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<th><strong>Docket Number:</strong></th>
<th>22-IEPR-05</th>
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<tr>
<td><strong>Project Title:</strong></td>
<td>Emerging Topics</td>
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<td><strong>TN #:</strong></td>
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<tr>
<td><strong>Document Title:</strong></td>
<td>Presentation - IEPR Commissioner Workshop - NorCAL ZERO Project</td>
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<tr>
<td><strong>Description:</strong></td>
<td>3C. PJ Callahan, Center for Transportation and the Enviro</td>
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<td><strong>Filer:</strong></td>
<td>Raquel Kravitz</td>
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<td><strong>Organization:</strong></td>
<td>Center for Transportation and the Environment</td>
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IEPR Commissioner Workshop: NorCAL ZERO Project

PJ Callahan
Lead Engineering Associate
Center for Transportation & the Environment
CTE - Four Service Areas

Prototype Development & Demonstration
We support technology providers through technology research, development, and demonstration.

Smart Deployment
We support early adopters by providing the best technical solutions for initial deployments.

Fleet Transition
We help fleet operators implement strategic plans for full electrification.

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

Who We Are: 501(3)(c) non-profit engineering and planning firm
Our Focus: Zero-Emission Transportation Technologies
Our Mission: Improve the health of our communities and the planet
Portfolio - > $800 million; 117 Active Projects totaling over $316 million
National Presence - Atlanta, Berkeley, Los Angeles, Minneapolis/St. Paul
FCEV Demos Advance Commercialization

- Proterra's 1st fuel cell electric bus – 2008
- UPS Fuel Cell Hybrid Electric Delivery Van – 2016 (CEC/CARB)
- Kenworth's 1st fuel cell Class 8 Truck – 2017
- Hyster-Yale's 1st fuel cell port container handler – 2017 (CARB)
- Fuel Cell Electric Bus Commercialization Consortium (FCEBCC) – 2018 (CARB)
- UPS Next Generation Delivery Van – 2019 (CARB)
- NorCAL ZERO: Largest deployment of FCETs in North America – 2021 (CEC/CARB)
- V2B Oakland: FCEBEPS with Bi-directional charging – 2022 (CEC)
Fuel Cell Electric Truck Benefits

Fuel cells are the perfect fit for heavy duty trucks & long driving distances

**Refueling Time**
Just 8 - 12 min
(20 min US truck target)

**Range**
Up to 500 miles for US 6x4 tractor
About 250 miles
Swiss 4x2 Cargo

**Payload**
Similar to Diesel
*Expected weight difference
BE Vs FCE truck +4 ton (+8,800 lbs.)

No big impact by low ambient temperatures
NorCAL ZERO Project Overview

- **Project Timeline:** Fall 2021 – Spring 2025
- **CEC Grant Amount:** $9,898,218 (Clean Transportation Program)
- **Co-Funded Amount (CARB grant and cost share):** $44,683,735*
- **Project Location:** West Oakland, California
- **Fueling Station Location:** East Bay Municipal Utilities District, Oakland, CA

*Additional funding provided by BAAQMD and ACTC
NorCAL ZERO Project Team

CARB and CEC: Primary Grants

Grant Recipient & Project Manager

Cost Share Grants

Evaluation and Community Outreach

Operations Team

Project Sponsors

Land & Biogas
H2 Station Refueling and Parking
NorCAL ZERO Project Benefits

- **Demonstrate Commercial Viability to Fleet Operators:** Range up to 500 miles
- **Expand Hydrogen Refueling Network:** 10- to 20-minute 60 kg fills; Up to 60 trucks
- **Provide Local Workforce Benefits:** Service and Repair Facility at NorCal Kenworth in San Leandro
- **Reduce Harmful Emissions:** 54% renewable fuel content with zero CI score

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<tr>
<th>Date</th>
<th>Milestone</th>
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<tr>
<td>June 15, 2023</td>
<td>Trucks fully deployed</td>
</tr>
<tr>
<td>June 14, 2024</td>
<td>Conclude 1-Year Performance Evaluation</td>
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<tr>
<td>June 14, 2029</td>
<td>Six Years of Truck Service</td>
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NorCAL ZERO Project Progress

Truck Build & Deployment:
• CARB Executive Order to operate in CA (complete)
• Vehicle Production Plan (complete)
• Prototype Testing in California (active/ongoing)

Infrastructure Development:
• Preliminary Hydrogen Safety Plan (complete)
• Demolition of Existing Site (active/ongoing)
• Station Construction Permitting (active/ongoing)

Maintenance Facility Upgrades:
• Facilities Assessment (complete)
• Facility Upgrade Permitting (active/ongoing)

Community Outreach:
• Draft Community Outreach Plan with WOEIP (active/ongoing)
Key Industry Challenges & Opportunities

- Lack of Commercially Available FCEV Options:
  - Investment in trucks/port/off-road vehicle demonstrations

- Lack of Available Refueling Infrastructure:
  - Investment in refueling infrastructure to support larger vehicle deployments

- High TCO:
  - Scaling vehicle, fuel production

- Technology Readiness:
  - Range improvements, weight reductions
DOE H2Hub Initiative

• 4+ Regional Clean Hydrogen Hubs to incentivize deployment of:
  – Renewable hydrogen production
  – Refueling infrastructure
  – **Transportation end-uses**

• Leverage California’s strength in transportation/goods movement:
  – Early adopting transit agencies (AC Transit, OCTA, Sunline, etc.)
  – Scaling projects like NorCAL ZERO

• CA is positioned to establish a self-sustaining commercial market

• Reduce criteria pollutants to benefit air quality in Disadvantaged Communities and address climate change
Thank You!

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