Funding Mechanisms to Assist and Accelerate ZEB Deployment

(Co-Hosted by California Hydrogen Business Council)

July 11, 2019
How to Ask Questions

• Submit your questions anytime during the program using the Questions module in your webinar control panel at the right of your screen.

• We will collect all questions and get to as many as time permits during the Q&A portion of the program.
The California Hydrogen Business Council (CHBC) is comprised of over 100 companies and agencies involved in the business of hydrogen. Our mission is to advance the commercialization of hydrogen in the energy sector, including transportation, goods movement, and stationary power systems to reduce emissions and dependence on oil in California.

CHBC Activities:
- Advocacy & Initiatives
  - Renewable Hydrogen, Renewable Energy and Climate
  - Hydrogen Blending and Gas System Integration
  - Hydrogen Fueling Station Build-out
  - Stakeholder Advocacy Campaign
- Communications & Business Expansion
- Goods Movement, Heavy-Duty Transportation, and Clean Ports
- Hydrogen Energy Storage and Renewable Hydrogen
- Public Transport

Mission & Sector Action Groups:
Our Members Include:

- Hydrogen producers and distributors
- Automotive companies
- Public transit systems and suppliers
- Fuel cell, electrolyzer, compressor and storage manufacturers
- Fueling station developers, engineers and consultants
- Municipal and state agencies
- Component suppliers
• Fuel Cell Electric Bus (FCEB) Fact Sheet from CHBC and California Fuel Cell Partnership:
Takeaways

• Hydrogen fueling infrastructure is versatile and easily scaled-up as more FCEBs are integrated in the fleet.

• Station developers work with transit agencies to find the best solution for the existing depot footprint.

• Hydrogen can be produced onsite through steam methane reformation or electrolysis. Fuel can also be delivered from a central production facility.

• One hydrogen station can fuel 1 to 100s of buses, offering similar operations and logistics to current diesel and CNG buses.

• If you missed the first three webinars, the recordings are available here: https://caltransit.org/events/webinars/fuel-cell-technology-a-four-part-series/
Events

- Fuel Cell Freight Webinar – (July 31)
- Policy Summit – Sacramento (August)
- The Other Electric Bus: **Meeting California’s Innovative Clean Transit Regulation with Fuel Cell Technology Workshop** (November 2019)
- Hydrogen & Fuel Cell **Ports Briefing**-POLB & POLA (November 2019)
- Stay Informed: [https://www.californiahydrogen.org/chbc-events/](https://www.californiahydrogen.org/chbc-events/)
California Fuel Cell Electric Bus Tour 2019

A city-to-city tour across Northern and Southern California, showcasing fuel cell electric buses and their advantages to transit agencies.

- Bus test drives
- Static displays of buses
- Fueling demonstrations
- Preventative maintenance workshops

Reserve a spot for your agency on the tour!
Contact Juan Contreras jcontreras@cafcp.org, 916-371-2792
Thank You!

Emanuel Wagner
+1 (310) 455-6095 x360
ewagner@californiahydrogen.org

Join us!
www.californiahydrogen.org
Fund the Fleet: Funding Mechanisms to Assist and Accelerate ZEB Deployment

California Hydrogen Business Council
July 11, 2019
About CTE

• **Mission:** To advance clean, sustainable, innovative transportation and energy technologies

• **501(3)(c) non-profit** engineering and planning firm

• **Portfolio - >$500 million**
  – Research, demonstration, deployment
  – **86 Active Projects** Totaling over **$300 million**

• Focused on **Zero-Emission** Technologies

• **National Presence**
  Atlanta, Berkeley, Los Angeles, St. Paul
Zero-Emission Projects
FCEBCC Program

• Fuel Cell Electric Bus Commercialization Consortium (FCEBCC)
  o AC Transit and OCTA
  o $45 million
  o 20 Buses
  o Two Stations
  o Facility Upgrades

• Next Step
  100-Bus Initiative
OCTA Fuel Cell Bus Deployment

- Orange County Transportation Authority
  - 10 Buses – 40’ Fuel Cell Electric
  - 40’ Buses – delivered under $1.2M each
  - Station Installation - $4.7M station ; $0.4M utility work
  - Facility Upgrade for hydrogen - $1M for 250 bus facility
MTD Fuel Cell Bus Deployment

- Champaign Urbana MTD Fuel Cell Bus Deployment
  - 2x 60’ Fuel Cell Electric Buses
    - About $1.5M each
  - Hydrogen station with Electrolysis production on site
    - RFP currently out for bid
  - Facility Upgrades
    - Estimate complete, but to be bid soon
100-Bus Initiative

**NEED**
Transit agencies will need **both** Battery-Electric and Fuel Cell Electric Buses (FCEBs) to meet the California Air Resources Board goal of 100% zero-emission buses by 2040.

**OBJECTIVE**
Drive down the capital cost of North American FCEBs to the point where they are **commercially viable** for transit properties seeking zero-emission solutions — $850,000/bus.

**ACTION**
Four or more transit agencies in northern and southern California, purchasing up to **25 FCEBs** each, and installing hydrogen fueling stations and facility upgrades where needed.

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**Driving Price Down**

![Graph showing the decline in fuel cell bus costs](graph)

- **2008**: $2,500,000
- **2010**: $2,000,000
- **2012**: $1,500,000
- **2014**: $1,000,000
- **2016**: $500,000

**Fuel Cell Bus Costs are Declining with Technology Advancements and Manufacturing Volume**

Source: New Flyer Industries
Program Description

The Low-No Program (5339(c)) provides funding for the purchase or lease of zero-emission and low-emission transit buses as well as for the acquisition, construction or leasing of supporting facilities and equipment. To date, approximately $194 million has been awarded for 123 projects across the country.

The Low-No Program is unique in its support of the deployment of advanced technology vehicles.
Eligibility Information

Eligible Applicants

• Designated Recipients, States, local governmental authorities or federally recognized Indian Tribes are eligible to submit proposals for this program.

Cost Sharing or Matching

• Vehicles are eligible for a maximum 85% Federal/15% non-Federal match.

• Low or no emission bus related equipment or facilities are eligible for a 90% Federal/10% non-Federal match.
Eligibility Information

Eligible Projects

• Purchase or lease of low or no emission buses
• Acquiring low or no emission buses with a leased power source
• Constructing or leasing facilities and related equipment for low or no emission buses
• Rehabilitating or improving existing facilities to accommodate low or no emission buses
• Workforce development
## Low-No Competitions

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount Available</td>
<td>$55 million</td>
<td>$55 million</td>
<td>$84.49 million*</td>
<td>$85 million*</td>
</tr>
<tr>
<td>Proposals Received</td>
<td>101 from 32 states</td>
<td>131 from 40 states</td>
<td>151 from 42 states</td>
<td>157 from 38 states and DC</td>
</tr>
<tr>
<td>Total Requested</td>
<td>$446 million</td>
<td>$515 million</td>
<td>$558 million</td>
<td>$500 million</td>
</tr>
<tr>
<td>Funded Projects</td>
<td>20</td>
<td>51</td>
<td>52</td>
<td>TBD</td>
</tr>
</tbody>
</table>

*Congress added additional funds in the appropriations bills for FY 18 and FY 19*
Other FTA Programs

- Urbanized Area Formula Program (Section 5307)
- Rural Formula Program (Section 5311)
- Buses and Bus Facilities Formula Program (Section 5339(a))
- Buses and Bus Facilities Competitive Program (Section 5339(b))
Questions?

Tara Clark
Federal Transit Administration
Phone: 202-366-2623
Email: tara.clark@dot.gov

https://www.transit.dot.gov/funding/grants/lowno
Hydrogen Bus Voucher Incentives
What is HVIP?

Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project

• **First-come, first-served vouchers** – Immediate discount at sale
• **Dealers learn voucher system** – Fewer complications for fleets
• **Set aside funding for each voucher** – Price certainty. No scrappage.
• New and retrofits; electric, hybrid, fuel cell, EPTO, Low-NOx natural gas
• 7,000 + vouchers, 1,000 fleets, 9 years
## Zero-Emission Truck Voucher Amounts

<table>
<thead>
<tr>
<th>GVWR (lbs)</th>
<th>Base Vehicle Incentive</th>
<th>1 to 100 vehicles&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Outside Disadvantaged Community</th>
<th>In Disadvantaged Community</th>
<th>&gt;100 vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,001 – 8,500</td>
<td>$20,000</td>
<td>$25,000</td>
<td>$12,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8,501 – 10,000</td>
<td>$25,000</td>
<td>$30,000</td>
<td>$18,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10,001 – 14,000</td>
<td>$50,000</td>
<td>$55,000</td>
<td>$30,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14,001 – 19,500</td>
<td>$80,000</td>
<td>$90,000</td>
<td>$35,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19,501 – 26,000</td>
<td>$90,000</td>
<td>$100,000</td>
<td>$40,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26,001 – 33,000</td>
<td>$95,000</td>
<td>$110,000</td>
<td>$45,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;33,000</td>
<td>$150,000</td>
<td>$165,000</td>
<td>$70,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrogen Fuel Cell Electric Truck</td>
<td>$300,000</td>
<td>$315,000</td>
<td>$142,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup> - The first three vouchers received by a fleet, inclusive of previous funding years, are eligible for the following additional funding amount: $2,000/vehicle if below 8,501 lbs; $5,000/vehicle if 8,501 to 10,000 lbs; and $10,000/vehicle if over 10,000 lbs.

Can combine incentives, to cover up to **100%** of vehicle cost for public fleets, **90%** for private fleets.
## Zero-Emission Transit Bus Voucher Amounts

<table>
<thead>
<tr>
<th>Bus Length and Bus Type</th>
<th>Base Vehicle Incentive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 to 100 vehicles¹</td>
</tr>
<tr>
<td></td>
<td>Outside</td>
</tr>
<tr>
<td></td>
<td>Disadvantaged Community</td>
</tr>
<tr>
<td>20 ft – 24 ft</td>
<td>$80,000</td>
</tr>
<tr>
<td>25 ft – 29 ft</td>
<td>$90,000</td>
</tr>
<tr>
<td>30 ft – 39 ft</td>
<td>$120,000</td>
</tr>
<tr>
<td>40 ft – 59 ft</td>
<td>$150,000</td>
</tr>
<tr>
<td>≥ 40 ft. Double Decker Bus</td>
<td>$175,000</td>
</tr>
<tr>
<td>≥ 60 ft. Zero-Emission Battery- Electric Articulating Transit Bus</td>
<td>$175,000</td>
</tr>
<tr>
<td>≥ 40 ft. Hydrogen Fuel Cell Electric Bus</td>
<td>$300,000</td>
</tr>
</tbody>
</table>

¹ - The first three vouchers received by a fleet for transit buses, inclusive of previous funding years, are eligible for the $10,000/vehicle in additional funding amounts.
Case-by-Case Consideration for Smaller Vehicles

• Effective October 2018, CARB will consider additional funding categories for smaller vehicles as they become commercially available.

• The approach would create a tiered allocation based on length and GVWR, with an interim system for case-by-case approval of voucher amounts until price data is available for commercial vehicles using hydrogen fuel cell technologies.

• Voucher amounts would be lower for vehicles that supplement fuel cell power with either combustion or plug-in range extenders.
Eligible Hydrogen Vehicles

NEW FLYER FUEL CELL ELECTRIC XHE40/XH60 TRANSIT BUS (not pictured)
OEM: New Flyer
VEHICLE INCENTIVES: $300,000  MODEL YEAR: 2019  LENGTH: 40 / 60 foot  DEALER: New Flyer of America

AXESS 40 FT FUEL CELL HYBRID TRANSIT BUS
OEM: El Dorado National
VEHICLE INCENTIVES: $300,000
MODEL YEARS: 2018-19
DEALERS: Creative Bus Sales, El Dorado National CA

AXESS 35 FOOT FUEL CELL HYBRID TRANSIT BUS
OEM: El Dorado National
VEHICLE INCENTIVES: $120,000
MODEL YEARS: 2018-19
DEALERS: Creative Bus Sales, El Dorado National CA
SunLine Transit Agency deployed the first HVIP-funded hydrogen fuel cell buses this year.

HVIP vouchers reduced the price of the 5 buses by $300,000 per vehicle.

SunLine’s clean fleet now numbers over 75 alternative-fuel buses.
Infrastructure Voucher Enhancements

**H2 infrastructure:** Up to $100,000 available in equipment costs for each fuel cell vehicle voucher; covers real costs of equipment

- Must have at least 5 vehicle vouchers
- Infrastructure cost can’t be already covered by other public funding
- Approved on a case-by-case basis by CARB/CALSTART
  (info@californiahvip.org)
Tarah Campi, HVIP Program Manager

HVIP’s Toll-Free Hotline
Available Mondays to Fridays, 9 a.m. – 5 p.m.
1-888-HVIP or 1-888-457-4847
or
Email us at: info@californiahvip.org
Visit: CaliforniaHVIP.org
Low Carbon Fuel Standard and Hydrogen Fuel Cell Electric Buses

July 11, 2019
CARB’s Mission

- Leads California’s fight against air pollution and climate change
- Protects public health
- Promotes clean, energy-efficient fuels and technology
Low Carbon Fuel Standard (LCFS) History

• State’s primary program to promote alternative fuel use
• Original adoption in 2009, amended in 2018 to strengthen targets through 2030
• Goal: Reduce carbon intensity (CI) of transportation fuels
• Expected benefits:
  • Reduce greenhouse gases
  • Transform and diversify fuel pool
  • Reduce petroleum dependency
  • Reduce emissions of criteria pollutants and toxics
How Does LCFS Work?

Fuels below standard generate credits

Fuels above standard generate deficits

*C Negative CIs have been achieved for some fuel pathways but are not shown.

**The average percent carbon intensity (CI) reduction for electricity shown represents Light-Duty Electric Vehicle charging.
Opportunities for Hydrogen in LCFS

• Who is eligible to generate LCFS credits?
  • Owner of fueling supply equipment (FSE) used for dispensing hydrogen are default credit generator
  • Including FCEV bus fleet operator if they also own the FSE

The default credit generator can designate a third-party to act on its behalf
## Key Steps for Participating in the LCFS

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Establish account in the LCFS Reporting Tool (LRT)*</td>
</tr>
<tr>
<td>Step 2</td>
<td>Register Fueling Supply Equipment (FSE)**</td>
</tr>
<tr>
<td>Step 3</td>
<td>Apply for and obtain a fuel pathway carbon intensity in Alternative Fuel Portal (AFP)</td>
</tr>
<tr>
<td>Step 4</td>
<td>Complete quarterly reporting for credit issuance</td>
</tr>
</tbody>
</table>

* [https://ssl.arb.ca.gov/lcfsrt/Login.aspx](https://ssl.arb.ca.gov/lcfsrt/Login.aspx)

** See FSE registration guidance on website: [https://ww3.arb.ca.gov/fuels/lcfs/guidance/lcsguidance_19-04.pdf](https://ww3.arb.ca.gov/fuels/lcfs/guidance/lcsguidance_19-04.pdf)
Step 3: Obtain a Fuel Pathway Carbon Intensity through AFP*

Lookup Table Application (Default Pathways)
- Pre-defined representative life-cycle assumptions**
- Streamlined application process with additional requirements for renewable hydrogen***
- Limited verification requirements

or

Tier 2 Application (Customized Pathways)
- User-defined inputs throughout
- Detailed application process
- Verification required for user-defined inputs

* [https://ssl.arb.ca.gov/lcfsrt/Login.aspx](https://ssl.arb.ca.gov/lcfsrt/Login.aspx)
** Documentation for Lookup Table pathway assumptions available on LCFS website: [https://www.arb.ca.gov/fuels/lcfs/ca-greet/lut-doc.pdf](https://www.arb.ca.gov/fuels/lcfs/ca-greet/lut-doc.pdf)
*** See Hydrogen Lookup Table Checklist on LCFS website: [https://www.arb.ca.gov/fuels/lcfs/fuelpathways/h2lut.xlsx](https://www.arb.ca.gov/fuels/lcfs/fuelpathways/h2lut.xlsx)
Applications must include, at a minimum (not limited to):
- Completed CA-GREET3.0 model
- Life cycle analysis report
- Supporting documentation for all user-defined inputs
- Attestation letter
Step 4: Reporting and Credit Generation

- Credits are generated based on fuel pathway carbon intensity, quantity of fuel dispensed and vehicle type
- Owner of hydrogen dispensing equipment reports fuel transactions in the LRT and generates credits on a quarterly basis
  - Can designate another party to report fuel transactions and generate the credits
- Credits can then be banked or sold to other parties participating in the program
# Potential LCFS Credit Revenue for Hydrogen

<table>
<thead>
<tr>
<th>Fuel Production Technology</th>
<th>Feedstock</th>
<th>Example Carbon Intensity</th>
<th>Fuel Displacement Multiplier</th>
<th>Potential LCFS Credit Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steam Methane Reformation</td>
<td>Fossil natural gas</td>
<td>117.67 gCO2e/MJ</td>
<td>1.9</td>
<td>$1.57/DGE</td>
</tr>
<tr>
<td></td>
<td>Biomethane from landfills</td>
<td>99.48 gCO2e/MJ</td>
<td>1.9</td>
<td>$2.03/DGE</td>
</tr>
<tr>
<td></td>
<td>Biomethane from dairy/swine manure</td>
<td>-300 gCO2e/MJ</td>
<td>1.9</td>
<td>$12.24/DGE</td>
</tr>
<tr>
<td>Electrolysis</td>
<td>CA grid electricity</td>
<td>164.46 gCO2e/MJ</td>
<td>1.9</td>
<td>$0.37/DGE</td>
</tr>
<tr>
<td></td>
<td>Zero-Cl electricity</td>
<td>10.51 gCO2e/MJ</td>
<td>1.9</td>
<td>$4.30/DGE</td>
</tr>
</tbody>
</table>

Note: assumes $190/credit, the average for June, 2019
THANK YOU

Contacts:
Application questions: Jordan Ramalingam, Jordan.Ramalingam@arb.ca.gov
Reporting/crediting questions: Arpit Soni, Arpit.Soni@arb.ca.gov
### VW Mitigation Trust Funding for California

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero-Emission Transit, School, and Shuttle Bus</td>
<td>$130M</td>
<td>$65M</td>
</tr>
<tr>
<td>Zero-Emission Class 8 Freight and Port Drayage Trucks</td>
<td>$90M</td>
<td>$27M</td>
</tr>
<tr>
<td>Combustion Freight and Marine Projects</td>
<td>$60M</td>
<td>$30M</td>
</tr>
<tr>
<td>Zero-Emission Freight and Marine Projects</td>
<td>$70M</td>
<td>$35M</td>
</tr>
<tr>
<td>Light-Duty Zero-Emission Infrastructure</td>
<td>$10M</td>
<td>$10M</td>
</tr>
</tbody>
</table>

*Note: Amounts in US dollars.*
Zero-Emission Transit, School, and Shuttle Buses

Administered by San Joaquin Valley Air Pollution Control District
Zero-Emission Transit, School, and Shuttle Buses

Key Points

- Open to public and private organizations
- First Come, First Served
- $130M Total Funding
  - $65M available in 2019
- 50% of funding to disadvantaged or low-income communities
Zero-Emission Transit, School, and Shuttle Buses
Eligible Projects and Funding Amounts

<table>
<thead>
<tr>
<th>Category</th>
<th>Funding Amount</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>School Buses</strong></td>
<td>$400,000</td>
<td>Up to $400,000 for a new, commercially-available, zero-emission technology</td>
</tr>
<tr>
<td><strong>Transit Buses</strong></td>
<td>$180,000</td>
<td>Up to $180,000 for a new, commercially-available, battery-electric bus</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Up to $400,000</strong> for a new, commercially-available, fuel-cell bus</td>
</tr>
<tr>
<td><strong>Shuttle Buses</strong></td>
<td>$160,000</td>
<td>Up to $160,000 for a new, commercially-available, zero-emission technology</td>
</tr>
</tbody>
</table>

- Total funding for this category is $130 million, with the initial $65 million increment available in 2019.
- No more than 50% of available funds in each increment will be allocated to a single bus category.
- Total cost per vehicle must not exceed 75% for non-government owned and 100% for government owned vehicles.
- Stacking of VW funds with HVIP and other CARB funds not allowed.
## Grantee Reporting and Operational Requirements

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inspections</strong></td>
<td>Make old and new engine / vehicle available for inspection</td>
</tr>
<tr>
<td><strong>Operations</strong></td>
<td>Operate the “grant-funded” engine / vehicle in accordance with the contract</td>
</tr>
<tr>
<td><strong>Payment</strong></td>
<td>Submit request for grant funds AFTER receiving award and completing project</td>
</tr>
<tr>
<td><strong>Reporting</strong></td>
<td>Submit annual reports for the term of the contract (expected 3 years)</td>
</tr>
<tr>
<td><strong>Scraping</strong></td>
<td>Scrap an older engine / vehicle and replace it with the “grant-funded” engine / vehicle</td>
</tr>
</tbody>
</table>
Zero-Emission Transit, School, and Shuttle Buses
Tentative Schedule

- **Q3 2019**
  - Solicitation Open

- **2019**
  - Q2 2019
    - Program Development
  - Q3- 2019
    - Begin Awards and Contracting

- **2020**
  - 2019-2023
    - Implementation & Reporting

- **2021**
  - Late 2021
    - Cycle 2 Program Development
Contact Us

vwbusinessmoney.valleyair.org/

https://ww2.arb.ca.gov/our-work/programs/volkswagen-environmental-mitigation-trust-california
Funding Mechanisms for ZEB Deployment at AC Transit
Our major hydrogen production and fueling facilities

- D2 Emeryville 2010 to present
  - Solar Powered Electrolyzer (65kh/day)
  - Currently undergoing major upgrade to increase fueling capacity and efficiency

- D4 Oakland 2014 to present
  - Solar Powered Electrolyzer (65kg/day)
Hydrogen Bus Fleet

- 2003-2006
  - 1 x 30ft Thor
- 2006-2010
  - 3 x 40ft VanHool A330
- 2010-present
  - 13 x 40ft VanHool A300
- 2019-future
  - 10 x 40ft New Flyer
  - 1 x 60ft New Flyer
How we funded past projects 2005-2015

• Construction of two hydrogen fueling stations
• Current 13 Fuel Cell buses in service

<table>
<thead>
<tr>
<th>Agency Level</th>
<th>Agencies</th>
<th>Amount/Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>FTA, DOE</td>
<td>$20 million</td>
</tr>
<tr>
<td>State</td>
<td>Caltrans, CARB, CEC</td>
<td>$19 million</td>
</tr>
<tr>
<td>Regional</td>
<td>BAAQMD, VTA, SamTrans, Golden Gate Transit</td>
<td>$13 million</td>
</tr>
<tr>
<td>Local</td>
<td>PG&amp;E, MTC</td>
<td>$11 million</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>$63 million</strong></td>
</tr>
</tbody>
</table>
How we’re funding current projects 2016-2019

- Emeryville station upgrade
- Next 10 Fuel Cell buses
- Consortium with OCTA (add’l 10 buses)

<table>
<thead>
<tr>
<th>Agency Level</th>
<th>Agencies</th>
<th>Amount/Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>CARB (AQIP program)</td>
<td>$7.4 million</td>
</tr>
<tr>
<td>Regional</td>
<td>BAAQMD, MTC</td>
<td>$6 million</td>
</tr>
<tr>
<td>Local</td>
<td>District funds</td>
<td>$2.6 million</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>$16 million</strong></td>
</tr>
</tbody>
</table>
How we’re funding our future projects 2019 - 2021

- 45 Zero Emission Buses (mix of fuel cell and battery electric)
  - Currently in planning phase
  - Full design and construction for fueling/charging facilities

<table>
<thead>
<tr>
<th>Agency Level</th>
<th>Agencies</th>
<th>Amount/Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>Formula Funds</td>
<td>$17.5 million</td>
</tr>
<tr>
<td>State</td>
<td>CARB (TIRCP program), SB1 LPP, HVIP</td>
<td>$37 million</td>
</tr>
<tr>
<td>Regional</td>
<td>MTC (RM3)</td>
<td>$6 million</td>
</tr>
<tr>
<td>Local</td>
<td>AC Transit Match (TBD)</td>
<td>$7.5 million</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>$68 million</strong></td>
</tr>
</tbody>
</table>
• Bus purchase
  • What is the “incremental” need above base cost of the diesel or hybrid bus you would have purchased?
  • What can fund that increment?
    • HVIP
    • LCTOP, Air Districts, VW Mitigation Trust
  • Funding the fueling station
Funding challenges

• Funding for
  • Planning and design phases
  • Maintenance training for new technologies
  • Battery and/or fuel cell replacement at half life?
• Grant management
• Educating the grantors and auditors – all learning from one another as we go along
• Operational costs
Thank You!

For further Information:

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How to Ask Questions

• Submit your questions anytime during the program using the Questions module in your webinar control panel at the right of your screen.

• We will collect all questions and get to as many as time permits during the Q&A portion of the program.
Contact Us

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Funding Mechanisms to Assist and Accelerate ZEB Deployment

(Co-Hosted by California Hydrogen Business Council)

July 11, 2019