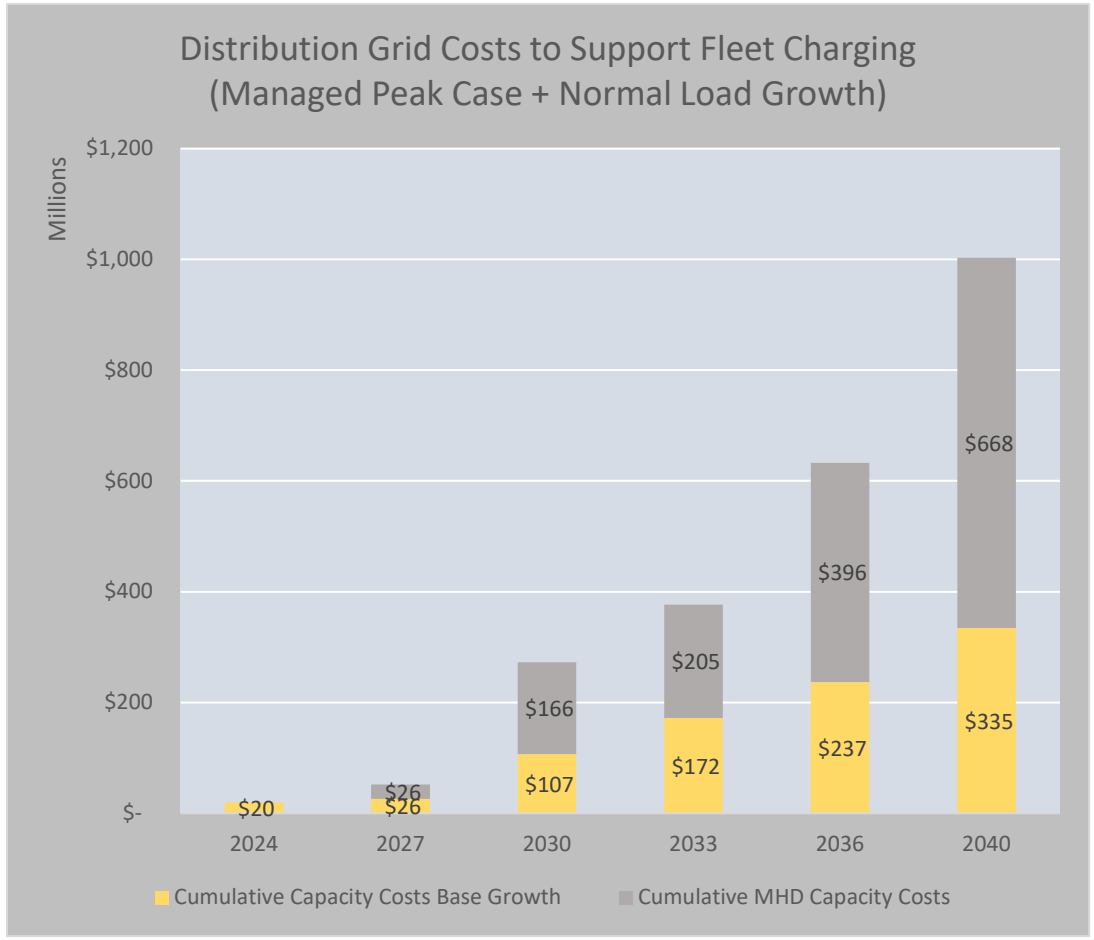
SMUD®

MDHD EV Forecast



- Forecast aligned to ACF compliance deadlines

Fleet System Impact Costs



- Load growth associated with fleet charging (under a managed charging scenario) increased SMUD capacity infrastructure costs by $670 million
- Only a few active new business requests for fleet charging but expecting an increase over the next five years

New Business Process

(New service request or upgrade of existing service)

Pre-application meeting

- Introduce potential customer programs
- Confirm SMUD facilities
- Provide SMUD requirements

Customer submits online Application

- Customer provide:
- Site plan
- One-line diagram
- Load calculations
- Panel size
- Pays deposit

Design

- SMUD provides a commitment package within 60 days of a completed application

Joint Trench

- Customer installs required joint trench and associated substructure per the commitment drawings

New Business Process

(New service request or upgrade of existing service)

Contract, payment and holds

- Sign service contract
- Payment of Rule 15/16 service connection
- Easements and conveyance documents
- SMUD inspections

Construction Service

- SMUD construction pre-job audit
- Crew schedules
- 60-day construction target

Field metering

- Customer schedules panel inspection from local agency
- SMUD sets the meter once inspection is approved and signed off

Create / update customer account

- SMUD creates new customer account or updates existing account

General Project Timelines

New service requests < 3 MW demand load

- 4 – 6 months on average, after completed application, for SMUD's work
- Overall timeline depends on customer achievement of milestones

New service requests > 3 MW demand load

- Requires engineering review to determine if load can be served by local distribution or sub-transmission
- If circuit or substation upgrades required, 2 – 4 years to complete land acquisition, design, procurement of major equipment, and construction

SMUD®

Flexible Connections

- Short-term operating agreements that limit charging during certain hours and times of year until capacity upgrades are complete
- Dynamic system controls that maximize charging based on current system conditions and loading
- Utilize BES with control systems

Large EV charging projects

Heavy Duty EV Charging station

- 29 MW of demand load
- 13.2 MW of DER
- Customer constructing dedicated substation and taking 69 kV sub-transmission service
- Project schedule – SND summer of 2025

MDHD rental fleet charging facility

- Customer requested service max demand of 3 MW
- Substation project required with in service date of summer 2026
- Customer agreed to short-term agreement to limit charging during off-peak hours

POU Panel Participants

- Paul Rodriguez, Imperial Irrigation District
- Harry Marks, Sacramento Municipal Utility District
- **Jessica Sutorus, City of Colton Electric Utility**

Your Neighborhood. Your City. Your Power.

City of Colton
ELECTRIC UTILITY

Colton Electric Utility (CEU) Introduction

Colton Demographics

Population- 56,000

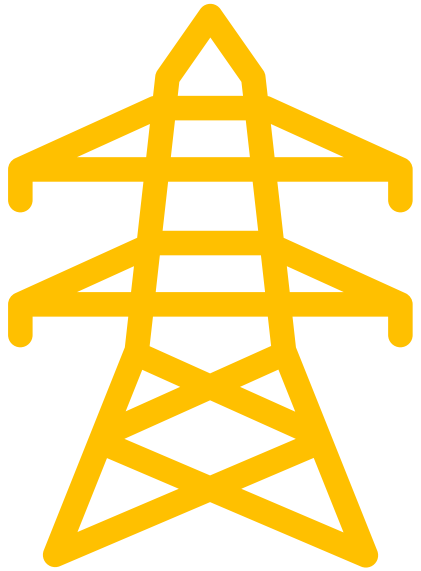
Service Area- 16 sq. miles

16,000 -Residential Customers 2700- Commercial Customers

95 MW Peak

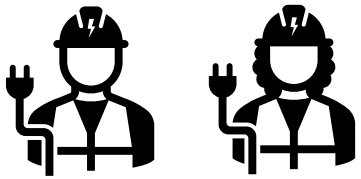
Colton is located along Interstate 10 in Southern California, about 60 miles east of Los Angeles.

TRENDS in applications for large EV charging sites such as medium and heavy-duty truck depots



CEUs experience: 2 service requests YTD

- 1-Developer has completed zoning change amendments to build before doing a capacity study with the utility.
- Distribution Studies are required because the distribution system was designed for the original land use zoning.
- Developers will market the project and contact every elected official before they even have a will-serve letter from the utility



How long does it take to provide service to large multi-MW customers and what are the slowest steps in the process?

- If the capacity is available, the process for approval/permits can be completed within 2-3 months if the design and equipment specified meet all the requirements as outlined in CEU's rules and regulations.
- If not available project must be phased over 1-2 years
- The slowest step in the process is the final installation because of the availability of equipment from the customer side.

Do applications to serve large EV charging deployments require larger capacity projects to serve them?
If additional larger capacity projects are needed, how much time does this/could this add to a project?

-14MW available capacity
4MW

Greenlane announced its new EV truck charging corridor along Interstate 15 in California. *Courtesy of Greenlane*

Have you used or considered temporary power solutions or flexible connections to energize sites while permanent infrastructure is constructed?

- CEU will phase the project development

Do you feel that you have a good estimate of how many chargers you will need in your region by 2025, 2030, and beyond to serve MDHD vehicles?

-No

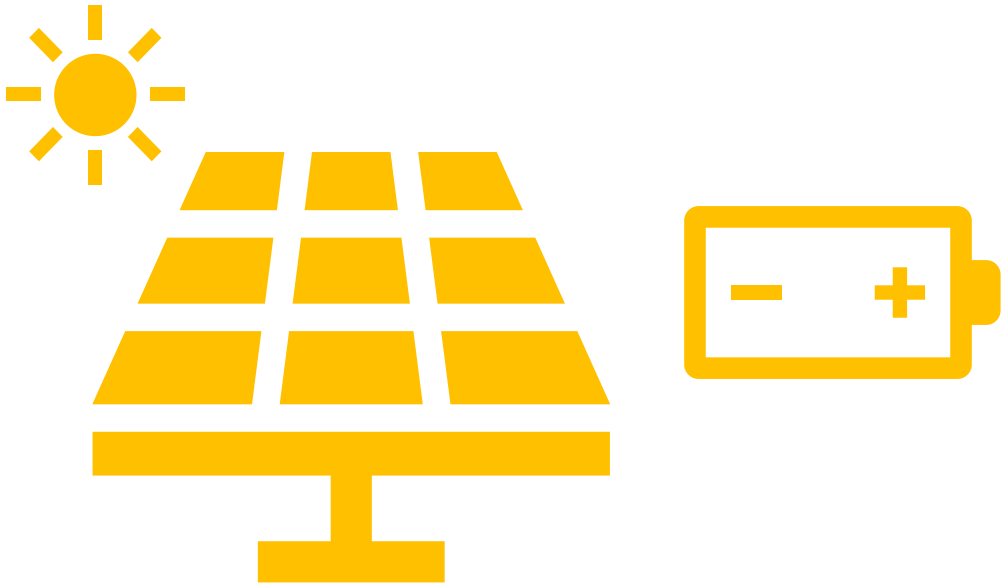
What are the technical, policy, or procedural barriers to use of temporary power, flexible service agreements, or other innovative bridging solutions?

- **How can CA state agencies help you energize projects sooner?**

  Provide technical assistance for smaller utilities who do not have experience with projects this large.

- **What should the CEC consider modifying in our funding programs to help support temporary power solutions or flexible connection options by MDHD site hosts?**

  Assist with the impacts of adding distributed generation to the project if the smaller utility is not AMI. In many cases, small utilities do not have advanced billing capabilities. The programming of a CIS system to allow this distributed generation can cause 3-6 months of project delays.



City of Colton
ELECTRIC UTILITY
Your Neighborhood Power

Contact Information:

Jessica Sutorus,
Environmental Conservation Supervisor for the City of Colton Electric Utility
(909) 370-5561
jsutorus@coltonca.gov

Technology Solutions

Panel Discussion

Technology Solutions Participants

- Vipul Gore, Gridscape Solutions
- Emil Youssefzadeh, WattEV
- Drew Felker, Critical Loop

Innovative Solutions Panel Discussion

- Provide an overview of your solution and how it can help power EV charging while permeant utility service is completed.
- What are you hearing from large EV charging customers and what projects or deployments do you have planned or ongoing?
- What are the biggest technical, policy, or procedural challenges to deploying these innovative solutions?
- What recommendations do you have for addressing the barriers?

Technology Solutions Participants

- **Vipul Gore, Gridscape Solutions**
- Emil Youssefzadeh, WattEV
- Drew Felker, Critical Loop

Microgrids & EV Fleet Charging Resilience Hubs

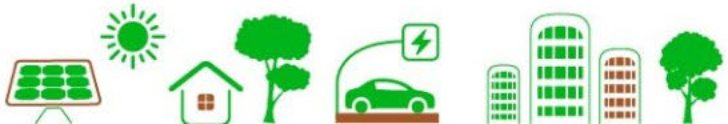
Vipul Gore
President & CEO
07/31/2024

EV Charging Hub Infrastructure

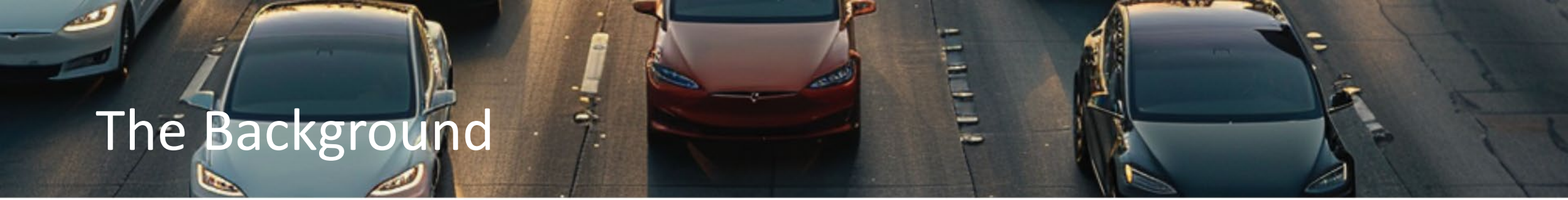
- Local Sustainable Power plant (Solar Microgrid) to deliver power to EV Chargers
- DC fast Chargers to Charge Zero Emission EV vehicles

<u>Develop a model for to transition away from fossil fuel to clean energy.</u>

<u>Objective:</u>
Start charging for 26 Evs with a local sustainable power plant.



GRIDSCAPE



The Background

Problem:

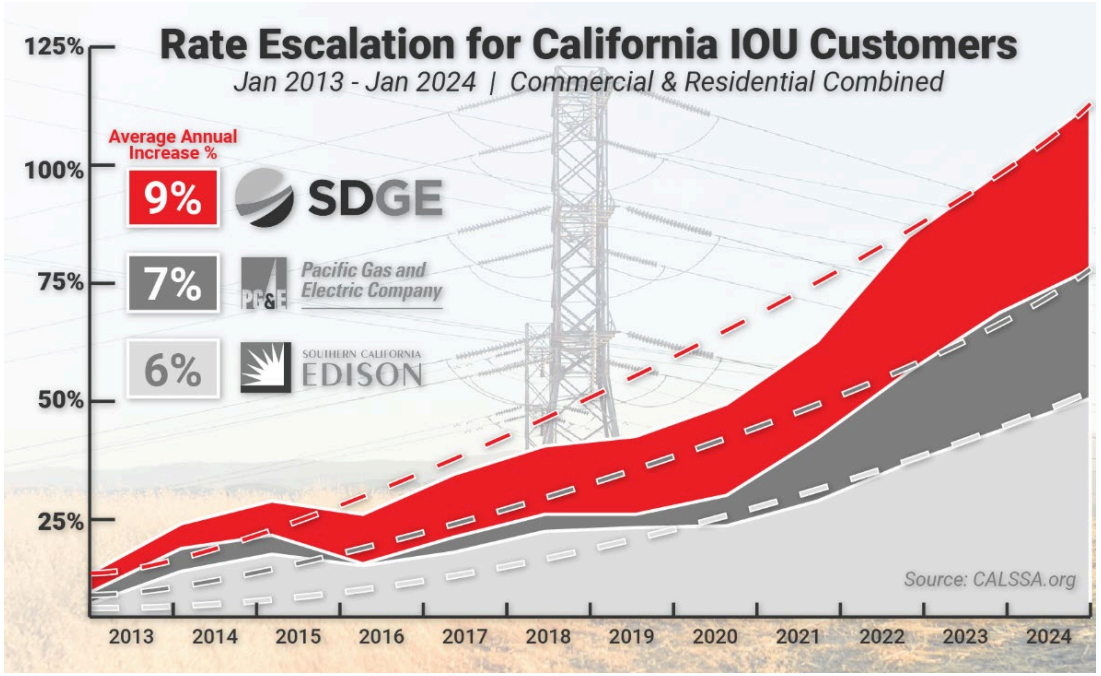
- As EV adoption booms, deploying charging infrastructure that supports electric cars remains a challenge.
- The significant load growth from an EV fleet can potentially exceed the capacity of the local infrastructure, leading to capital-intensive upgrades on customer side of meter and on the distribution network or impact charging timings.
- Without an EV charging load management strategy, electrification of cars could mean a new rate class, leading to higher demand charges and on-peak volumetric bill impacts.

Solution:

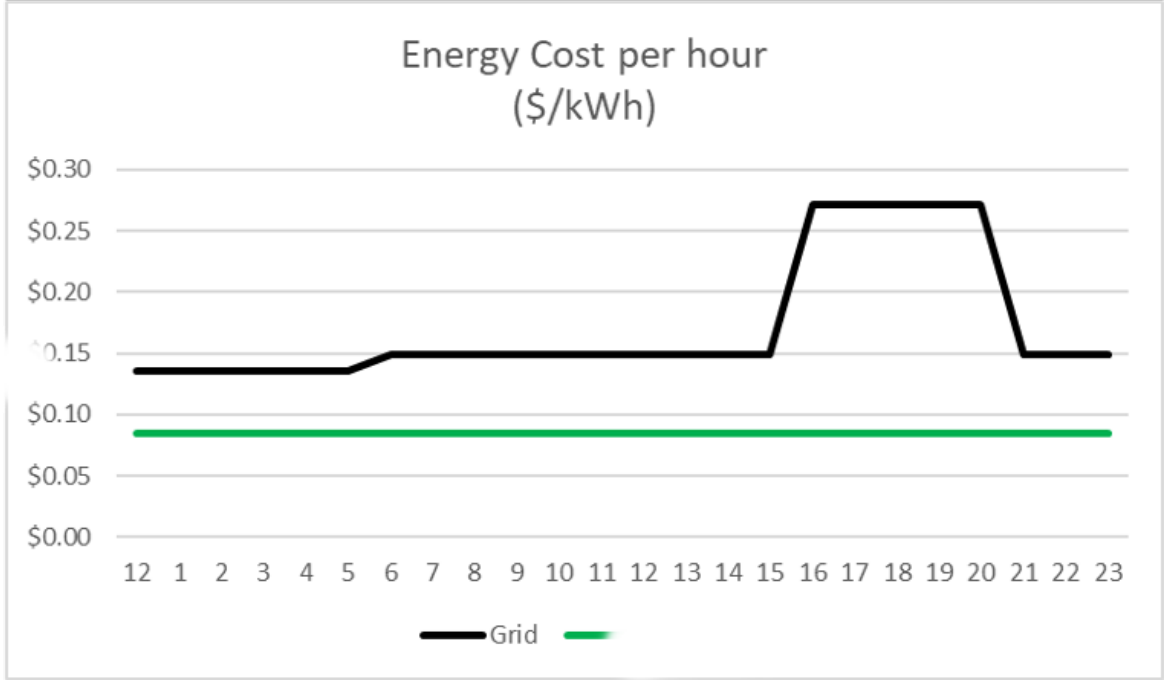
- This is where a local sustainable power plant helps overcome these barriers to adoption.
- Local Power Plants streamline the deployment of charging infrastructure while lowering energy costs, reducing carbon emissions and 24x7 availability.

GRIDSCAPE

Utility Energy Costs Increase Each Year



Utility Rates Fluctuate Throughout the Day



GRIDSCAPE

Why Solar Microgrid for Power- In a nutshell

- Cost-Effective
  - ✓ Known yearly cost of escalation
  - ✓ Lower cost than Utility (ROI less than 10 years)

- Locally sourced sustainable energy – Meet Climate action goals.
- Model for complete transition away from Fossil fuel and resiliency (important for meeting Company Climate Action goals)

GRIDSCAPE

Need for Local Sustainable Power Plant

- **Dynamic EV Charging Load Management on AC side**
- • EV cars charging creates huge demand loads.
  If this is not carefully managed locally, the utility will impose huge demand charges.
  • On Plug-out, large renewable power can suddenly be exported to the grid, & the utility transformer risks overload.
  • Scheduled • Smart • Solar & Battery EV Charging ---- when TOU rates are expensive.
  • Enables a Plan to Schedule EV charging with best economic optimization.

- **EV charger/dispenser DC load Management**
  • Different DC connectors/dispensers can impose imbalance on the DC side when multiple EVs are connected.
  • Multiplexing

- **Future-proofing EV Fleet Charging with V2G/V2B technology**
  • Most of the EVs will be enabled for bidirectional V2G/V2B technology.
  • Select a system that's V2G/V2B technology & integrated with microgrid.

GRIDSCAPE

EV Charging Hub Design Concept

- **PV Size:** 777 kW
- **BESS/ Microgrid Size (Large):** 900 kWh
- **Number of chargers:** 13

- **Number of EVs= 26**
  - **EV capacity (kWh): 100-200**
- **Number of Chargers = 13**
  - **Capacity per Charger (kW): DC 50 | AC 19.2**
- **Miles driven / truck-year = 24,221**
- **Average consumption / week (kWh) = 24,221**
- **Number of charging sessions per day: 39**

GRIDSCAPE

Local Power Plant Cost- Benefit Analysis

Auto Dealers	
Interval Data	*Evsim*
Tariff	*BEV-2-S*
Additional Comments	PGE-NEM3, 04.01.24
Meter ID	
Option Name	**autoD**
Annual Site Load (kWh)	1,259,514
Annual Load Factor	
PV & BESS	
Existing PV (kW)	**0**
Rooftop PV (kW)	*777*
Carport PV (kW)	*0*
Ground Mount PV (kW)	*0*
Total New PV (kW)	**777**
Total Solar Size (kW)	**777**
Total Solar Production (kWh)	1,261,647
Solar Offset	**100%**
BESS Size (kWh)	**900**
Resiliency Allocation (kWh)	90
Peak/Cost Shaving Allocation (kWh)	810
Cost Avoidance	
Energy Costs	*$375,546*
Demand Costs	*$0*
Annual Bill Before MG (2026)	**$375,546**
Energy Costs	*$101,355*
Demand Costs	*$0*
Annual Bill After MG (2026)	**$101,355**
Utility Cost Avoidance (2026)	***$274,191***
Cost Offset	**73.0%**
Resilience	
Maximum Resiliency Hours	96.25
Average Resiliency Hours	**23.77**
Minimum Resiliency Hours	0.50
Critical Load (%)	**10%**

Project Cost	
PV Cost	*$3,205,125*
Rooftop PV cost	*$2,913,750*
Carport PV cost	*$0*
Ground Mount PV cost	*$0*
Estimated Installation cost	*$0*
Project Management	*$291,375*
BESS Cost	*$1,339,195*
BESS System Costs (not including tax)	*$769,500*
Resiliency	*$85,500*
Total BESS Equipment Cost	*$855,000*
BESS System Tax	*$76,950*
BESS System Delivery	*$85,500*
Estimated Installation cost	*$100,000*
Commission and Testing	*$100,000*
Project Management	*$121,745*
EV Costs	*$114,000*
Additional Costs	*$100,000*
Additional Infrastructure costs	*$100,000*
Additional Trenching costs	*$0*
Additional Project Management	*$0*
Equipment and Services Total	
Total Project Cost	**$4,758,320**
Estimated Incentives	
Sales Tax Refund	$0
ITC (30%)	$1,427,496
Total Incentive	**$1,427,496**
Effective Cost	**$3,330,824**
System OAM (Annual)	**$14,000**
Solar OAM (Annual)	**$11,655**
Net Utility Cost Avoidance (2026)	**$248,536**

Option Name	autoD
Tariff	BEV-2-S
Annual Site load (kWh)	1,259,514
Total Solar Size (kW)	**777**
Total Solar Production (kWh)	1,261,647
Solar Offset	100%
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Demand Costs	*$0*
Annual Bill After MG	$101,355
Utility Cost Avoidance (2026)	**$274,191**
Cost Offset	73%
Average Resiliency Hours	**23.77**
Critical Load (%)	10%
Project Cost	
PV Costs	*$3,205,125*
BESS Costs	*$1,339,195*
EV Costs	*$114,000*
Additional Costs	*$100,000*
Project Total	**$4,758,320**
Net Savings (25 years)	$12,219,384
Effective Cost	3,330,824
Incentives	
ITC (30%)	*$1,427,496*
Total Incentive	**$1,427,496**
Annual OAM	$25,655
System OAM	*$14,000*
Solar OAM (doesn't include cleaning)	*$11,655*
25 Years Cash Purchase Term	
Year 1 cash flow	$274,191
Cumulative Cash Flow (25 years)	$7,818,197

Option Name	autoD
Total Solar Size (KW)	777
BESS Size (kWh)	900
Project Cost	$4,758,320
Utility Net Savings (25 years)	$12,219,384
Year 1 Cash Flow	$274,191
Cumulative Cash Fow (25 years)	**$7,818,197**

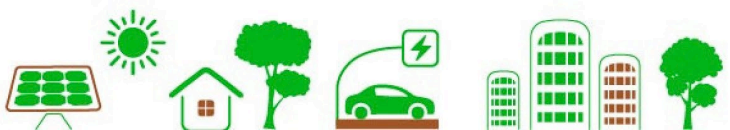
About Gridscape

- Largest small to midsize locally sustainable Power Plant (microgrid) Developer and Technology Provider for Sites and/or Fleet EV Charging.
- Product Centric Approach (vs Project Centric Methodology) for scalability.
- Software driven
  - ✓ *No Technology obsolescence*
  - ✓ *Dynamically configurable (change operational mode on-demand)*
- Full Energy Management including demand charge reduction, TOU arbitrage, resiliency, & grid services.
- Multi-site Interconnected network of local power plants.
- Experience with interconnection agreements: PG&E, SCE, SDG&E, SMUD
- 60+ microgrids contracted or Deployed in 5 years

GRIDSCAPE

Gridscape Fleet EV Microgrid Solutions

- Local renewable power generation with Solar PV Carports and/or other sources (Wind, Fuel Cells, etc.).
- Right-sized Microgrid BESS system to offset 100% energy and local resiliency needs.
- Dynamic, AI software-driven on-grid/off-grid operations to maximize energy savings, renewable self-generation and resilience.
- Smart AI-based Dynamic Load Management to reduce huge utility demand charges and utility transformer overloads for sudden load changes (plug-in/plug-out of electric buses).
- V2B/V2G integrated system to maximize ancillary grid service revenue and secondary energy backup.



Technology Overview:

Gridscape is a pioneering renewable energy management system. Gridscape Microgrid, comprises of distinct hardware and software elements.

Hardware component

- Vertically Integrated System: Designed and manufactured in-house for seamless compatibility and optimal performance.
- Scalable Deployment: Ensures flexibility and efficiency in implementing renewable energy solutions.
- Future-Proof Design: Enables easy upgrades with evolving technology without compromising quality or integration.

Software component

- EnergyScope: AI and ML-driven software powers the vertically integrated system. It provides real-time data visualization and intelligent management.
- Distributed Energy Resource Management: Empowers efficient utilization and coordination of renewable resources for maximum effectiveness.

The Synergy

Hardware: Facilitates cost-effective deployment and smooth integration.

Software: Enhances operational efficiency and enables dynamic energy management.

Together: Gridscape Microgrid offers a sustainable, adaptable solution for the future of energy management.

GRIDSCAPE

Gridscape Integrated Microgrid: Innovations

Hardware Innovations:

1. Microgrid Box Hardware:
- Vertically Integrated & Modular Design
- Scalable from 75 kWh to 9.1 MWh
- Built-in BMS for Future Battery Packs
- Over-the-Air Software Updates
- Standardized Installation & Maintenance

2. Commercial Smart Service Panel:
- Plug-and-Play Solution
- Coordination of Microgrids & BESS Systems
- Significant Cost & Time Savings
- Extended Battery Lifetime

3. Multi-Vehicle V2B Charging Platform:
- Enhances Microgrid Resilience
- Utilizes EVs for VPP Grid Services

Software Innovations:

1. EnergyScope DERMS:
- AI/ML-based Energy Management
- Real-time Visualization
- Seamless On/Off-Grid Transition
- Automatic Load Shedding

2. Gridscape VPP Grid Service:
- Integration with VPP Grid Services
- Enables Revenue Generation
- FERC 2222 Compliance

Current Projects in Contract or Deployed

Site Name	Number of Microgrids	Solar Size kW	Microgrid BESS Size kWh	Utility	Status
Ava Community Energy (City of Hayward, Fremont, Berkeley, San Leandro, Pleasanton, Oakland, Livermore, and Emeryville) *Bay Area, CA*	61	10,000	20,000	PG&E	Design Phase, Expected Operation Q2, 2026
Town of San Anselmo Solar and BESS Microgrid *San Anselmo, CA*	1	94	225	PG&E	Design Phase, Expected Operation Q2, 2025
Placer County Office of Education Solar PV and EVSE *Rocklin, CA*	1	235	-	PG&E	Design Phase, Expected Operation Q1, 2025
Kern Valley High School *Lake Isabella, CA*	1	418	975	SCE	Design Phase, Expected Operation Q2, 2025
San Jose City Community College Campus-wide Microgrid *San Jose, CA*	1	1,440	2,600	PG&E	Design Phase, Expected Operation Q1, 2025
Chabot Community College Campus-wide Microgrid *Hayward, CA*	1	1,060	3,000	PG&E	Permitting Process, Expected Operation Q4, 2024
Lancaster Community Microgrid (3 Schools + 2 Residential Communities) *Lancaster, CA*	5	2,500	3,750	SCE	Design Phase, Expected Operation Q4, 2024
City of San Diego (8) Critical Facilities *San Diego, CA*	8	980	2,250	SDGE	Permitting Process, Expected Operation Q4, 2024
City of Fontana (5) Critical Facilities *Fontana, CA*	5	1,418	1,560	SCE	Construction Completed, Expected Operation Q3, 2024
City of Hayward Fire Station 6 *Hayward, CA*	1	225	240	PG&E	Operational
Imperial Western Products (IWP) *Coachella, CA*	1	842	1,300	IID	Operational
Holiday Inn Hotels (2) *Milpitas, CA*	2	740	480	PG&E	Operational
San Pasqual Band of Mission Indians Community Microgrid *San Diego County, CA*	1	180	480	SDGE	Operational
SMUD Microgrid & EV Charging Infrastructure *Sacramento, CA*	1	60	112	SMUD	Operational
City of Fremont (3) Fire Stations *Fremont CA*	3	122	360	PG&E	Operational
Affordable Housing Units *Willowbrook, CA*	2	248	480	SCE	Operational
American Red Cross *San Leandro, CA*	1	62	60	PG&E	Operational
Total	**96**	**20,624**	**37,872**		

GRIDSCAPE

Testimonials

“The City of Fremont’s collaboration with local company Gridscape Technologies is a textbook example of a beneficial public/private partnership. Gridscape’s vision of piloting solar-battery microgrids at critical municipal facilities to showcase the company’s technology dovetailed with the City’s goals of reducing emissions, lowering utility bills, and bolstering resiliency. Gridscape secured State funding and worked closely with City staff to develop the necessary contracts, to secure permits, and to construct and put the microgrids in service without adversely impacting Fire Department operations. We are pleased to have been able to showcase the cutting-edge technology of a local firm while also securing many benefits for City operations and the community.”

- Mayor Lily Mei, City of Fremont

"We're excited to partner with Gridscape on our Resilient Critical Facilities microgrid portfolio to deliver a more resilient and sustainable energy future. With their strong commitment to clean energy and successful track record, exemplified by their work on the Fremont fire station microgrid, Gridscape is the perfect partner for this project. Together, we'll address the challenges of the rapidly changing energy landscape and bring sustainable and affordable energy solutions to our communities."

- JP Ross, VP Local Development, Electrification & Innovation, EBCE

GRIDSCAPE

''This is going to save the city money over the long haul. There's the savings from the energy perspective. There's also the resiliency component. This is a safety measure for the city as well. Too often climate action is framed as sacrifice — that we will need to give things up to have a healthy, livable planet, this project proves that it is not always the case".

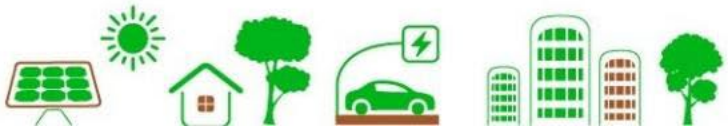
- Council President Sean Elo-Rivera (District 9)

'' The Chabot College district has been working with Gridscape for 18 months now. At every step of in the process, our expectations have been met with positive results. I fully recommend Gridscape to those looking to implement solar microgrids.''

- Owen Letcher, Vice Chancellor, Faculties, Bond Programs & Operations

''The best technology aligns with operational realities and by collaborating with Gridscape, we have managed to achieve exactly that. Gridscape is helping us solve both climate and operational challenges in the most effective way.''

- Dr. Matthew Kritscher. VP Student Services



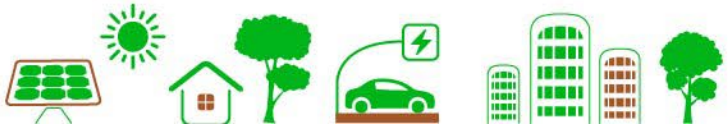
GRIDSCAPE

Case Study

Microgrids	29
Total Microgrid Size	6,200 kWh
Estimated utility cost avoided (25 yr)	$60,690,440
GHG Reductions	1814 MT/yr
Financing Partner	SunWealth
EPC	
Agreement Term	

Microgrids	8
Total Microgrid Size	2175 kWh
1st Year Savings	$420,854
GHG Reductions	2,175 MT/yr
Financing Partner	Shell
EPC	Green Realities
Agreement Term	25

Microgrids	1
Total Microgrid Size	1200 kWh
1st Year Savings	$174,305
GHG Reductions	595 MT/yr
Grant Provider	CEC
EPC	Green Realities
Agreement Term	10



GRIDSCAPE

Microgrids	3
Total Microgrid Size	360 kWh
Estimated energy cost saved (10 yr)	$300,000
GHG Reductions	99,645 lbs/yr
Grant Provider	CEC
Agreement Term	10

Microgrids	1
Total Microgrid Size	480 kWh
Annual energy cost saving	$78,286.
GHG Reductions	112 MT/yr
Grant Provider	DOE
EPC	Industria Power
Agreement Term	10

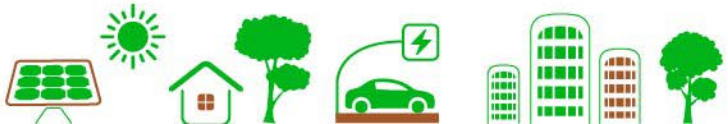
Project: SMUD

Site:
Utility Headquarter Commercial Building / Parking Lot / Public Charging

Infrastructure
- 100 KW Solar Carport System
- 112 kWhr 2nd Life Li-On Energy Storage System
- EnergyScope™ Microgrid Controller & DERMS
- One Ultra-fast 175 kW DC Fast Charger (ABB)
- Ten AC L2 EV Charging Stations
- 21 KV Microgrid Recloser

Operations
- Public Charging Open to public since Dec 2019
- Total Number of Charging transactions: **2,035**
- Total Revenue Collected: **$4,402**
- Total Energy Dispensed: **22.2 MWh**

Total Grid Power Import:
- *0.075% of 22.2MWh (incl Demand Response events)*



GRIDSCAPE

Project Images

GRIDSCAPE

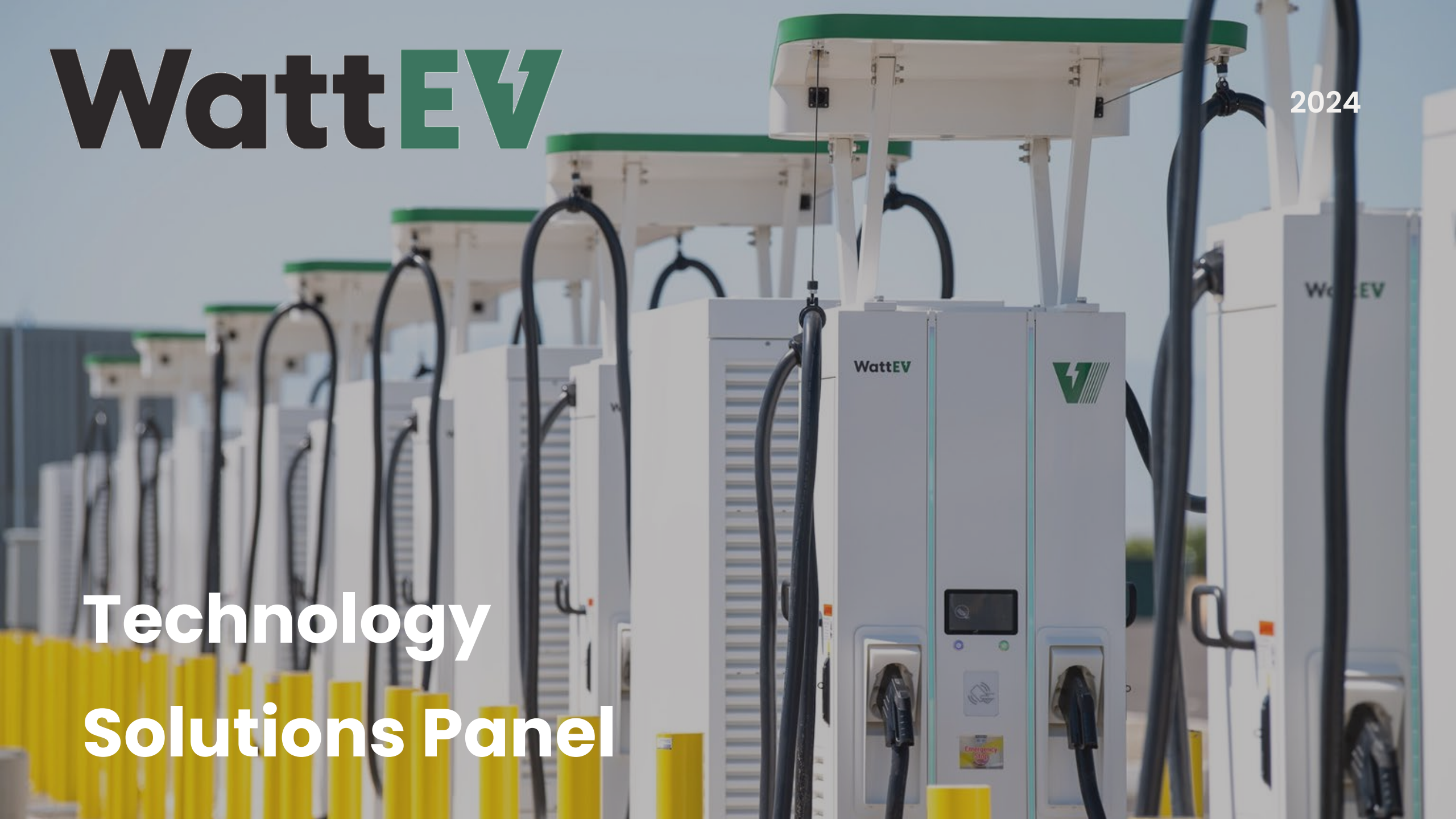
www.grid-scape.com

Technology Solutions Participants

- Vipul Gore, Gridscape Solutions
- **Emil Youssefzadeh, WattEV**
- Drew Felker, Critical Loop

WattEV

2024



Technology Solutions Panel

About WattEV

FOUNDED	2020
HEADQUARTERS	LONG BEACH, CA
FLEET SIZE	180 BY 2025
LINES OF BUSINESS	TURN-KEY DEVELOPER, OPERATOR, AND SOLUTIONS PROVIDER TO THE HD TRANSPORTATION SECTOR
GLOBAL	LARGEST HD CHARGING DEPOTS NETWORK IN THE NATION
GOALS	OVER 110 MW CAPACITY BY 2026
OPERATIONS	CA, OR, TX, AZ, WA

Mission

To accelerate the transition to all-electric transportation in the heavy duty trucking industry.

Vision

To harness the power of technology and data to make a positive shift in the health of our air, our planet, and our people.

Charging Infrastructure

Truck-as-a-Service for Fleets

Supply Chain Solutions for Shippers

MCS Charging Solutions

Innovative Solutions

Powering the Future of Electric Transportation

Charging Infrastructure

WattEV is leading the market in Heavy-Duty charging infrastructure with 5 depots in operation and 15 in the pipeline. The strategically located charging depots ensure that sustainable transportation solutions are not just a future aspiration but a present reality.

5
Charging Depots Deployed

109
Charging ports across 5 sites

22MW
Of Aggregate Power

Ongoing and Planned Projects

- Continuously expanding charging infrastructure
- Implementing MCS capable chargers
- Partnering with Fortune 500 retailers to support their electrification goals
- Increase fleet size

WattEV

California Charging Network

Port of Long Beach
Moreno Valley
Perris
Gardena
San Bernardino
Bakersfield
Vernon
Blythe
Otay Mesa

Taft HWY
Fresno
Gustine
Stockton
Port of Oakland
Sacramento
Salem, OR

Customer Feedback

Key areas of interest:

Reliability and Efficiency
Minimize downtime, maximize operational efficiency

Scalability
As EV fleets grow, customers are looking for scalable charging solutions

Sustainability
Align with corporate ESG goals and reduce carbon footprint

Cost-Effectiveness
Cost-effective solutions providing ROI

Delivering Solutions that Drive the Future of Sustainable Transportation

Challenges in Deployment

1 **Regulatory:** Obtaining official approval to develop electric truck stops

→ Causes delays in project implementations and environmental benefits

2 **Energy:** Grid limitations and utility programs

→ Causes challenges to the deployment of charging infrastructure

Addressing the Barriers

Current Progress

AB 1236 is a significant step forward

Limitation: Helpful but not sufficient to address all barriers

Recommendations

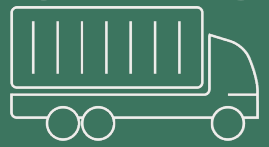
- Policy Unification
- Categorical Exemption

Future Outlook

1,739,079 lb of CO_2

emissions saved

in 13 months



50
Charging Depots by 2026

DEPOTS LOCATED AT MAJOR HIGHWAYS, PORTS, AND INDUSTRIAL ZONES

110
MW Capacity by 2026

MEGAWATT CHARGE READY DEPOTS

12,000
Trucks in fleet by 2030

CONTINUOUSLY EXPANDING THE SIZE OF TRUCK FLEET

Thank You.

info@wattev.com

(949) 916 - 2751

www.wattev.com

@WattEV, Inc.

@WattEVinc

Technology Solutions Participants

- Vipul Gore, Gridscape Solutions
- Emil Youssefzadeh, WattEV
- **Drew Felker, Critical Loop**

CRITICAL LOOP

Drew Felker
drew@criticalloop.com
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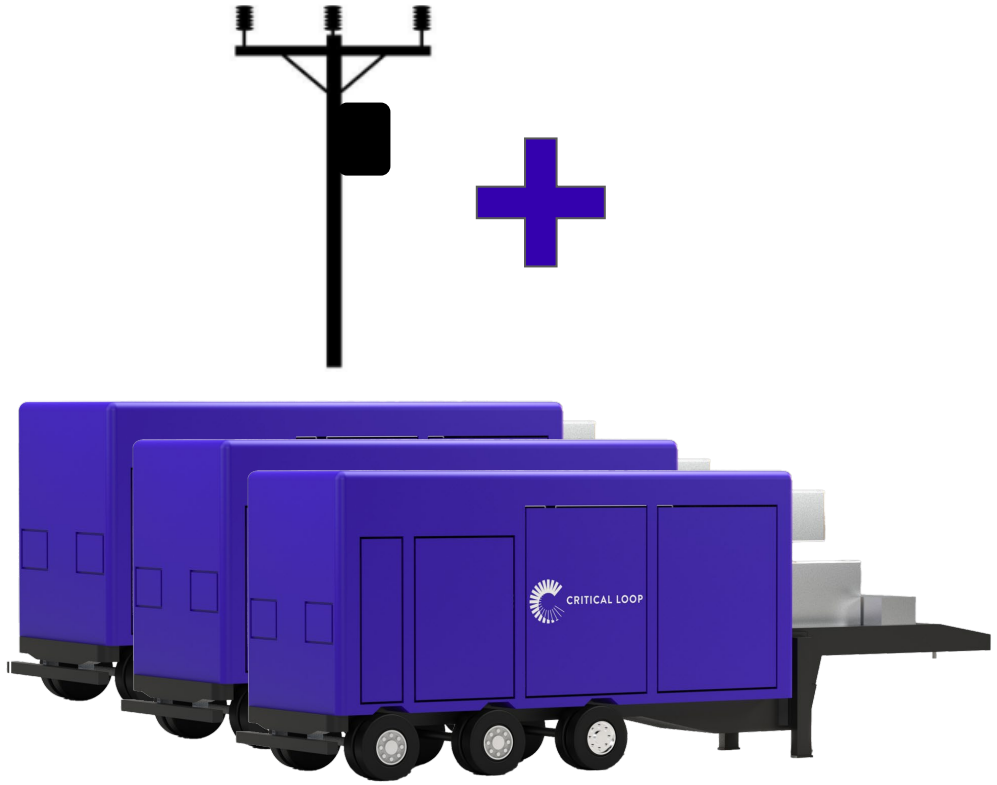
www.criticalloop.com

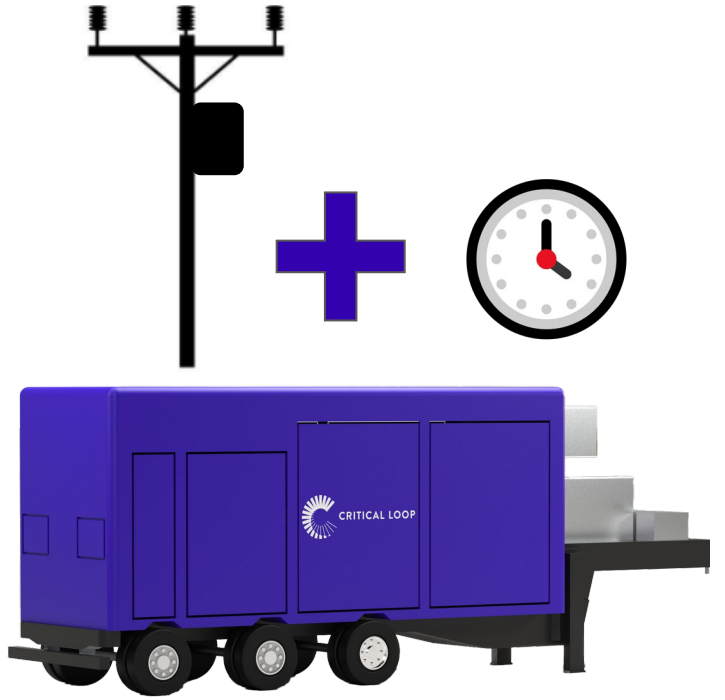
Our Scalable System: 250KWh → MWh+, 250kW → MW+

Pre Grid Connection

Waiting For Upgrade

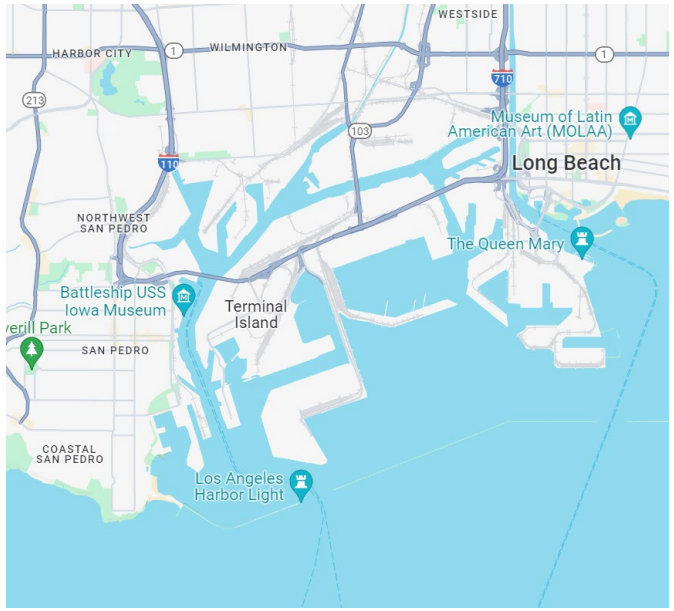


EV-ToU

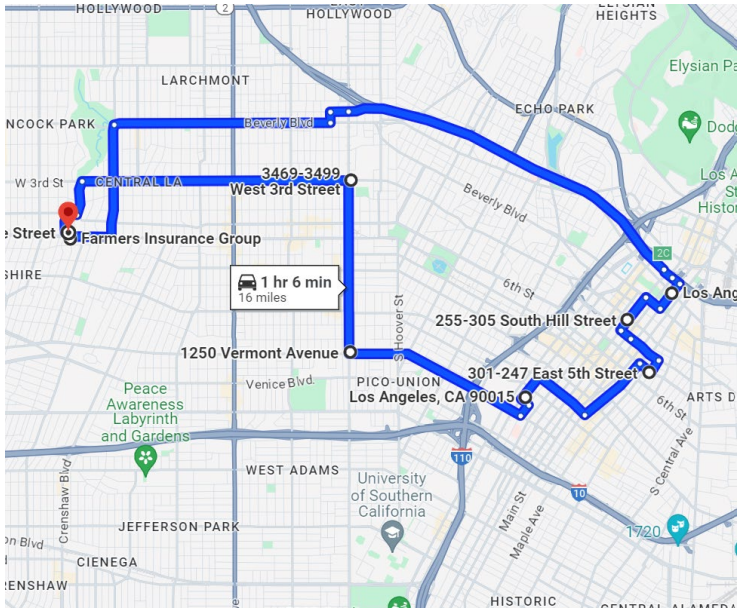


Deployment Types

Hubs



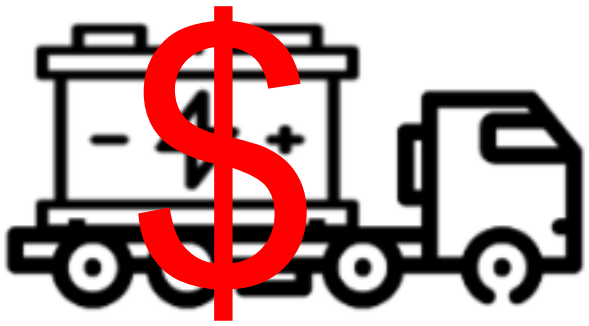
Range Extension



Temporary Lots

Barriers to Deployment

Cost of Equipment



Space Constraints at Location

Rule 21 Interconnection

Recommended Support:

- Continue grant programs to help increase scale and reduce costs
- Streamline and make templates for Regulations for Rule 21 Interconnection

CRITICAL LOOP

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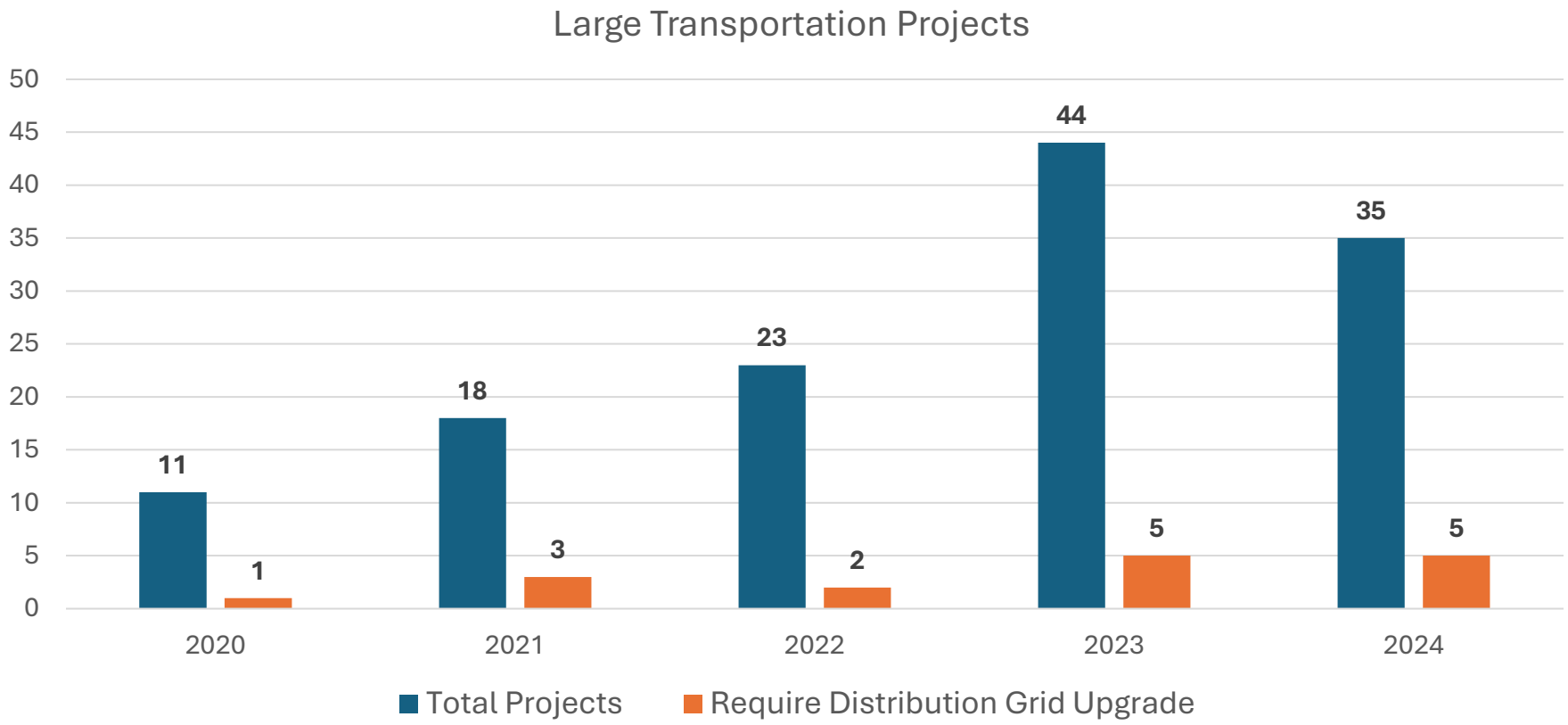
Case Study

Case Study – 9MW in 12 Months

Prologis, LADWP, and Mainspring Collaboration at Denker Avenue Microgrid


Large Transportation Projects
50
45
40
35
30
25
20
15
10
5
0
11
1
18
3
23
2
44
5
35
5
2020
2021
2022
2023
2024
Total Projects
Require Distribution Grid Upgrade

Proposed On-Site Microgrid

- Prologis proposed microgrid in Q2 2023
- LADWP initially denied proposal as it did not meet requirements
- Concerns were raised that generators would be used to sell power
- Expect to send station designs to customers by August 2024
- Overhead line extension and two substations in a box required
- Supply chain concerns with customer equipment
- Estimated energization in Q2 2026

PROLOGIS MOBILITY

next generation sustainability solutions

Prologis is a critical waypoint for the global economy

$2.7 TRILLION

is the economic value of goods flowing through our distribution centers each year, representing:

4.0%
of GDP for the 19 countries where we do business

2.8%
of the World's GDP

1.1 MILLION
employees under Prologis' roofs

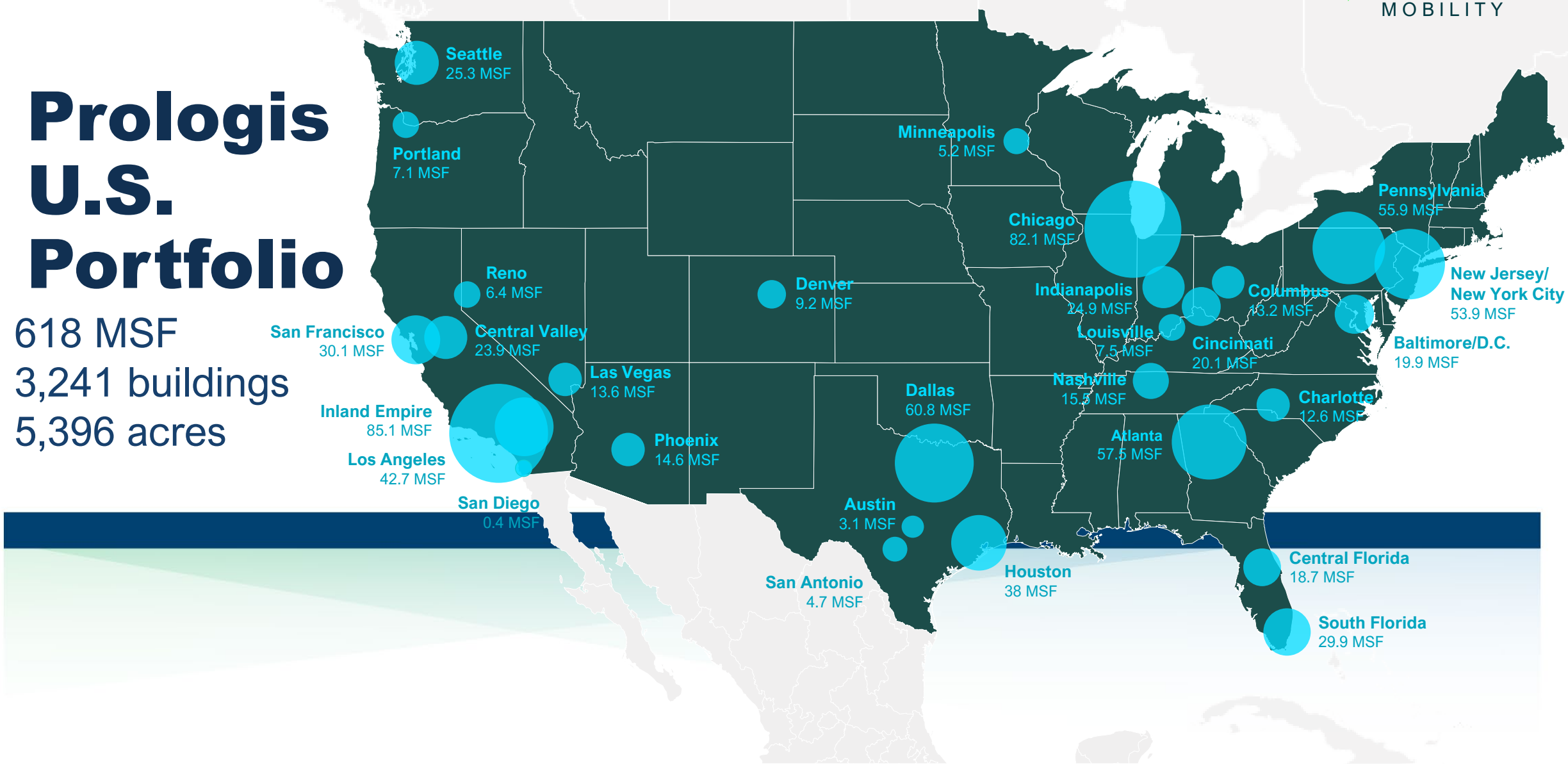
Prologis Park Redlands, Redlands, California

1. Source: Oxford Economics, IMF, Prologis Research as of December 31, 2022.

PROLOGIS® MOBILITY

Prologis U.S. Portfolio

618 MSF
3,241 buildings
5,396 acres



We build logistics centers to meet our customers' needs

We build around 40 million square feet per year globally

Speculative Builds

Build logistics facilities to meet the expected needs in a particular market

Build-to-Suit

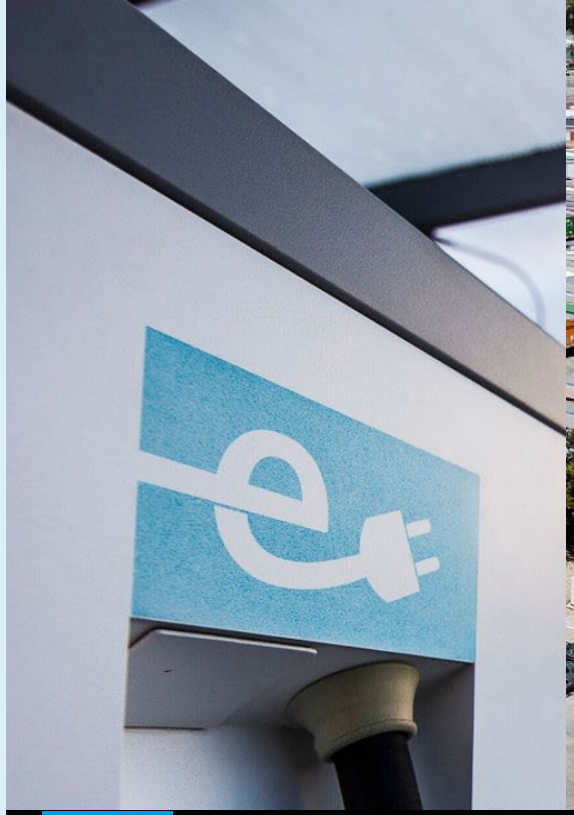
Build logistics facilities to customers' requirements

Data Centers

Build data centers in key markets to meet growing demand

Prologis Mobility

Providing charging infrastructure to our customers where it's needed most.



Workplace Charging

Passenger vehicle charging for distribution center employees to empower your team's sustainability.

Distribution Centers

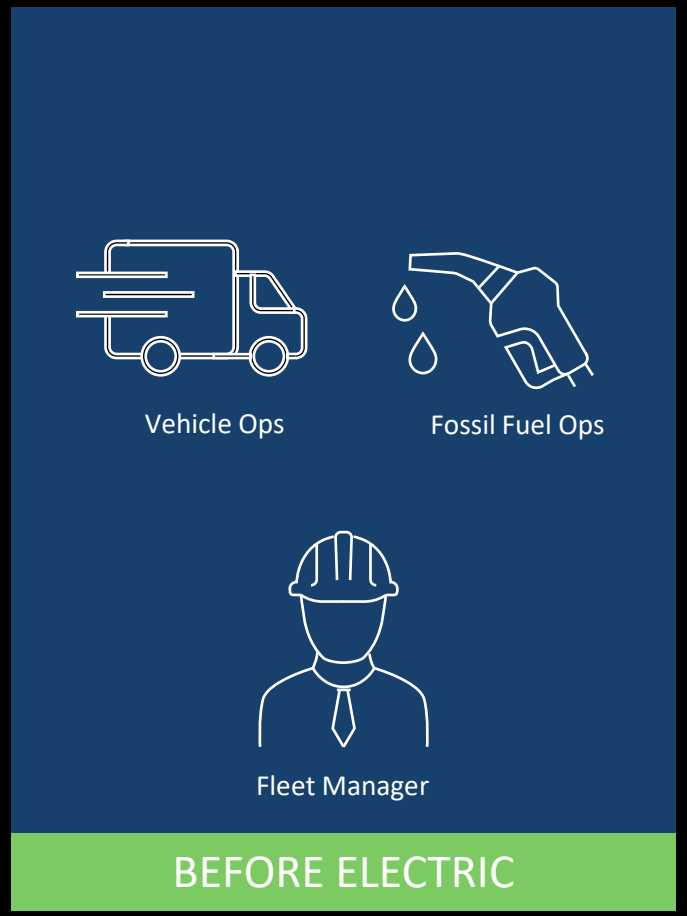
Onsite fleet charging at Prologis and non-Prologis warehouses for drayage, last mile delivery, yard tractors, forklifts and more.

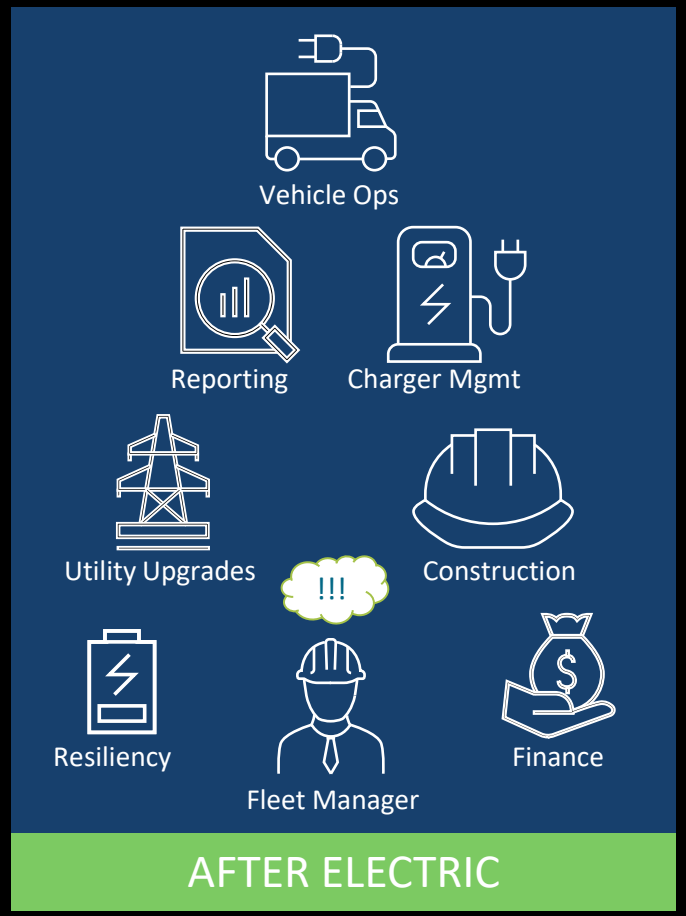
Hubs

Subscription based fleet charging at dedicated sites along common routes and near key locations.

Charging As A Service (CaaS)

Simplifying Fleet Electrification





Fixed or $/kWh Fee

9MW in 12 months

North America's Largest Truck Charging Project

96
Charge points

1.3T/d
H^2-to-EV ready

6MW 3h
energy storage

3MW
generation capacity

Location: Torrance, California

Key features

- Linear generators, BESS, DCFCs
- Working with grid upgrade timelines
- Additional reliability when grid joins
- Renewable Natural Gas & H^2 flexible


ALL THE WAY TO ZERO


MAERSK
ALL THEV
CAI

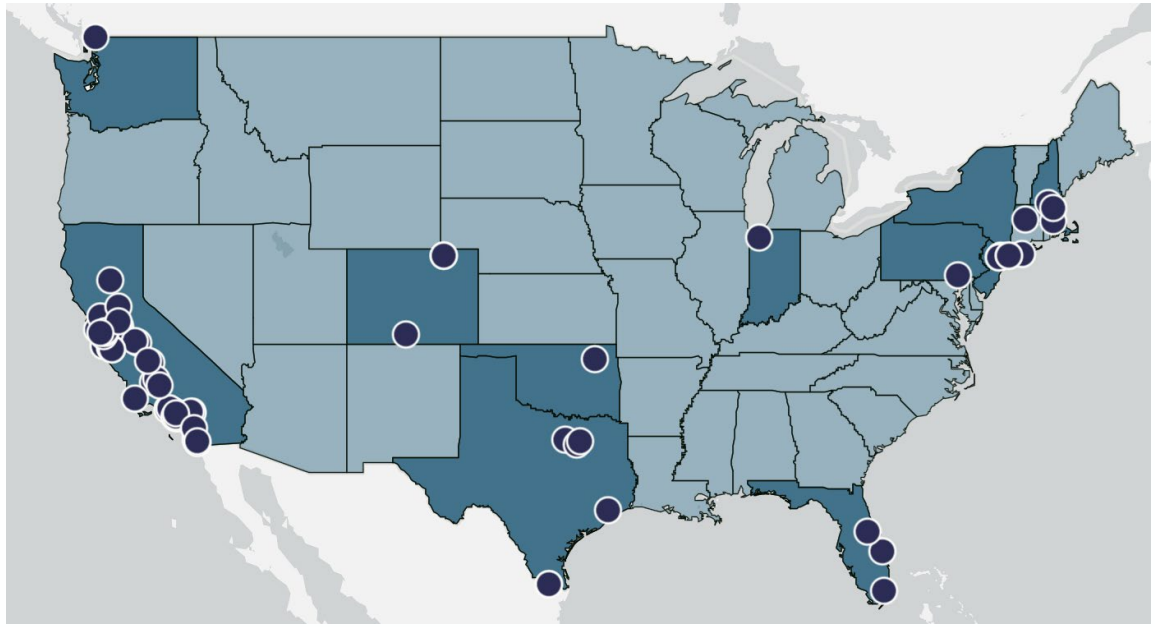
Mainspring

Fast, low-cost, clean power for EV fleet operators

May 2024

Proven commercial results for top-tier customers

Rapidly expanding nationwide footprint

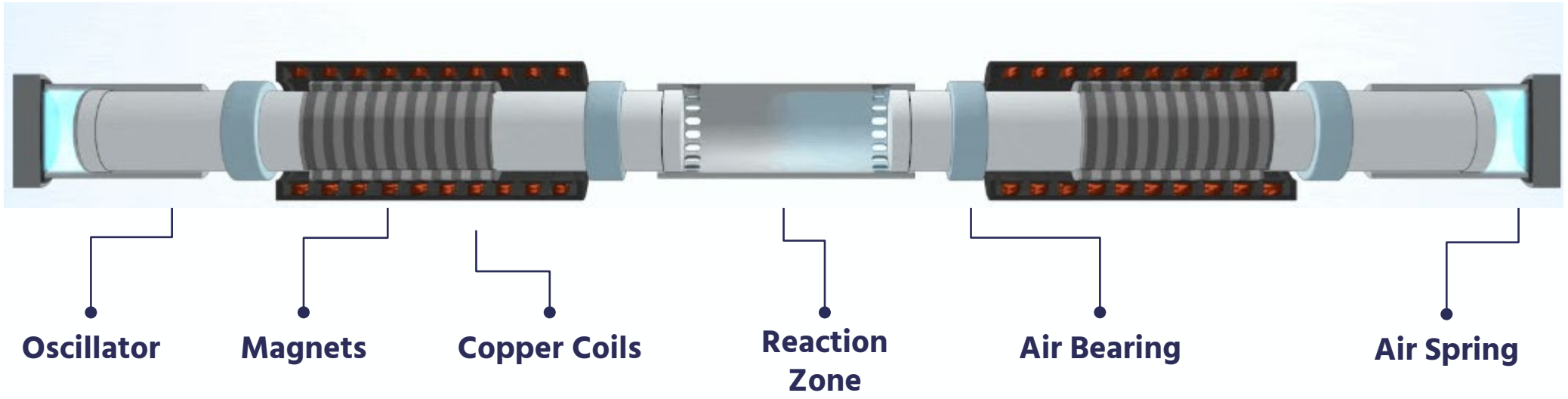


In-field power generation experience

40+ years core run time	3+ years customer operation	Consistently beats NERC availability rate

Kroger · Lineage · PROLOGIS · NapaSan · FPL · PG&E · American Electric Power · NextEra Energy Resources

Core technology enabling low cost and emission performance

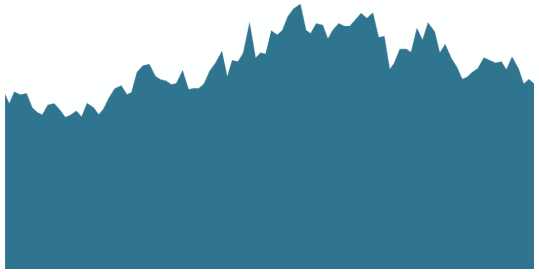


- ☑ **High Efficiency** enabled by direct conversion of linear motion into electricity
- ☑ **Ultra-Low Emissions** enabled by low-temperature, non-combustion reaction without a flame or burning
- ☑ **Low Maintenance & High Reliability** enabled by having only two moving parts riding on air

Video: mainspringenergy.com/technology/

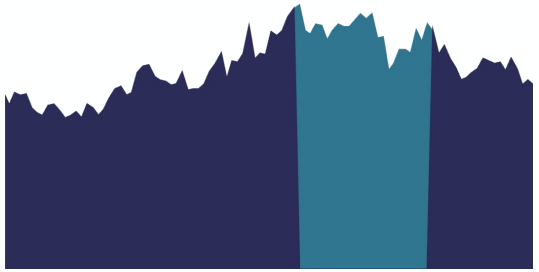
Fuel and operational flexibility unlocks evolving use-cases

Ammonia Methane Hydrogen



Fully dispatchable with black start and island capability

Peak shaving without duration limitations



100% facility backup during outages

Grid MSE

Public Comment

Zoom Comments

Two ways to provide comments:

1. **Use the raise hand function in Zoom:**
   - Zoom Phone Controls:
     - *6 - Toggle mute/unmute.
     - *9 - Raise hand.
   - Please introduce yourself by stating your name and affiliation.
   - Keep questions under 3 minutes to allow time for others.
2. **Type questions in the Q&A Box in Zoom:**
   - Please provide name and affiliation.

Comments

Docket #: 19-TRAN-02

E-Commenting System:

https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=19-TRAN-02

Email Docket Unit: DOCKET@energy.ca.gov

Reference: “Accelerating Medium- and Heavy-Duty Site Energization”

All comments due by 5:00 p.m. on August 16, 2024.

Thank You!