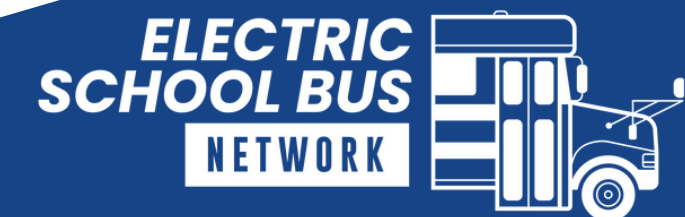


ELECTRIC SCHOOL BUS NETWORK CALIFORNIA FORUM

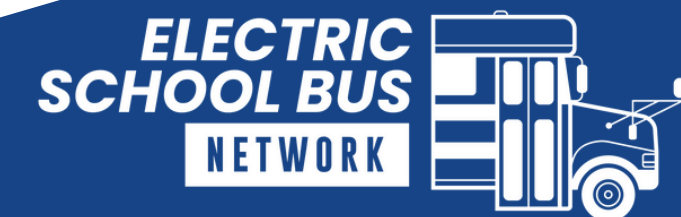
Planning for V2G



DECEMBER 6, 2023

FORUM AGENDA

- 01.** Intro to the Electric School Bus Network
- 02.** Programmatic Updates
- 03.** Planning for V2G with Nuvve, SDGE, & SDUSD
- 04.** Q&A
- 05.** Summary + Closing

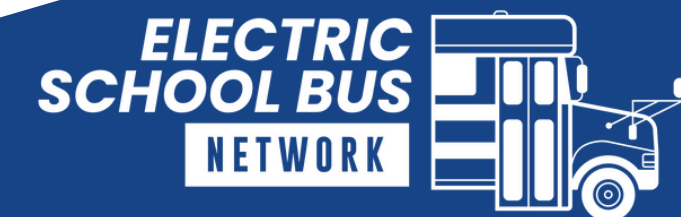




ELECTRIC SCHOOL BUS NETWORK

The Electric School Bus Network accelerates nationwide school bus fleet electrification through peer-to-peer networking and dialogue-driven forum meetings for school districts, advocacy organizations, government organizations, and industry representatives. The ESB Network provides access to educational tools, resources, and subject matter experts to help support the electric school bus fleet transition.

In Partnership With:



MEET THE ESB TEAM



Rachel Chard
National Program Manager



Michelle Hanson
Program Manager



Ian Fried
Lead Project Manager



Juan Espinoza
Project Manager



Chrystal Ales
Project Manager



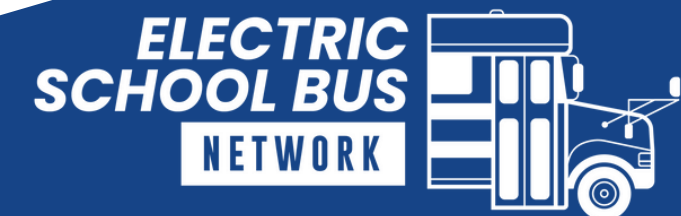
Emily Gasca
Project Manager



Liza Walsh
Associate Project Manager

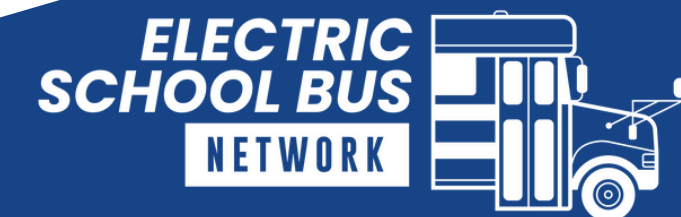


Katelyn Tomaszewski
Project Manager

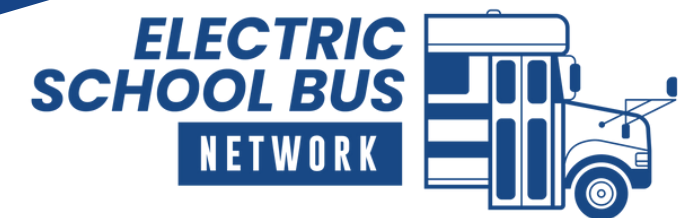


MARK YOUR CALENDARS!

- **National Forum**
 - ESB Network National Forums occur every other month on the second Wednesday at **2:00 p.m. Eastern Time.**
- **California Forum**
 - ESB Network California Forums occur every other month on the first Wednesday at **11:00 a.m. Pacific Time.**



FUNDING OPPORTUNITY UPDATES



Public School Bus Set-Aside & EnergIZE Joint Application

The HVIP Public School Bus Set-Aside & Energy Infrastructure Incentives for Zero-Emission Commercial Vehicles Project (EnergIZE) Joint Application will close on **December 15, 2023, at 5:00pm Pacific Time.**

Maximum Voucher Amounts

School Bus Type	Without a wheelchair lift	With a wheelchair lift
Type A	\$285,000	\$310,000
Type C	\$350,000	\$375,000
Type D	\$370,000	\$395,000

- Voucher amounts in the Public School Bus Set-Aside intend to cover nearly, if not all, the full cost of a new zero-emission school bus.
- Vouchers for the Public School Bus Set-Aside may cover taxes and fees related to the purchase of the eligible vehicle.

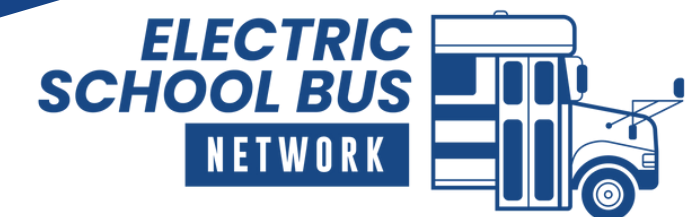


Public School Bus Set-Aside and EnergIZE Joint Application Resources

- HVIP Public School Bus Set-Aside website californiahvip.org/purchasers/#schoolbus
 - Online [Joint Application](#) (includes preliminary infrastructure questions)
 - Joint [Application Guidance](#)
 - [Letter of Intent](#) Template
 - [DGS Statewide Procurement Contract](#) for Zero-Emission School Buses
- Reach out to SchoolBusTeam@CALSTART.org for Assistance or Questions



V2G REQUIREMENTS



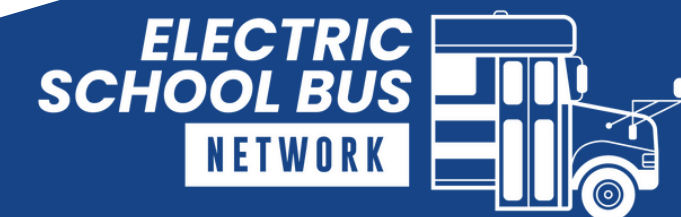
HVIP V2G Requirements

- School buses funded specifically with funds from the Public-School Bus Set-Aside **must have Vehicle-to-Grid (V2G) functionality.**
- **Utilizing V2G, however, is not required.**
 - The purpose of this requirement is to **plan ahead**, avoiding the need to upgrade the school buses in the future to obtain this functionality.
- New school buses must comply with ISO 15118-20 Road Vehicles - Vehicle to grid communication interface - Part 20: 2nd generation network layer and application layer requirements.
- More information about the HVIP eligibility process may be found at www.californiahvip.org/sellers.



ENERGIIZE V2G REQUIREMENTS

- Current EnergiIZE Commercial Vehicles Project Public School Bus Set-Aside V2G EV charging equipment requirement:
- Shall be hardware ready for ISO 15118-20.
- See EnergiIZE Public School Bus Set-Aside [Implementation Manual Addendum](#) for full list of EV charging equipment requirements.
- Eligible California public schools and entities must submit HVIP Public School Bus Set-Aside and EnergiIZE Joint Application until **5:00 p.m. PT December 15, 2023**, prior to moving on to next step – submitting infrastructure information.
- Current "Standard" EnergiIZE funding lanes do not have specific V2G EV charging equipment requirement.
- Must still meet the EV charging equipment requirements listed in the [Implementation Manual](#).
- EV Fast Track lane opens **February 7, 2024**.



Electric School Bus Network California Forum

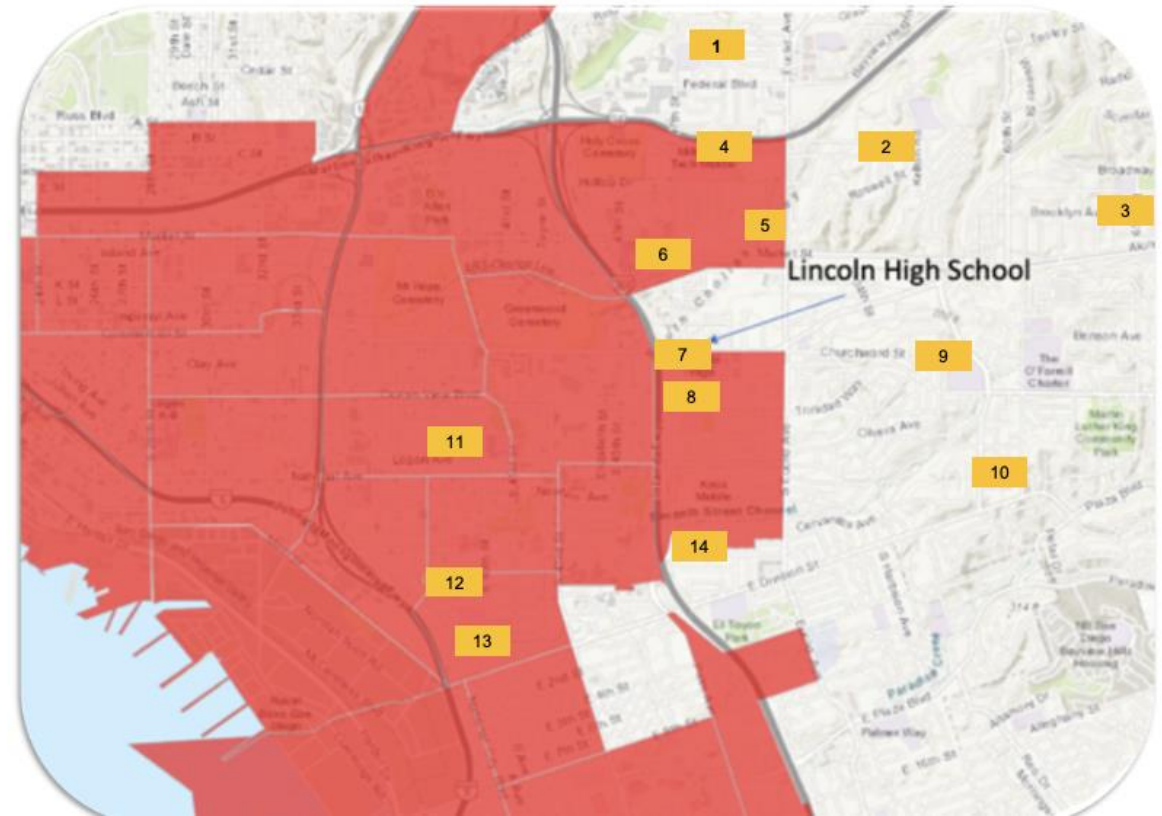
Vehicle-to-Grid, Dec. 6, 2023



San Diego Unified
SCHOOL DISTRICT



- \$9.6M CARB grant, 2020-2024
- Zero emission transportation to improve air quality in our communities
- Goal: Make the program replicable to other school districts
- Pilot program benefitting all 14 Lincoln Cluster schools
- Vehicle-to-grid capable
- Audience: students, staff, parents, and local community members



9 of the 14 schools are in the part of San Diego County with the worst air quality.

12 Key Program Elements



- 13 electric school buses:
 - 10 IC buses, Type C, 2023, with wheelchair lifts
 - 3 Blue Bird buses, Type D, 2021, 40 ft. transit style
- V2G charging - 3 DC fast chargers, 11 Level 2
- Electric food truck for food delivery program
- Electric large-scale truck for community events
- Electric landscape and custodial equipment
- Electric truck to transport landscape and custodial equipment
- Enclosed electric trailer to transport landscape and custodial equipment
- Electric van for staff to transport students to sports activities
- Electric car for staff
- Battery storage
- Robust education and outreach effort
- Electric bike pilot program for Lincoln High School students and staff

Project Partners



- San Diego Unified School District - Project Lead
- CALSTART - Emissions data analytics
- SDG&E - Charging infrastructure
- Nuuve - Chargers and V2G capabilities
- S Curve Strategies - Stakeholder management

Education and Outreach

- Center for Sustainable Energy
- Circulate San Diego
- Cleantech San Diego
- Environmental Health Coalition
- Groundwork San Diego

It's important to have partners that know transportation electrification and know the community.

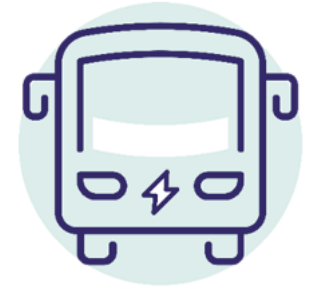
Understanding V2G



WE SET OUT WITH SOME QUESTIONS

- What industry experts could best support us?
- How could we use V2G to enhance our grid stability and resilience?
- What hardware options are available?
- Are there cost savings and ways to generate revenue?
- Can we grow these efforts? Can we use the results of this project to enlist more V2G grant funding in the future?

Lessons Learned



PARTNERSHIPS

- Partnering with SDGE, Power Your Drive for Fleets, and Nuve saved our District funds that allowed us to install the electric vehicle V2G charging infrastructure to support our electric fleet of school buses and white fleet vehicles purchased under this “Clean Mobility in Schools” grant.

MATURE THE HARDWARE

- Few bidirectional chargers and vehicles (particularly AC) are commercially available at present, with performance challenges and high costs. A greater range and maturity of technology is expected in the coming years.

COMMUNITY RESILIENCE

- V2G-capable electric school buses could play a role in disaster recovery and response by providing electricity during earthquakes, fires and other emergencies.

Lessons Learned, cont'd.



UNDERSTANDING THE POTENTIAL REVENUE

- Revenues from electric school bus battery storage, for instance, could help utilities and school districts better plan for upfront purchase and operational costs.

GRANT APPLICATIONS

- Having project management and outreach partners that can accurately define the technology and associated training required for electric school bus V2G applications will be paramount.
- Paving the way for equitable electric school bus deployment with V2G applications calls for continued research and collaboration across diverse stakeholders.

Questions



John Burciaga

Transportation Operations

San Diego Unified School District

jburciaga@sandi.net



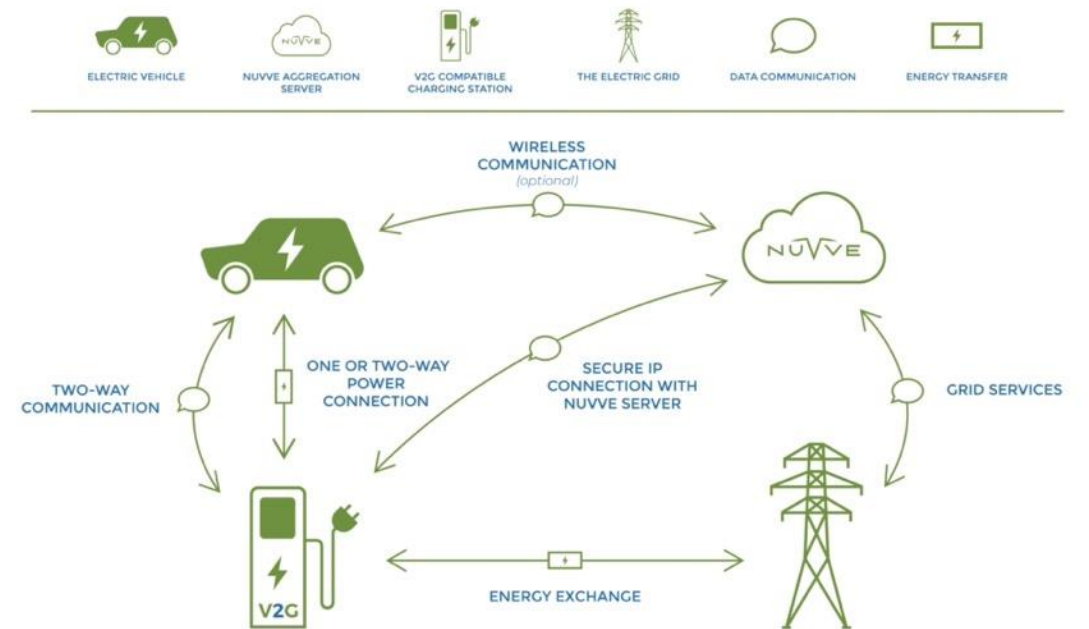


ESB Network California Forum—Preparing for V2G

December 2023

WHAT IS VEHICLE-TO-GRID?

- V2G allows EVs to serve as distributed energy resources (DERs) by enabling EVs to charge *and* discharge energy from their batteries
- Stored energy from EV batteries is then used to add capacity to the grid
- Nuve controls power flow in and out of EV chargers and creates a **V**irtual **P**ower **P**lant or **VPP** out of many small EV batteries to deliver energy services



HOW V2G WORKS FOR CUSTOMERS

1 PLUG IN YOUR CAR
to any charger



2 CHARGE BATTERY
safely and efficiently in V2G Mode



3 MAKE MONEY
by providing power capacity
and sending energy back
and forth to regulate the Grid



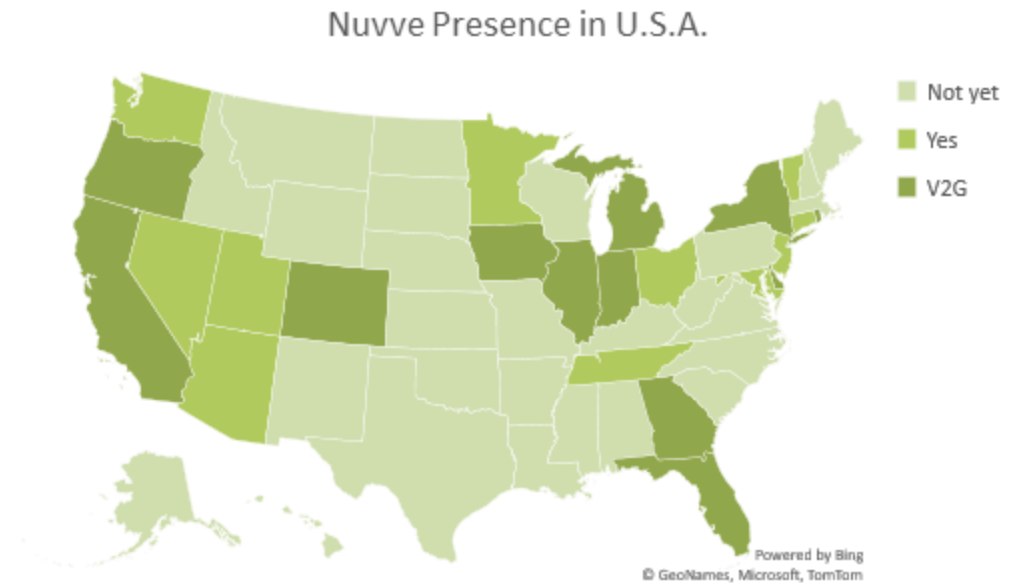
OR SAVE COSTS
by using stored energy from
EV batteries to reduce building
energy peak consumption

4 YOU'RE READY TO DRIVE
with the charge you set for the day
with advance trip planning using a
mobile fleet management app



OUR NATIONAL FOOTPRINT

- Global headquarters in San Diego, CA
- 25+ years of V2G R&D
- 242 Level 2 charging stations and 123 DC fast chargers installed across the U.S.
- Working with over 100 school districts in California
- Secured over \$24M in EPA Clean School Bus rebates for our school district partners



PREPARING FOR V2G

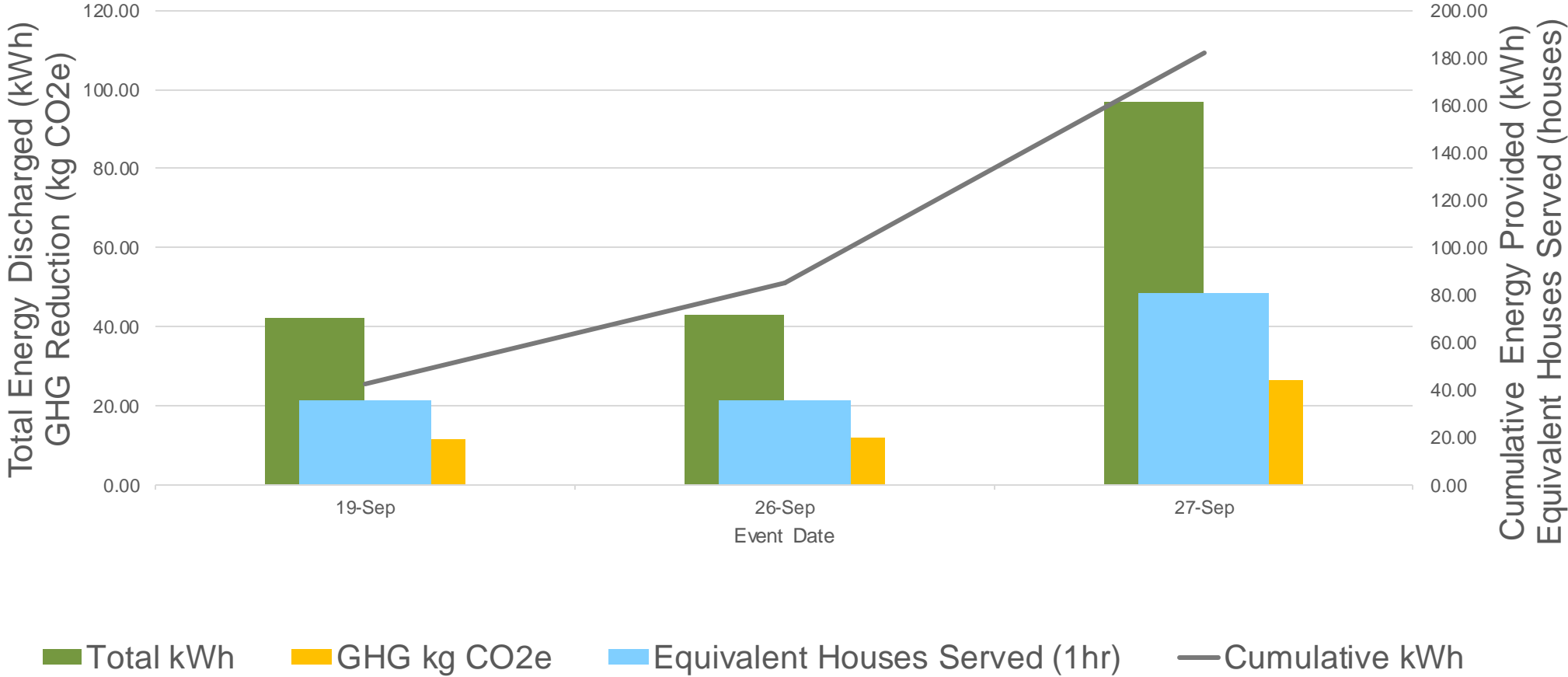
- Map out your fleet electrification plans
- Select your V2G-capable charging stations and electric school buses
- Engage your utility
- Apply for grants and rebates
- Learn about pathways for earning revenue by discharging bus batteries
- Stay connected with your utility, your dealership, and your V2G provider

EMERGENCY LOAD REDUCTION PROGRAM

- Pays customers to reduce energy consumption or discharge to the electrical grid during grid emergencies
- Compensation of \$2/kWh
- Duration is May–October
- Managed by PG&E, SCE, and SDG&E
- Two school districts actively participating in 2023

ELRP SDUSD ESTIMATES

Total kWh Discharged per Event and Cumulative kWh



THANK YOU



Rachel Zook
rzook@nuvve.com



Energy Innovation Clean Transportation

Clean Transportation Programs

June/ J 2023



**IT'S EASY TO
LOVELECTRIC**

Power Your Drive *for Fleets*

Program Overview & Requirements

SDG&E helps install make-ready charging infrastructure for medium- and heavy-duty fleets

PROGRAM REQUIREMENTS



Demonstrate commitment to procure a minimum of 2 electric fleet vehicles



Demonstrate long-term electrification growth plan and schedule of load increase



Provide data related to charger usage for a minimum of **5 years**



Own or lease the property where chargers are installed, and **operate and maintain vehicles and chargers for minimum of 10 years**



PROGRAM OVERVIEW

\$107 million
budget over 5 years

3,000+ new EVs
on- and off-road Class 2-8

300+ customer sites
commercial and private fleets

LOVELECTRIC

Power Your Drive *for Fleets*

Eligible Vehicle Types

Program eligibility includes a diverse mix of on-road and off-road, medium- and heavy-duty vehicle types

MEDIUM DUTY



Delivery & shuttle (Class 2-6)
>6,000 LBs

HEAVY DUTY



Transit (Class 7-8)



School bus (Class 6-7)



Goods movement (Class 7-8)



Other (Class 7-8)

OFF-ROAD



Truck stop electrification



Transport refrigeration units



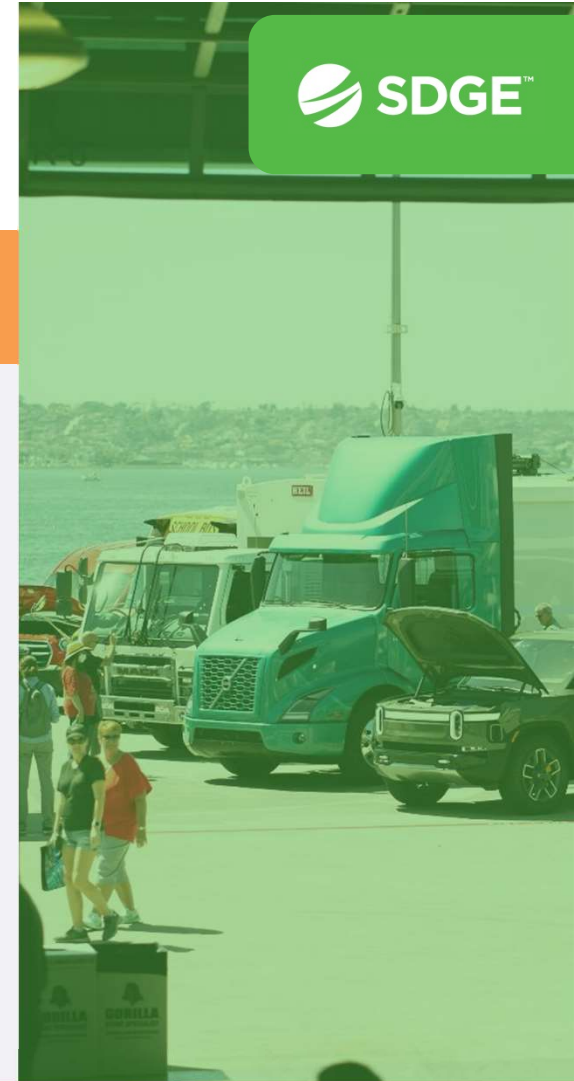
Yard trucks



Airport ground support equipment

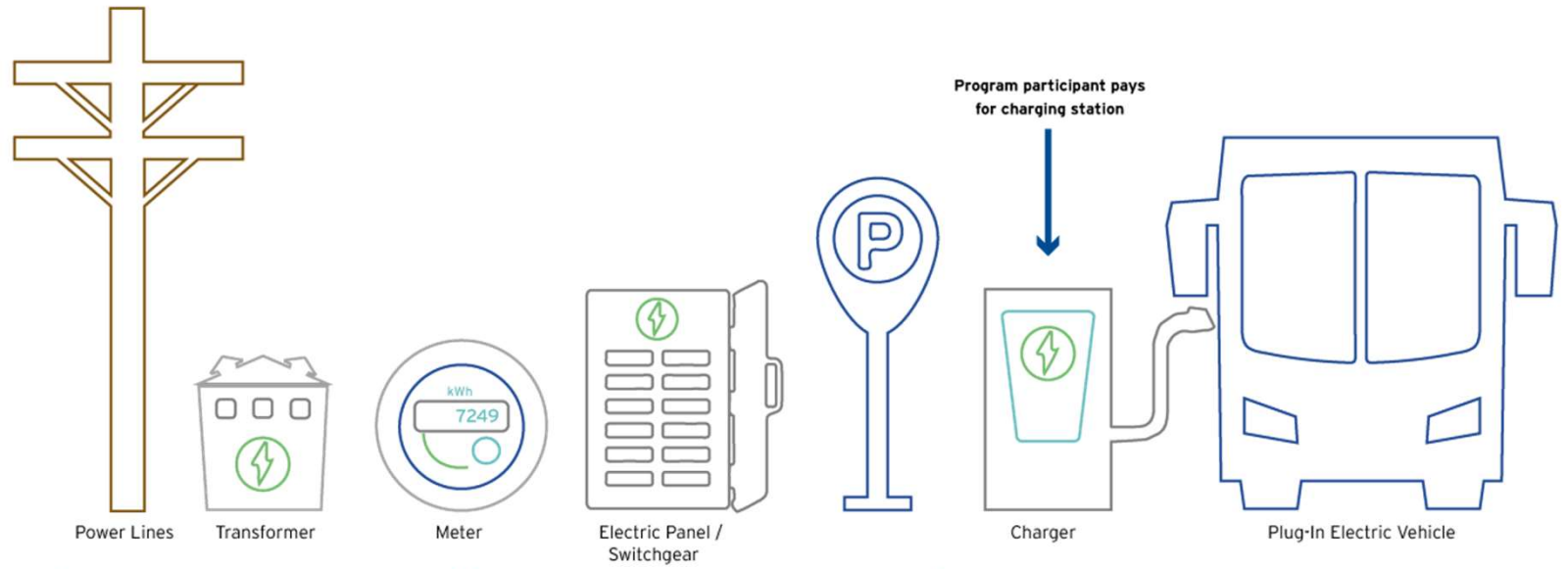


Forklifts (Class 2 or higher)
>6,000 LBs



Power Your Drive for Fleets

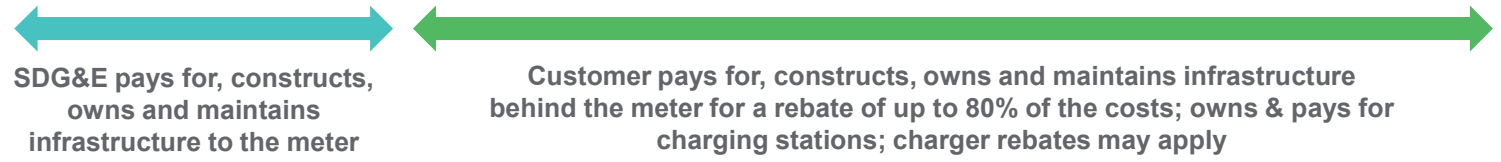
Installation & Ownership Options



Option 1: SDG&E-Owned Infrastructure

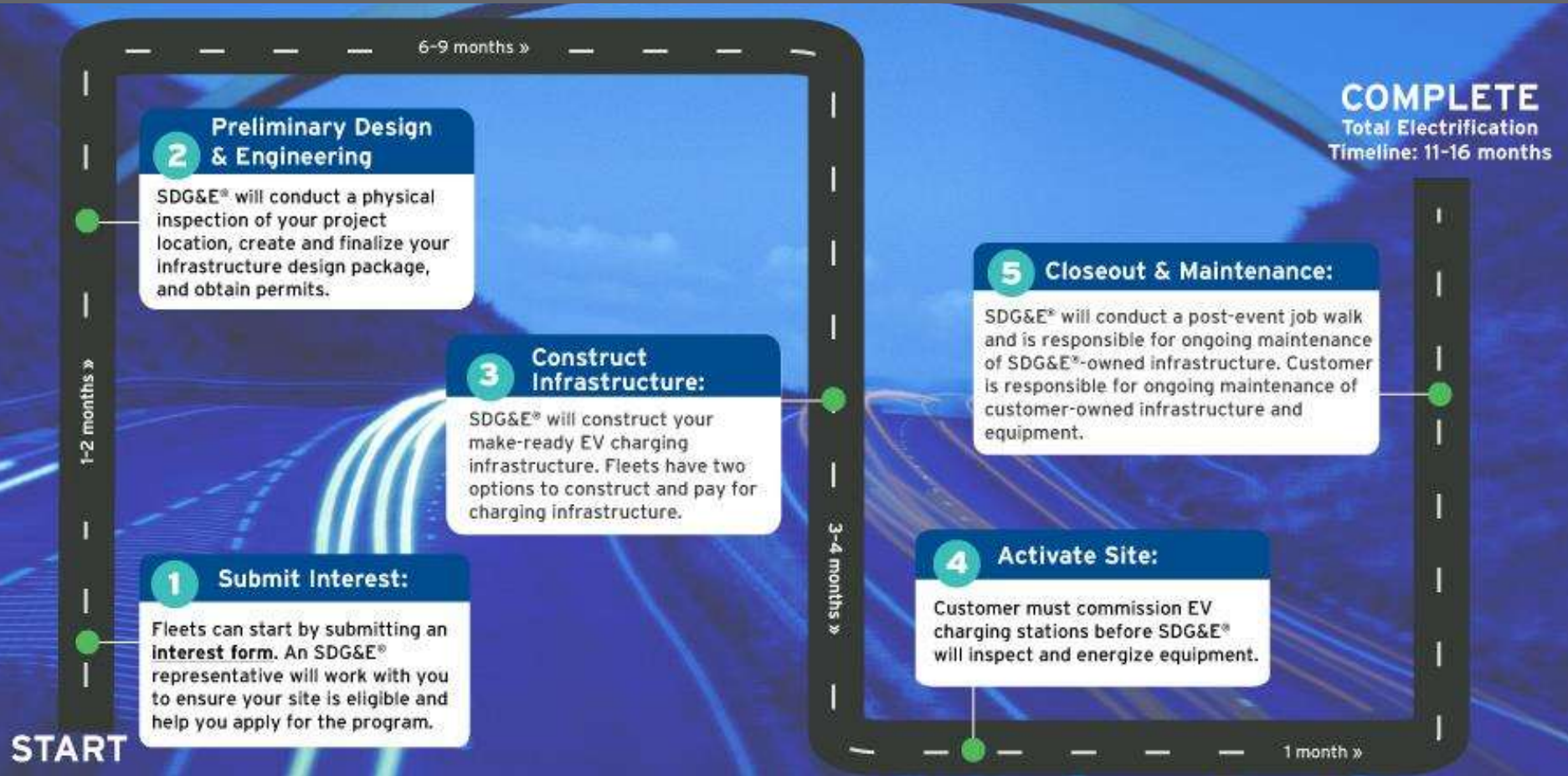


Option 2: Customer-Owned Infrastructure



Power Your Drive *for Fleets*

Installation & Ownership Options



Power Your Drive *for Fleets*

Fleet-Friendly Pricing & Charger Rebates



Who is eligible for the charger rebate?

- School buses
- Transit buses
- Sites located in areas of opportunity

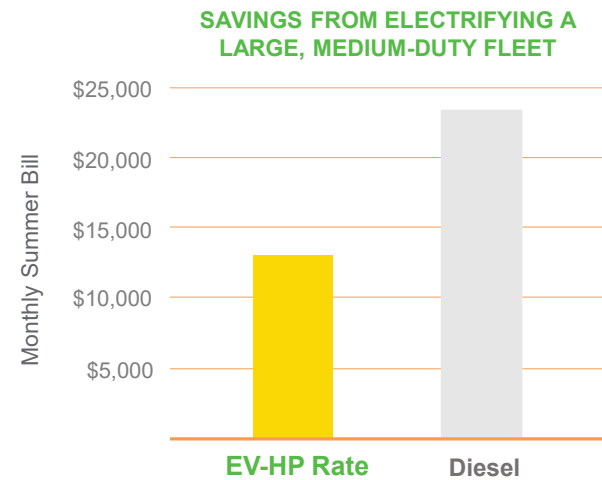
Maximum rebate amounts per charger power level

EVSE power	Max. rebate amount*
Up to 19.2kW	\$3,000 per charger
19.3kW up to 50kW	\$15,000 per charger
50.1kW up to 150kW	\$45,000 per charger
150.1kW and above	\$75,000 per charger

**Eligible sites will receive a rebate for each qualified charger for the lesser of 50% of the cost of the charger or the maximum amount based on power output as detailed above, not to exceed 50% of the cost of the charger.*

Benefits of the EV-HP Rate

- Eliminates Demand Charges
- Lower, Fixed Rates
- Simpler Billing Through a Monthly Subscription Plan



Eligible EV-HP customers have an opportunity to **save up to 50% on electricity costs** compared to the cost of fueling with diesel.

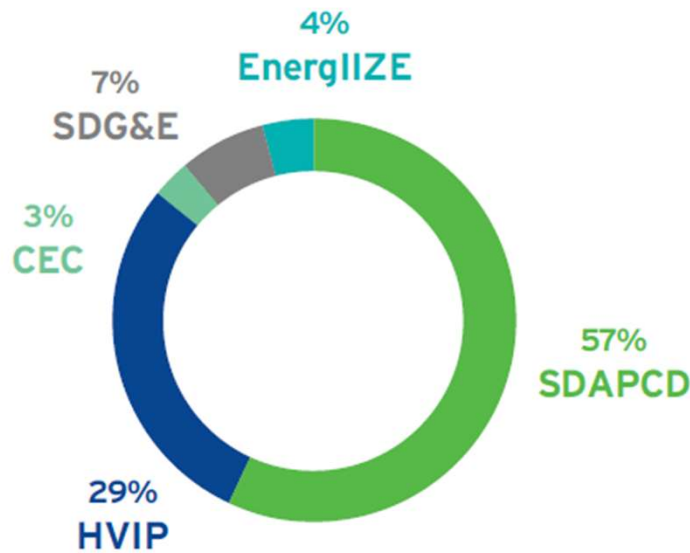
Power Your Drive for Fleets

Case Study: Grossmont Union High School District

Taking Advantage of Funding

Developing a strategy to procure public sector funding and high-priority grants allowed GUHSD to secure over \$7.2 million in grant funding for infrastructure and vehicles.

- ❖ \$4.2 million in funding came from the San Diego Air Pollution Control District (SDAPCD)
- ❖ \$2.1 million from California's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)
- ❖ \$200,000 from the California Energy Commission (CEC)
- ❖ \$319,000 from EnergIIZE
- ❖ The district also worked with SDG&E's Power Your Drive for Fleets program to receive make-ready charging infrastructure, valued at approximately \$500,000



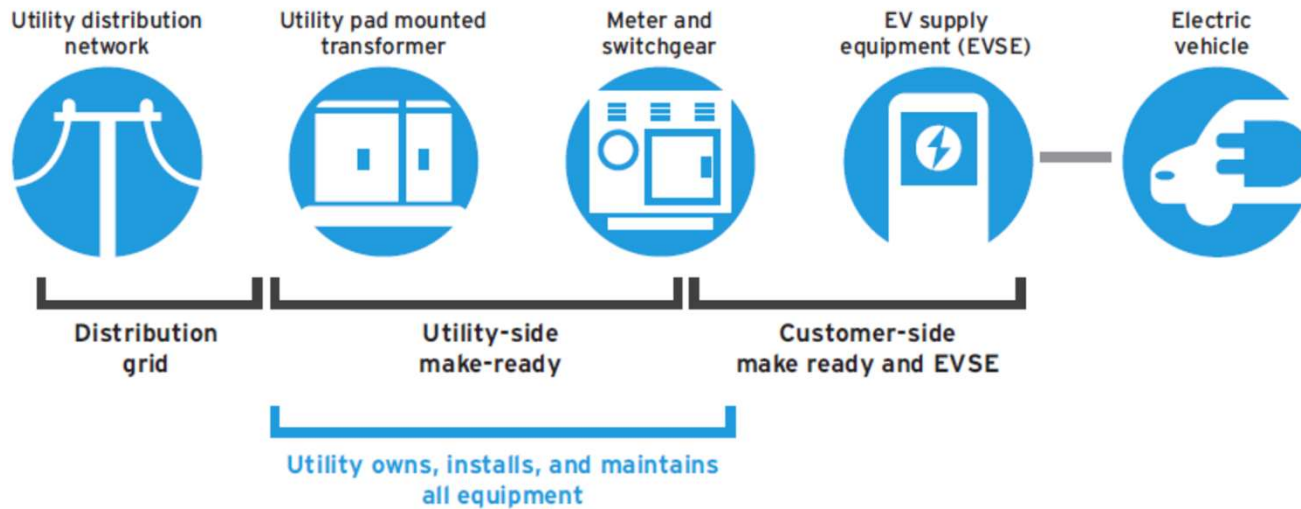
KEY GOALS

- ✓ Reduce annual fuel costs
- ✓ Create a healthier environment for students
- ✓ Transition to a zero-emissions bus fleet by 2030
- ✓ Simplify and reduce costs of vehicle maintenance
- ✓ Take advantage of public funding opportunities
- ✓ Demonstrate leadership

SDG&E's EV Rule to Reduce Costs

Optional Pathway for Separately-Metered EV Charging

EV Infrastructure Rule



SDG&E's Rule 45 allows installing, owning, and maintaining the "make-ready" equipment upstream of the customer meter:

- ✓ Transformer and electrical conductor
- ✓ Construction work like trenching and repaving a parking lot
- ✓ Service-related ducts and structures



Want to learn more about the program?

sdge.com/fleets

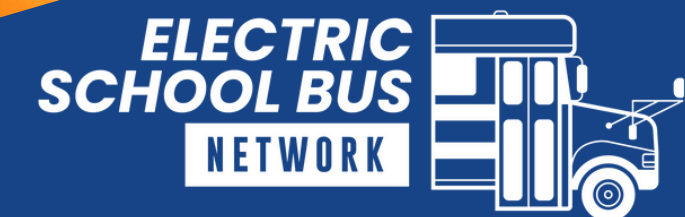
Ready to talk to a customer solutions specialist?

ctprograms@sdge.com

Thank you for your time today.

ANY QUESTIONS?

Please raise your hand or type your questions for our speakers in the chat!



SAVE THE DATE!

- Forum follow-up email will be sent **Friday, December 8**
 - Recording of the meeting
 - Copy of the slide deck
 - ESB Network Newsletter will be sent on **Tuesday, December 12**
- Mark your calendars for the next California Forum:
 - **Wednesday, February 7, 2024, from 11:00 a.m.–12:00 p.m. PT**
- Please email schoolbusteam@calstart.org with questions

