

# GO-ing Green: Hydrogen Fuel Cell Transition Project

Stakeholder Engagement Workshop

May 17, 2023



# Agenda

- Introductions
- Project Background
- About CTE
- Project Timeline
- Community Benefits

# Low or No Emission (Low-No) Grant Program

- FTA's FY22 Low- and No-Emission and Bus and Bus Facilities programs
- \$1.66 billion in available funding
- \$12,117,144 awarded to Gold Coast Transit
- New Flyer and CTE are named partners
- RFPs will be issued for the refueling station and maintenance facilities upgrade



# About CTE

## Who We Are

501(c)(3) nonprofit engineering and planning firm

## Our Mission

Improve the health of our climate and communities by bringing people together to develop and commercialize clean, efficient, and sustainable transportation technologies

## Portfolio

\$1.2 billion

- Research, demonstration, deployment
- 115 active projects totaling \$365m+

## Our Focus

Zero-Emission Transportation Technologies

## National Presence

Atlanta, Berkeley, Los Angeles, St. Paul



# Four Service Areas



## Prototype Development & Demonstration

We support technology providers' cutting edge pilots.



## Smart Deployment

We support early adopters with technical solutions.



## Fleet Transition

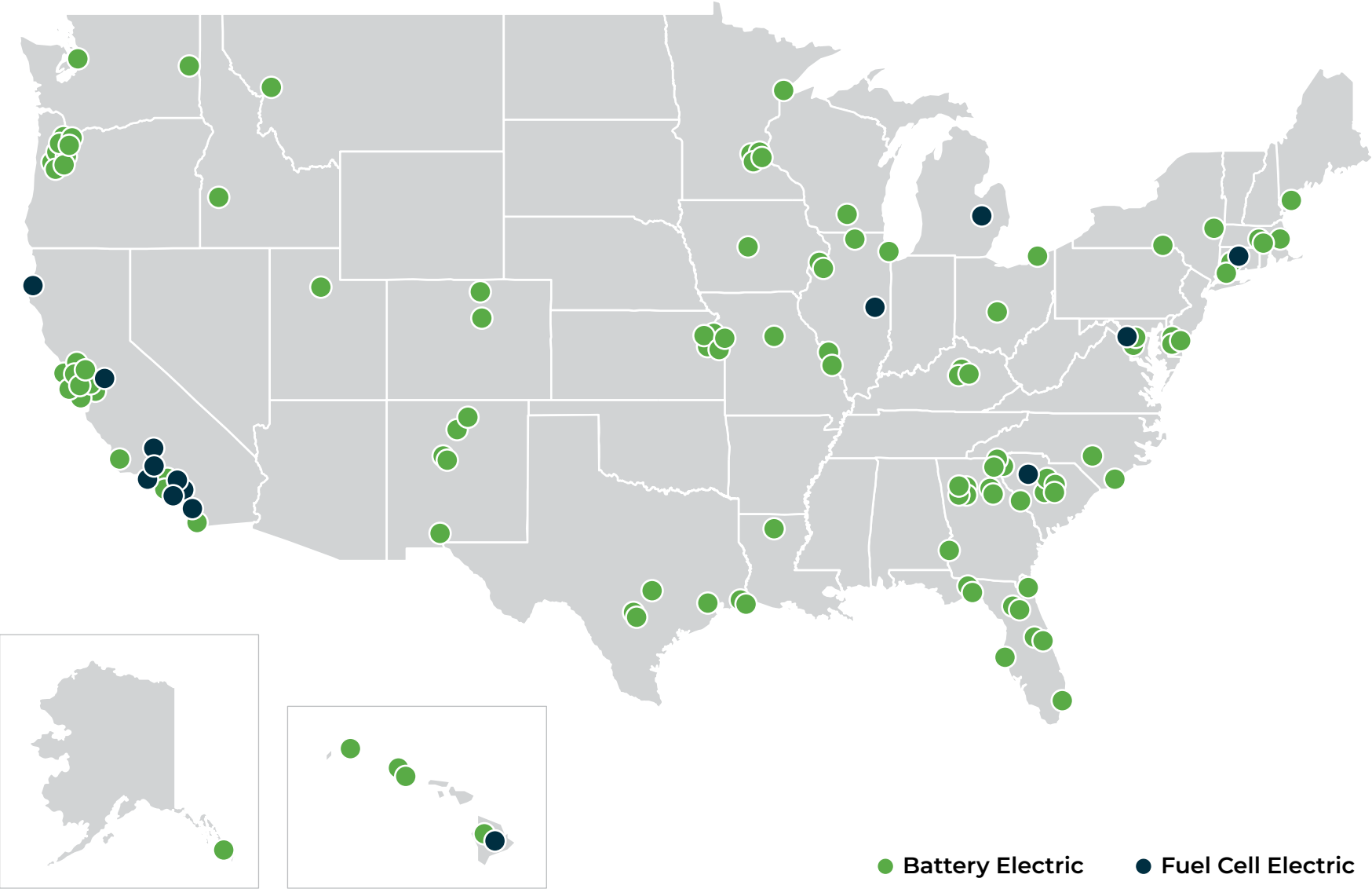
We help fleet operators develop strategic plans.



## Education & Outreach

We help organizations of all shapes and sizes stay ahead of the technology curve.

# CTE Projects



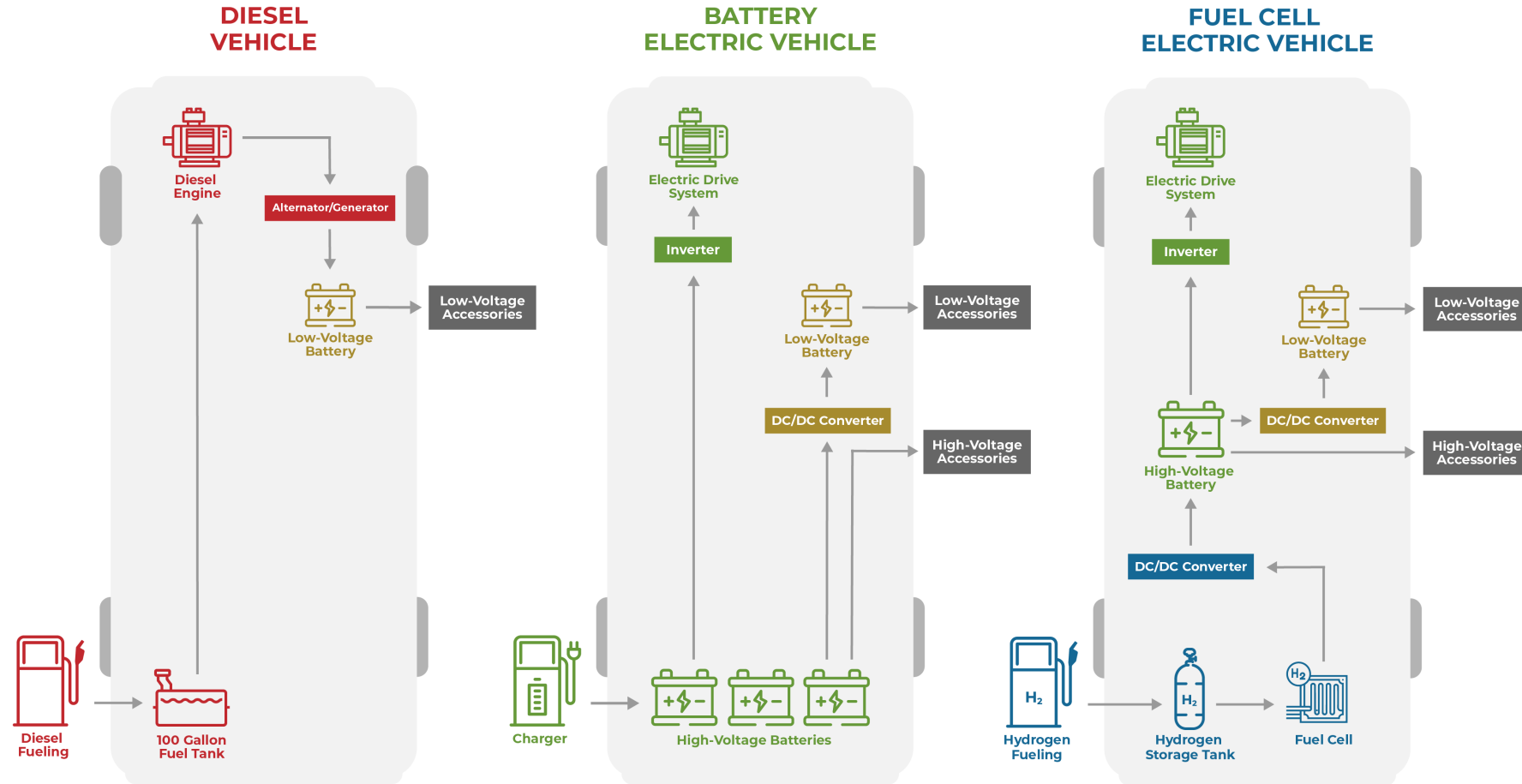
# Hydrogen Fuel Cell Projects

**CTE has supported 40+ hydrogen based projects over the past 30 years**

- AC Transit FCEB Support (13 FCEBs)
- AC Transit and OCTA FCEB (\$45 million – 20 buses)
- Shell Oil Light-Duty H2 Fueling Station
- Champaign-Urbana FCEB deployment, electrolysis hydrogen refueling station and full facility modifications for indoor parking and maintenance
- SamTrans FCEB Deployment (10 FCEBs)
- Winnipeg Hydrogen Fueling Station – Electrolyzer
- Foothill Transit
- North County Transit District
- Fuel Cell Electric Class 8 Drayage Truck (Kenworth)
- Fuel Cell UPS Class 6 Delivery Van (2 deployments)
- Transit Fuel Cell Electric Top Loader – POLA (Hyster-Yale)
- NorCal Zero Class 8 Trucks and Infrastructure (Hyundai)



# Fuel Cell Drive System



## Legend

■ Diesel Fuel Components

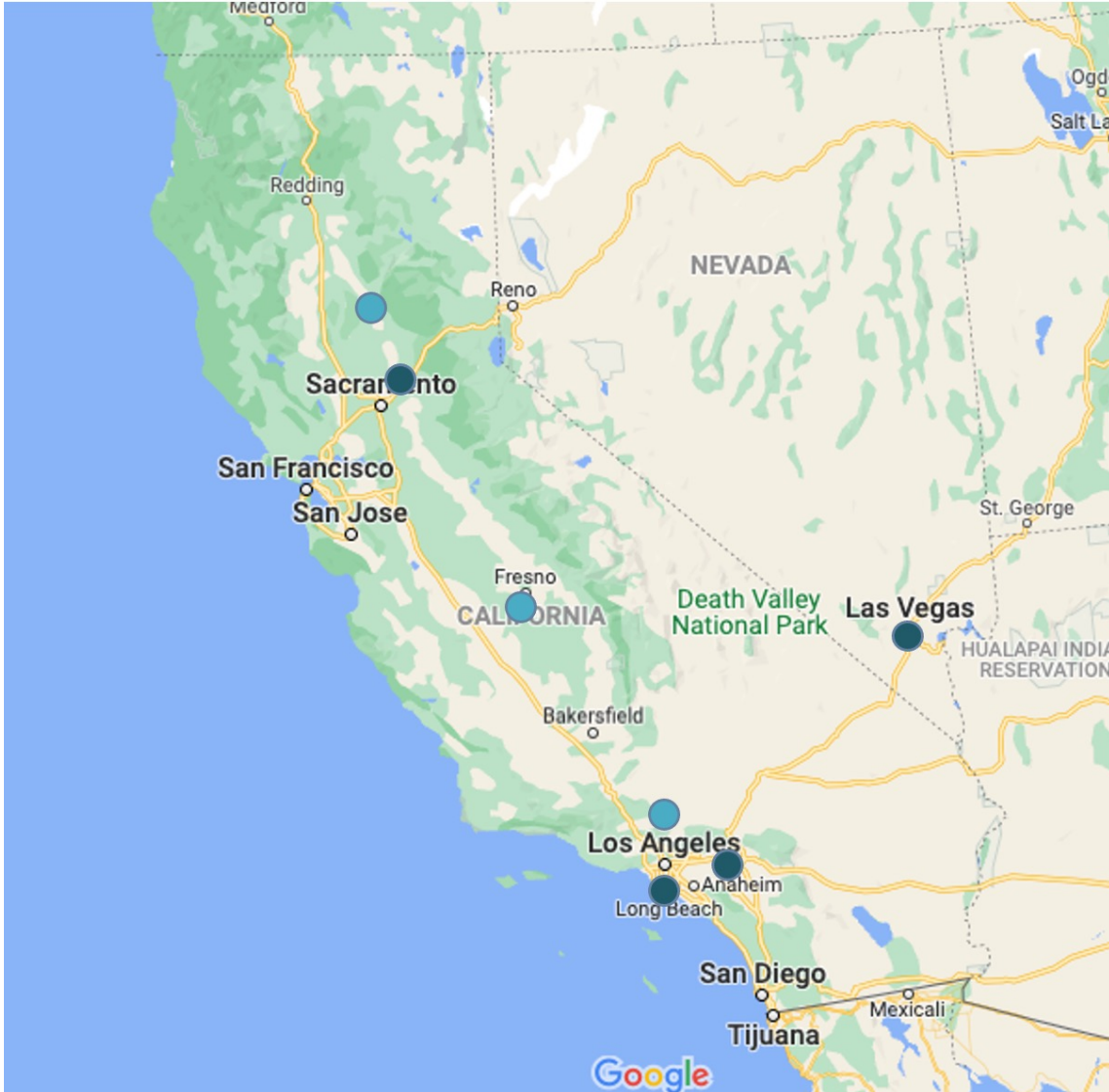
■ Battery Electric Components

■ Hydrogen Fuel Cell Components

■ Shared Vehicle Components



# Hydrogen Production Centers

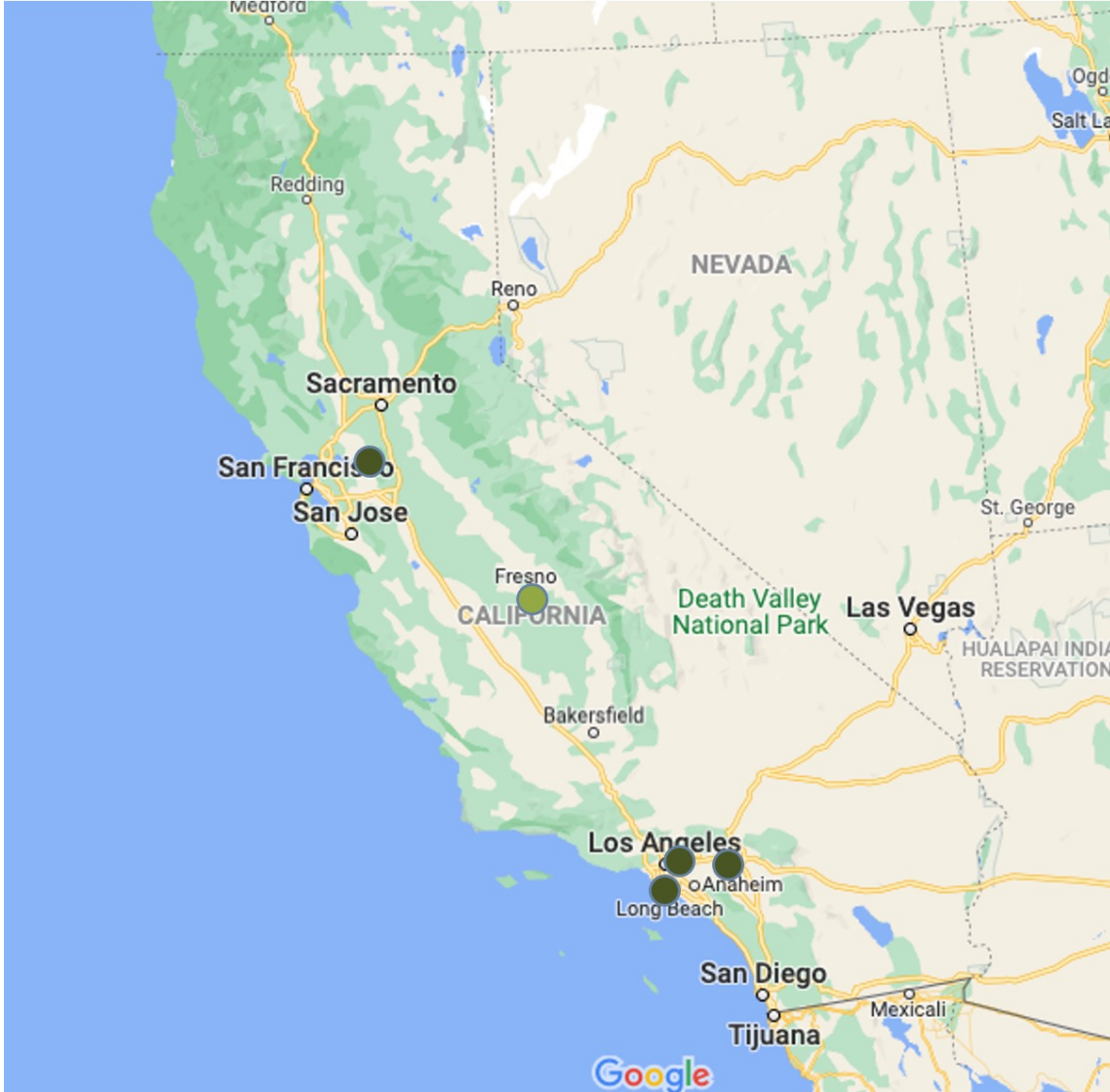


## Hydrogen Producers

1. Air Liquide (Las Vegas)
2. Air Products (Sacramento & Los Angeles)
3. Linde (Ontario, CA)
4. *Plug Power (Fresno) – Proposed*
5. *SG2 H2 Energy (Butte & Lancaster) – Proposed*

- **Proposed Hydrogen Production Centers**
- **In-Service Hydrogen Production Centers**

# Hydrogen Storage & Distribution Centers

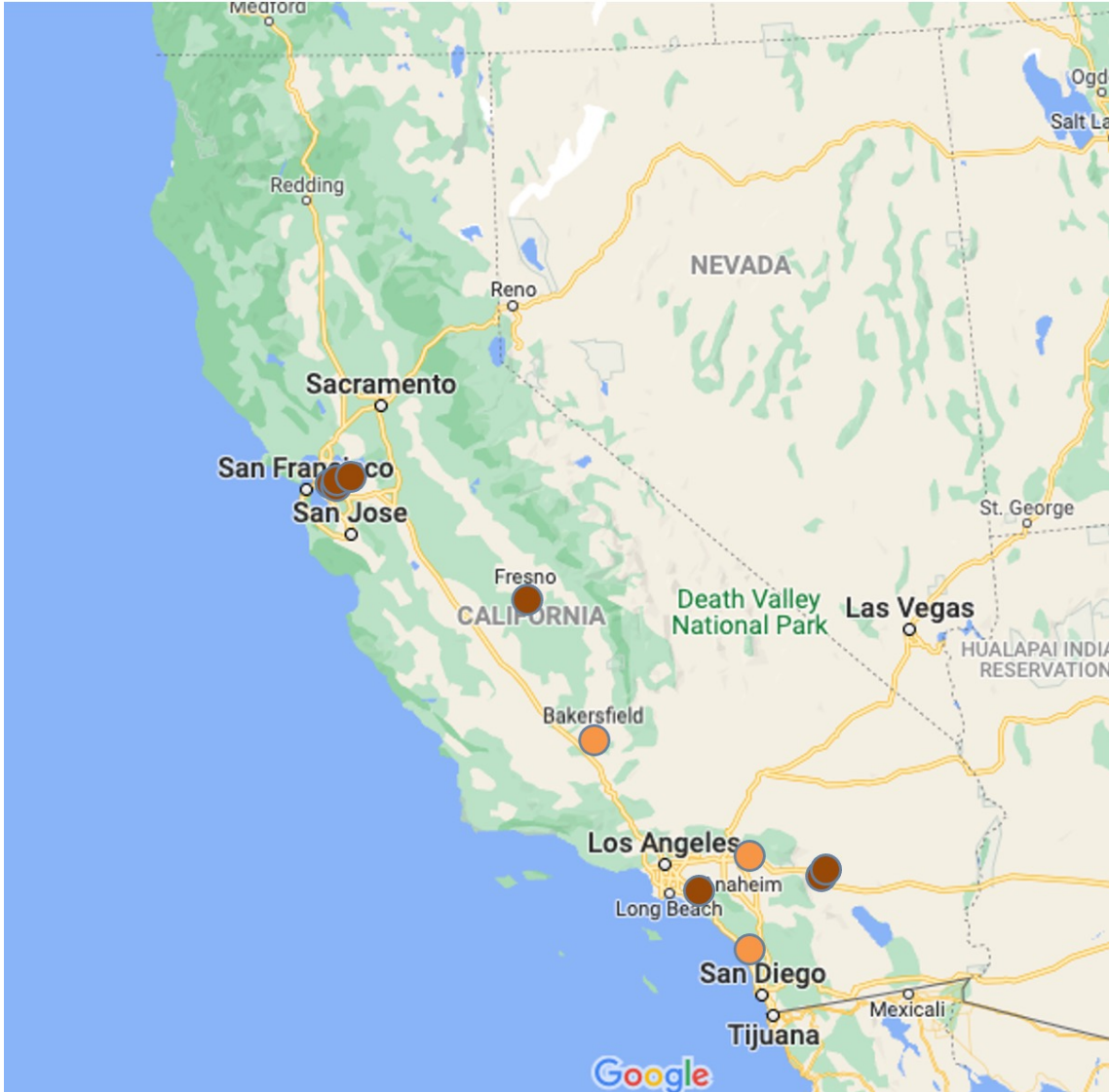


## Distribution Center Operators

1. First Element (Livermore)
2. Shell (Los Angeles, Port of Long Beach, & Ontario)
3. *Plug Power (Fresno) – Proposed*

- ***Proposed Hydrogen Distribution Hubs***
- ***In-Service Hydrogen Distribution Hubs***

# Medium/Heavy Duty Fueling Stations

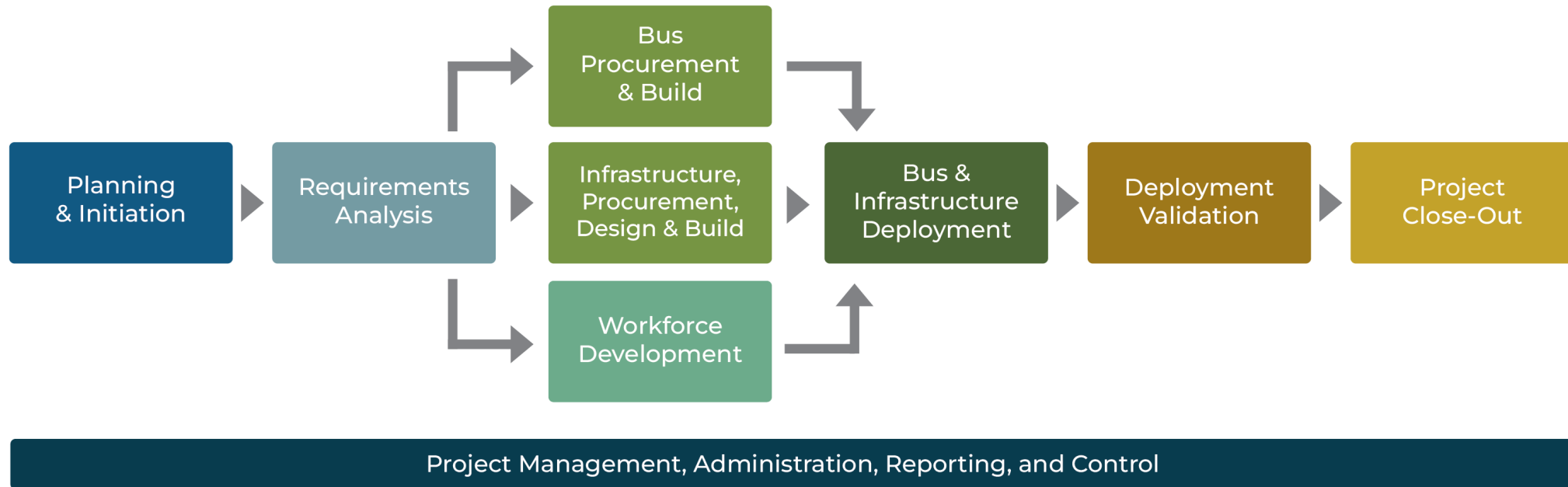


## Med/Heavy Fueling Stations

1. AC Transit (Emeryville & Oakland)
2. OCTA (Santa Ana)
3. Sunline (Thousand Palms & *Indio - proposed*)
4. First Element (Oakland & Fresno & Livermore)
5. Golden Empire Transit (Bakersfield)
6. North County Transit (Oceanside)
7. Foothill Transit (Pomona)
8. Gold Coast Transit District

- **Proposed Med/Heavy Duty Fueling Station**  
● **In-Service Med/Heavy Duty Fueling Station**

# Project Plan





# Phase 1: Planning & Initiation

## Task Description

- Conduct the kickoff meeting
- Finalize project scope, approach, and timeline
- Define tasks, roles, and responsibilities
- Complete the data collection

## CTE Deliverable

- Project kickoff meeting agendas, presentations, and minutes
- Project workbook

# Phase 2: Bus Procurement & Build

## Task Description

- Develop and finalize bus specifications
- Execute New Flyer contract
- Monitor bus build
- Deliver buses

## CTE Deliverable

- Technical specification review
- Bus configuration review
- Inspection reports

# Phase 3: Infrastructure Procurement, Design, & Build

## Task Description

- Develop and finalize hydrogen fueling station specifications
- Review and evaluate the existing modeled fuel demands and conceptual design
- Issue refueling station RFP
- Issue facility modification RFP
- Vendor(s) selection

## CTE Deliverable

- Refueling station RFP procurement support, technical evaluation, and selection
- Facility modification RFP procurement support and technical evaluation
- Technical advisory

# Phase 4: Bus & Infrastructure Deployment

## Task Description

- Bus and infrastructure commissioning
- Validate the performance and operation of the buses and infrastructure
- Buses enter revenue service

## CTE Deliverable

- Validation test plan
- Validation test report

# Phase 5: Deployment Validation

## Task Description

- Collect, analyze, and report Key Performance Indicators (KPIs)

## CTE Deliverable

- Deployment validation KPIs workshop
- Data collection and reporting plan
- Monthly KPI reports

# Phase 6: Project Close Out

## Task Description

- Summarize project results
- Close out the project with FTA

## CTE Deliverable

- Issue final report

# Phase 7: Project Management, Administration, Reporting, & Control

## Task Description

- Coordinate regular meetings and information sharing between project partners/stakeholders
- Advocate for the transit agency's interests
- Technical advisory
- Track project tasks, risks, budget, and timeline

## CTE Deliverable

- Compile quarterly management reports (QMRs)
- Compile a final management report
- Maintain project schedule

# Timeline

Deliverable	2023				2024				2025				2026				2027			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
+ FTA Award and Project Consultant Contract Execution																				
+ 1. Planning and Initiation																				
+ 2. Bus Procurement and Build																				
+ 3. Infrastructure Procurement, Design and Build																				
+ 4. Bus and Infrastructure Deployment																				
+ 5. Deployment Validation and Key Performance Indicators																				
+ 6. Project Close-out																				
+ 7. Admin																				



# Project Benefits

- These five FCEB buses will replace five CNG buses that are 14 years old and in poor condition.
- The refueling station will be designed with a capacity to fuel up to 50 buses.
- 58% of GCTD's service area is a designated historically disadvantaged community (DAC) which will be served by these zero-emission vehicles.

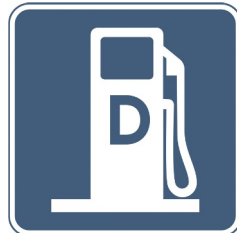
## Miles Driven

328,020 mi



## CNG Saved

114,900 dge



## Emissions Reduced

643 tons



# Questions & Discussion