DOCKETED	
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Project Title:	Medium- and Heavy-Duty Zero-Emission Vehicles and Infrastructure
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MD/HD ZEV Infrastructure Funding Allocation Workshop

Funding Ideas for Medium- and Heavy-Duty ZEV Infrastructure Projects

Fuels and Transportation Division

February 28, 2022| 9:00 am

Workshop Agenda

- Welcome and Introductions
  - Housekeeping
  - Commitment to Diversity
  - Empower Innovation
- Past and Current MD/HD Infrastructure funded projects
- Fiscal Year 2021/2022 MD/HD Infrastructure Funding
- Proposed Medium-and-Heavy-Duty (MD/HD) ZEV Infrastructure Projects
- Q&A and Public Comment

Housekeeping

- Workshop is being recorded.
- Workshop Event Webpage: https://www.energy.ca.gov/event/workshop/2022-02/staff-workshop-funding-allocations-future-medium-and-heavy-duty-charging-and
- Virtual Participation through Zoom
  - Q&A period after the main presentation
  - Raise Hand or Q&A feature
- Written Comments to Docket # 19-TRAN-02: https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=19-TRAN-02

Deadline: March 18, 2022 by 5:00 PM

Commitment to Diversity

The CEC adopted a resolution strengthening its commitment to diversity in our funding programs. The CEC continues to encourage disadvantaged and underrepresented businesses and communities to engage in and benefit from our many programs.

To meet this commitment, CEC staff conducts outreach efforts and activities to:

- Engage with disadvantaged and underrepresented groups throughout the state;
- Notify potential new applicants about the CEC's funding opportunities;
- Assist applicants to understand how to apply for funding from CEC's programs;
- Survey participants to measure progress in diversity outreach efforts.

Diversity Survey

Scan the code on a phone or tablet with a QR reader to access the survey.

One Minute Survey

The information supplied will be used for public reporting purposes to display anonymous overall attendance of diverse groups.

Zoom Participants, please use the link in the chat to access the survey or scan the QR code on the left of the screen with a phone or table to access the survey.

Survey Link: https://forms.office.com/g/n6ZRHqeE62

Find a Partner on EmpowerInnovation.net

Empower Innovation strives to accelerate your clean tech journey with easy access to funding opportunities from the CEC and other funding providers, curated resources and events, and connections to people and organizations.

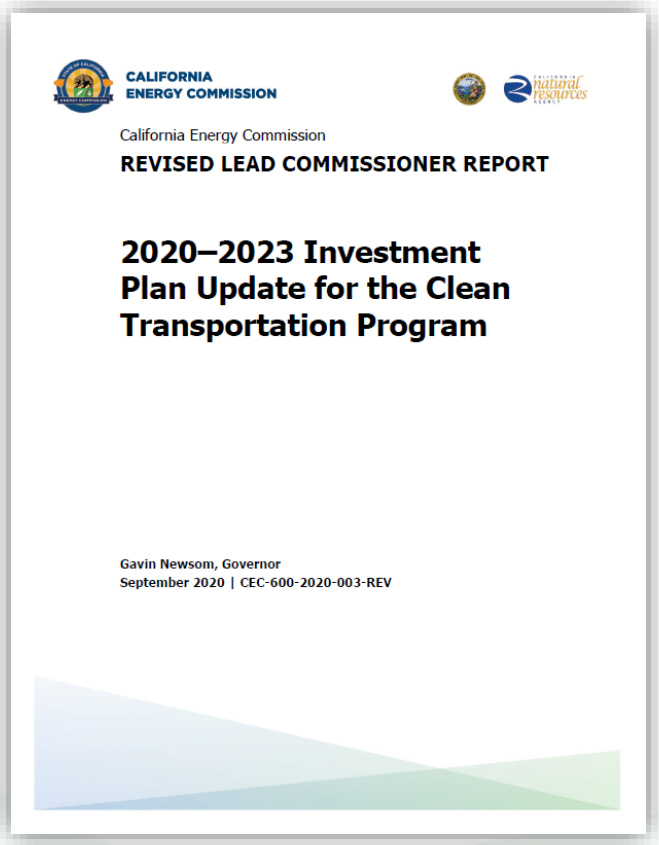
FIND A PARTNER	**RESOURCES & TOOLS**
Announce your interest in this funding opportunity and message other interested parties to find potential partners.	Browse the collection of resources for clean tech innovators including Resource Libraries, Funding Sources, Tools, and Databases.

To search for funding opportunities, please go to this link:
https://www.empowerinnovation.net/en/custom/funding/directory

Please direct questions for the Empower Innovation platform to:
https://www.empowerinnovation.net/en/contact_us

Clean Transportation Program Background

- Established in 2007 by Assembly Bill 118 (2007).
- Extended to January 1, 2024 by Assembly Bill 8 (2013)
- Provides approximately $95 million of funding per year through 2023.
- Investment Plan to determine funding allocations across various categories.



Purpose of the Clean Transportation Program

Provides approximately $95 M of funding per year through the end of 2023

"…to develop and deploy innovative technologies that transform California's fuel and vehicle types to help attain the state's climate change policies."

Complementary goals:

- Improve air quality
- Investments in low-income and disadvantaged communities
- Promote economic development
- Increase alternative fuel use
- Reduce petroleum dependence

2021-2023 **Zero-Emission Investments Funding Prioritizes**

$314M

Light-Duty Electric Vehicle Charging Infrastructure and eMobility

$690M

Medium and Heavy-Duty Zero-Emission Vehicles and Infrastructure

(battery-electric and hydrogen fuel cell)

$77M

Hydrogen Refueling Infrastructure

$25M

Zero and Near Zero Carbon Fuel Production and Supply

$243.8M

ZEV Manufacturing

$15M

Workforce Development

Total Clean Transportation Program (CTP) funding:

$238M

Total General Funding (administered through CTP):

$1.127B

Total Funding

$1.365B

General Funds from ZEV Package

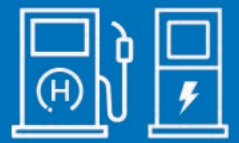
to be Administered by the CEC

$250 million - for zero-emission drayage trucks

$25 million - for drayage truck and infrastructure pilot

$90 million - for transit buses

$50 million - for school buses



$250 million - for ZEV manufacturing grants

$500 million - for ZEV infrastructure

$785 million appropriated in Budget Act of 2021;

$380 million anticipated in FY 2022-23 and 2023-24

The budget prioritizes diesel emission reduction by earmarking funding to replace

- **1,125 Drayage Trucks**
- **1,000 School Buses**
- **1,000 Transit Buses**

with zero-emission alternatives and refueling infrastructure

And to accelerate **charging** and **hydrogen refueling** stations and promote ZEV-related **manufacturing**

Combined Clean Transportation Program and General Fund MD/HD Allocations in the Lead Commissioner Report (in millions)

Category	Funded Activity	2021-2022	2022-2023*	2023-2024*
Clean Transportation Program & General Fund Zero-Emission Vehicles and Infrastructure	Medium- and Heavy-Duty Zero-Emission Vehicles and Infrastructure	$238.1	$30.1	$13.8
General Fund Zero-Emission Vehicles and Infrastructure	Drayage	$80.75	$85.0	$80.0
General Fund Zero-Emission Vehicles and Infrastructure	Drayage and Infrastructure Pilot	$25.0	-	-
General Fund Zero-Emission Vehicles and Infrastructure	Transit	$28.5	$30.0	$30.0
General Fund Zero-Emission Vehicles and Infrastructure	School Bus	$19.0	$15.0	$15.0
Clean Transportation Program & General Fund Zero-Emission Vehicles and Infrastructure	Hydrogen Fueling Infrastructure *	$47.0	$20.0	$10.0
	Total	**$438.35**	**$180.1**	**$148.8**

*The Hydrogen Fueling Infrastructure activity primarily supports publicly available, light-duty infrastructure.

2020 Solicitations and Total Awards

Grant Funding Opportunity Title	Total Amount
Block Grant for MD/HD Zero-Emission Refueling Infrastructure Incentive Projects	$50 million *(authority up to $276 million)*
Zero-Emission Transit Fleet Infrastructure Deployment	$36.2 million
Blueprints for Medium- and Heavy-Duty Zero-Emission Vehicle Infrastructure	$7.6 million
BESTFIT Innovative Charging Solutions ***(MD/HD projects)***	$8.4 million
Hydrogen Fuel Cell Demonstrations in Rail and Marine Applications at Ports (H2RAM) (Joint project with ERDD)	$4 million
Zero-Emission Drayage Truck and Infrastructure Pilot Project ***(Joint solicitation with the CA Air Resources Board (CARB))***	$44.3 million *($108.2 M total with CARB funds)*

EnergIIZE Commercial Vehicles

EnergIIZE Project Overview

1 Simplified Applications and Approved Vendor Network

Selected projects from pre-approved vendors can speed approvals and receive vendor support to apply.

2 Connects and Leverages Existing Programs

The application process will be integrated with other ZEV funding programs to be pre-approved for infrastructure incentives.

3 Provide Technical Support through the Infrastructure Readiness Center (IRC)

The IRC provides resources to prepare applicants to participate and receive technical support for infrastructure projects.

EnergIIZE Award

- Nation's first incentive project
- Zero-emission truck and bus charging and hydrogen refueling infrastructure
- Up to $276 Million Total Funding Awarded

EnergIIZE Next Steps

- Release of Incentive Funding:
  - **EV Fast Track - March 23, 2022, 9 AM**
- **Subscribe to energiize to receive email updates**

Goals of Workshop

- Propose solicitation concepts to increase the charging and refueling infrastructure needed to support the deployment of zero-emission MD/HD vehicle technologies within the California freight system, transit bus fleets, school bus fleets, and other transportation sectors
- Identify gaps in MD/HD charging and refueling infrastructure incentive funding
- Gather stakeholder feedback on proposed solicitation concepts
- Determine funding needs at individual project-level and solicitation-level

Agenda

Summary of Proposed Concepts
Hydrogen Refueling
School District Vehicle Grid Integration
Truck Parking EV Charging and Hydrogen Refueling
Warehouse and Regional Trucking
Innovative EV Charging and Hydrogen Refueling Technologies
Mobility-as-a-Service Models
Rural Small Transit Fleet Infrastructure Deployment
Large Scale Ultra-Fast Charging Stations
MD/HD Blueprint Planning Documents
Infrastructure Concepts to Complement CARB Demonstration and Pilot Project Concepts
MD/HD Loan Pilot

Hydrogen Refueling Concept

Jane Berner, Air Pollution Specialist
Hydrogen Strategy, Infrastructure & Production Unit

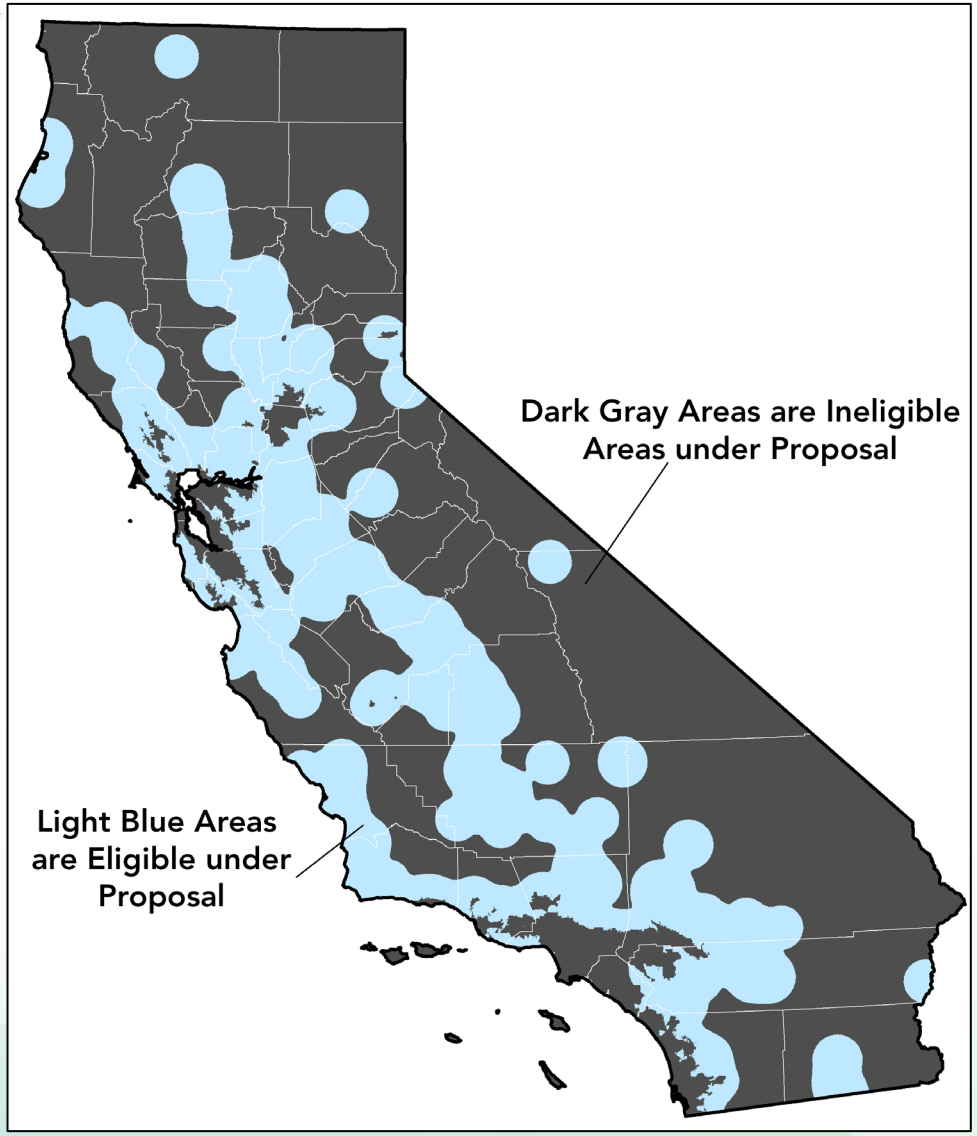
Background

Category	Funded Activity	2021-2022	2022-2023	2023-2024
Clean Transportation Program & General Fund Zero-Emission Vehicles and Infrastructure	Hydrogen Fueling Infrastructure	$47.0	$20.0	$10.0

- Concept would use $27 million of the $47 million in FY 2021-2022 (General Funds)
- Objectives
  - Achieve 200 hydrogen refueling stations
  - Bring hydrogen fueling to additional areas of California
  - Support fuel cell electric vehicle (FCEV) growth in multiple market segments
  - Foster excellent customer experience

Solicitation Concept

- Offer available funds for projects that would:
  - Build hydrogen refueling stations that, at minimum, are publicly available to light-duty FCEVs and provide two fueling positions
  - Include a private or public fueling point for a medium- or heavy-duty use
  - Eligible locations:
    - A connector/destination area shown in light blue in the map
    - Any site in California that is on or adjacent to property where a medium- or heavy-duty vehicle fleet is serviced



Map provided by CARB

Questions

- Is there interest in developing such projects?
- Should a MD/HD fueling component be optional or required? At what minimum daily capacity and number of fueling positions?
- Conformance to which MD/HD fueling protocols should be required?
- What amount of grant funds per station is appropriate for a station that has both LD and MD/HD components?
- Should grant funding be limited to equipment costs, or should it be for all CEC budget categories (i.e., labor, subcontracts, indirect costs)?
- Should this concept include support for onsite, direct renewable hydrogen production? Which production technologies should be eligible, at what minimum production capacity, and at what funding level?

School District Vehicle Grid Integration Concept

Sarah Williams, Energy Commission Specialist II
School Bus Unit

Background

- There are projected to be more than 1,200 bi-directional enabled school buses on the road or funded through various programs over the next 3 years.
- The combined battery storage of these buses will exceed 120 MWh.

Solicitation Concept

- Electric Vehicle Service Providers (EVSP) are in a unique position with relationships with school districts, vehicle manufacturers, and utilities. The CEC would like to utilize these stakeholder connections for a bi-directional solicitation.
- EVSPs would use off the shelf direct current fast chargers (DCFC) selecting a variety that would work for vehicle to grid and vehicle to building applications.
- EVSPS would select school bus fleets ideally in areas that are likely to experience power outages because of public safety power shutoffs or fire danger.
  - The goal would be to minimize operational costs and improve resiliency in emergency situations.

Solicitation Concepts (cont.)

- The solicitation would fund 1-2 EVSPs to partner with public school districts, county offices of education (COE), or transportation joint power authorities (JPA).
  - Applicants would potentially partner with multiple school districts in various locations to demonstrate various use cases.
- Awardees would install bidirectional charging stations at key sites throughout the districts.
- The final product will be a turnkey solution for other school bus operators to adopt.

Questions

- Should this solicitation focus on either vehicle-to-grid or vehicle-to-building projects, or allow for both?
- What amount of funding would be necessary for this concept?
- What types of partners (geographic locations, types of equipment, size of fleet) would be best suited to this concept?
- What should the match share percentage be for an EVSP?

Truck Parking EV Charging and Hydrogen Refueling

Alex Wan, Associate Energy Specialist
Freight and Transit Unit

Background

- 100% of MD/HD trucks and buses must be zero emission by 2045 (Executive Order N-79-20)
  - 180,000 MD/HD vehicles anticipated for 2030
  - Charging infrastructure gap
    - Additional 157,000 DC Fast Chargers needed to charge the EVs

- Truck parking shortages nationwide
  - Demand for truck parking > supply of truck parking facilities
  - Safety concerns

- Truck parking charging and refueling
  - Need for charging and refueling infrastructure
  - Parking needs

Solicitation Concept

- Focus on the needs of independent owner operators and long-haul and regional-haul drivers

- Fund centralized locations for overnight, public charging

Questions

Here are the discussion questions that we have for you:

- What types of entities should be eligible to apply?
- What amount of grant funds would be appropriate for this type of project?
- What would be the best way to integrate truck parking charging and refueling with a freight corridor?
- Which geographic locations should be targeted for these funds?

Warehouse and Regional Trucking

Kate Reid, Air Resources Engineer
Freight and Transit Unit

Background

- 100% of in-state sales of MD/HD vehicles in California must be zero emission by 2045
- Regional haul, heavy-duty trucking operations are good candidates for electrification due to the segment's relatively short-hauls and return-to-base operations
  - Trucks typically stay within a 300-mile radius from a home base
- Last-mile delivery operations have increased due to rapid growth of e-Commerce
  - Increased demand for frequent deliveries from distribution and fulfillment centers (warehouses)

Solicitation Concept

- Funding to support the deployment of ZEV infrastructure for HD regional-haul and MD urban delivery vehicles
  - ZEV infrastructure for HD regional-haul fleets that stay within about a 300-mile radius from a home base
  - ZEV infrastructure for "last-mile" MD delivery fleets located in or near a metropolitan area servicing warehouse distribution centers or transportation hubs

Questions

- How can we best provide refueling/charging options for warehouse and regional fleets?
- Is depot charging/home-base charging sufficient or is public charging or opportunity/destination charging necessary?
- Should geographic areas be targeted for these funds?
- Should infrastructure be shared between organizations/businesses?
- What amount of grant funds would be appropriate for this type of project?

Innovative EV Charging & Hydrogen Refueling Technologies

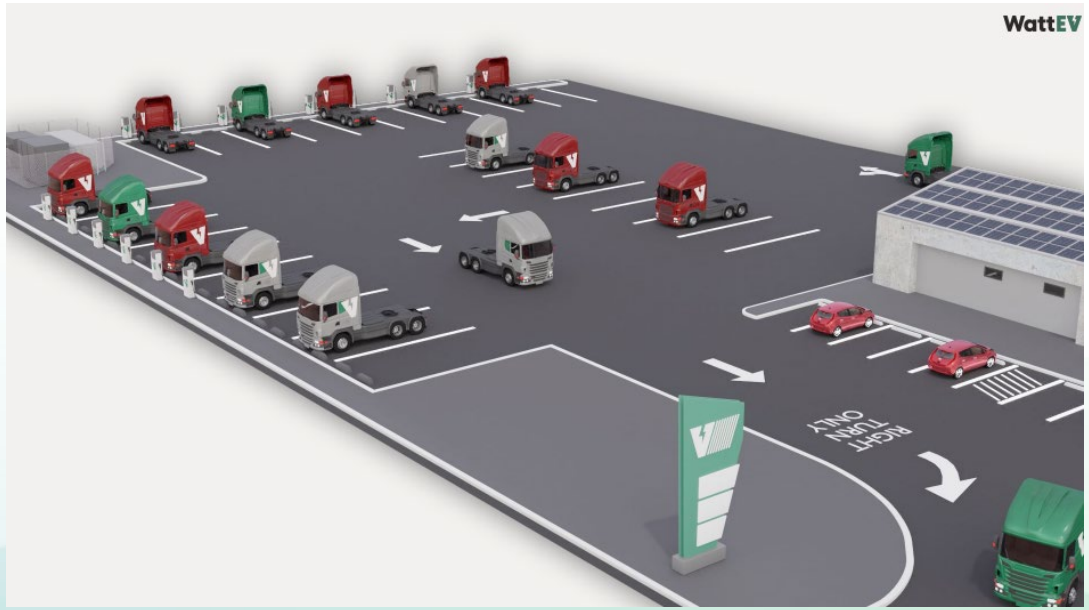
Kate Reid, Air Resources Engineer
Freight and Transit Unit

Background

- Original BESTFIT solicitation (GFO-20-605) released in August 2020
- For the Medium- and Heavy-Duty sector, 2 Areas of Focus:
  1) Minimize Operation, Purchase, and/or Installation Costs
  2) Demonstrate Advancements in Customer or Charging Interface
- 6 MD/HD projects funded (over $8.4 M total)

FIGURE 1: MD CHARGING SYSTEM IN-FIELD WITH CLOSE-UPS OF VEHICLE AND GROUND ASSEMBLY

Momentum Dynamics Corporation



WattEV

Solicitation Concept

- Rapid evolution of the ZEV industry requires continued support for emerging innovative charging and refueling solutions
- Replicate and improve original BESTFIT solicitation
- Focus on replicable models for MD/HD charging
- Include innovation in hydrogen refueling infrastructure
- Potential Sub-concepts:
  - Battery swapping for MD/HD EVs
  - Overhead Catenary
  - Charging/Refueling Corridors

Questions

Administrative Questions

- What changes or improvements should be made to the design of the BESTFIT solicitation?
- Is a maximum award of $2M the right amount?
- Should we have a 2-phase application process (initial 5-page abstract, followed by a full application if the abstract passes)?

Technical Questions

- Should the 2 areas of focus remain the same as the original BESTFIT, or are there other challenges we should consider addressing?
- Which subconcepts should be integrated into a MD/HD BESTFIT opportunity, including those not listed in the previous slide?
- Should there be an increased focus on innovative hydrogen refueling stations in MD/HD BESTFIT?

Mobility-as-a-Service Models

Esther Odufuwa, Energy Commission Specialist I
Freight and Transit Unit

Background

Goals

- Develop and innovate replicable models
- Remove financial barriers

Benefits

- Eliminate ownership of land
- Alleviate utility bottlenecks
- Allow economies of scale

Solicitation Concept

- Provide funding for EV charging or hydrogen refueling infrastructure to support Mobility-as-a-Service applications
- Examples may include:
  - Charging-as-a-Service
  - Infrastructure-as-a-Service
  - Maintenance-as-a-Service
  - Trucking-as-a-Service
  - Parking-as-a-Service

Questions

- What current models exist and how could they be innovated/improved?
- How can this concept specifically target the drayage sector, which is heavily composed of IOOs, who may be unable to purchase ZEVs or finance their own infrastructure upfront?
- What component of these models would be the most advantageous for the CEC to fund (ex. construction of ZEV infrastructure)?
- Is there a pool of existing infrastructure-based service providers?
- What amount of grant funds would be appropriate for this type of project?

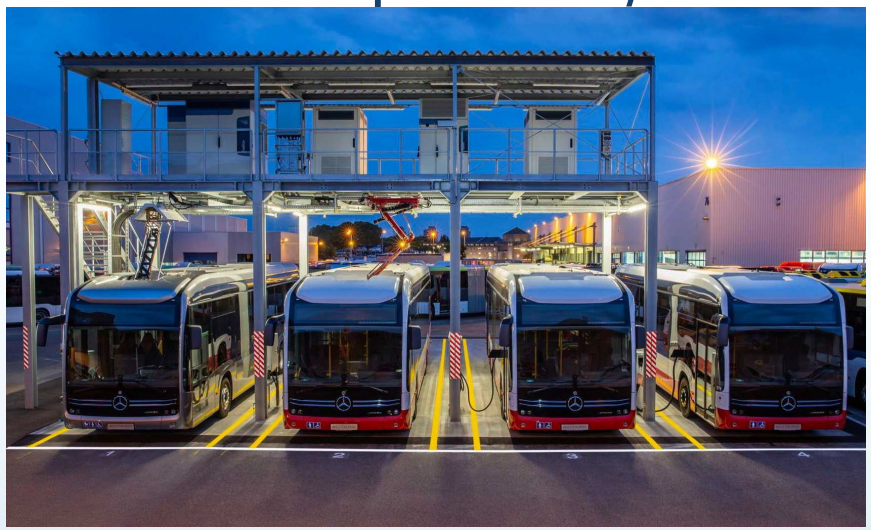
Zero-Emission Rural Small Transit Fleet Infrastructure Deployment

Esther Odufuwa, Energy Commission Specialist I
Freight and Transit Unit

Background

Zero-Emission Transit Fleet Infrastructure Deployment Solicitation (GFO-20-602) released in July 2020

- 4 Areas of Focus:
  - Large fleet/Urban
  - Small fleet/Urban
  - Small fleet/Rural
  - Multiple fleets/Shared
- 7 projects funded for a total of ~$36.2 million
  - 4 Large fleet /Urban
  - 3 Small fleet/ Urban



LADOT Washington Yard

Sunline Transit

Santa Clara Valley Transportation Authority

Solicitation Concept

- Support the deployment of fueling infrastructure for MD/HD zero-emission transit bus fleets
- Target only small, rural transit fleets defined as:
  - Areas with a population below 200,000
  - Total buses operated in annual maximum service is under 100

Questions

- Should a separate solicitation be developed for rural small transit fleets?
- How can this solicitation concept address funding gaps within EnergIIZE? Are there funding needs outside of infrastructure-only costs?
- Should infrastructure be just for bus depot conversion or for the entire fleet?
- Should the solicitation target a geographic area?
- Is 25% cost share too much?
- How much funding is needed per district?
- Are there small fleets interested in forming a bus group to share infrastructure?

Large Scale Ultra-Fast Charging Stations

Kate Reid, Air Resources Engineer
Freight and Transit Unit

Background

- EnergIIZE is not designed to cover large-scale buildout projects
- Allows for economies of scale for charging infrastructure projects
- More cost-effective overall financing of charging infrastructure
- Higher kW/$ and chargers/$ value for use of public funding

Solicitation Concept

- Funding to install large scale ultra-fast charging stations
- Develop replicable models for public-access "ultra-fast" charging stations
- Increase private sector financing of large-scale charging stations

Questions

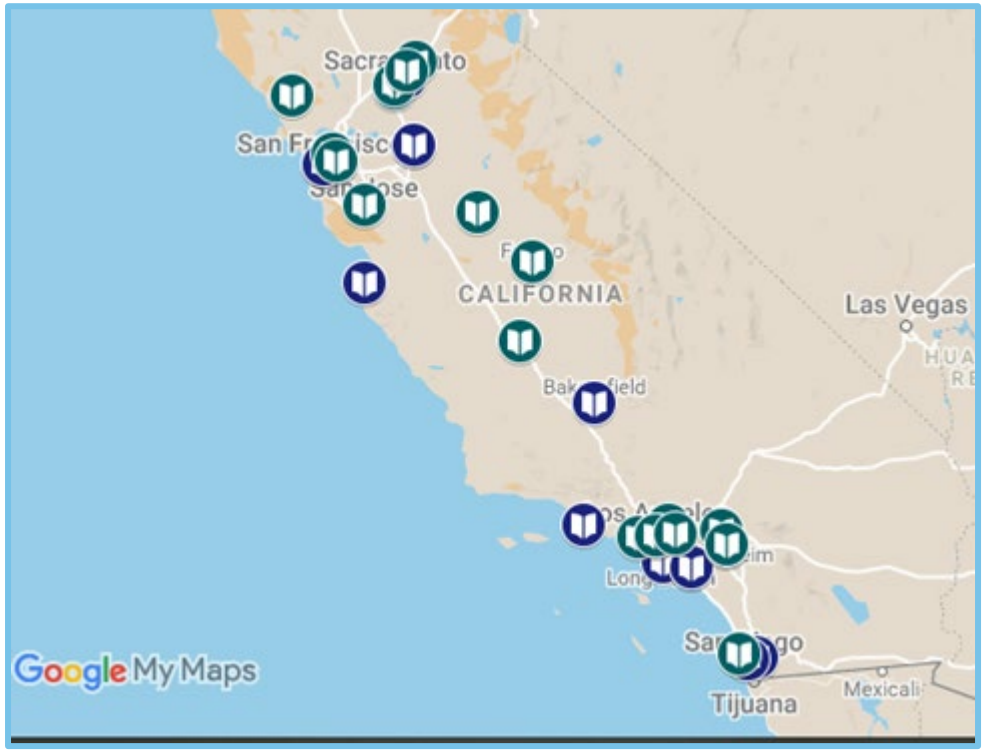
- What defines a site as large scale? How many chargers/outlets would be the minimum?
- What is the industry accepted minimum for ultra-fast charging?
- How many entities would be able to apply to this sort of solicitation, due to the large scale?

MD/HD Blueprints

Esther Odufuwa, Energy Commission Specialist I
Freight and Transit Unit

Background

- Up to $200,000 per award
- 45 applications received asked for over $8 million
- 40 awards across multiple counties
  - Public Agencies - $3,799,722
  - Private Enterprise - $4,154,393



Solicitation Concept

- Fund MD/HD planning blueprints to accelerate the deployment of MD/HD ZEVs and ZEV infrastructure with a holistic and futuristic view of transportation planning
- Identify actions and milestones needed for implementation of MD/HD ZEVs and the related electric charging and/or hydrogen refueling infrastructure
- Improve utility coordination to address capacity and upgrade issues as well as any other issues that the utility and/or IOO/fleet may encounter
- End result: Solidified timelines, reduced bottlenecks, and more efficient infrastructure deployment process

Questions

- Is there interest to have the CEC fund more blueprint documents?
- Should the blueprints be targeted to a specific geographical area? Nonattainment areas, disadvantaged communities, low-income communities?
- What is the reasonable cost for a blueprint?
- Is additional technical assistance needed after a blueprint or planning is complete to expedite project implementation?
  - What kind of technical assistance?
  - How would the additional technical assistance affect ZEV infrastructure timelines?

Infrastructure to Complement CARB Demonstration Concepts

Kate Reid, Air Resources Engineer
Freight and Transit Unit

Background

- CARB's Long-Term Heavy-Duty Investment Strategy laid out a roadmap showing how much heavy-duty incentive funding would be needed over the next three years to help put the State on a trajectory to meet its ZEV adoption and emission reduction goals

- CARB is proposing to focus on off-road demonstration and pilot projects with this year's funding of $40 million

- CARB and the CEC will coordinate and collaborate

Solicitation Concept

- Support CARB's upcoming zero-emission vehicle demonstration projects with ZEV infrastructure funding
- CEC funding must mitigate on-road emissions, so projects must be co-located with on-road vehicle infrastructure
- Project types include:
  - Green zones – municipal level and small off-road engines (SORES)
  - Commercial harbor crafts and microgrids – tugboats and ferries
  - Modular zero-emission cargo handling equipment and off-road equipment
  - Ocean going vessels while at anchor
  - Locomotives – zero-emission interstate line haul

Questions

- As this is a joint funding opportunity with CARB, is there interest in having potential funding opportunities be administered by a third-party implementer?
- What amount of grant funds would be appropriate for these types of projects?
- What are the best scoring criteria that should be used to determine which entities should be awarded funding?
- How do we best serve the needs of surrounding communities?

MD/HD Loan Pilot

Alex Wan, Associate Energy Specialist
Freight and Transit Unit

Background

- The California goal to reduce GHG emissions by 40 percent below 1990 levels by 2030 requires greater investment from private capital sources beyond current levels of government incentives and private capital commitments.
- Public loan programs have demonstrated effectiveness in stimulating private investment in critical infrastructure.
- Vehicle loan programs exist that could be partnered with infrastructure loan programs.

Solicitation Concept

- CEC released a Request for Information on August 24, 2021 seeking information to assess if a loan program would be an efficient use of state funds to enhance MD/HD ZEV charging and refueling infrastructure.
- Docket Log, 20-FINANCE-01: https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=20-FINANCE-01

Questions

- What vehicle segments, vocations, and/or locations of the medium- and heavy-duty clean transportation infrastructure system are most amenable to a loan program at this time?
- How should a loan program be structured to deliver maximum effectiveness?
- In which instances and under what program designs would you prefer a loan over a grant? Would reduced reporting requirements or a streamlined application process cause you to prefer a loan over a grant?
- Are there any other thoughts or recommendations that you would like us to consider?

Public Comment/Discussion Period

Zoom Participants

- Use the "raise hand" feature to make verbal comments
- Use the Q&A feature to type in your question

Telephone Participants:

- Dial *9 to raise your hand
- Dial *6 to mute/unmute your phone line

Written Comments

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

Deadline for comment: March 18, 2022

Summary of Questions

- What amount of grant funds would be appropriate for each project/concept?
- Should the CEC target specific regions in the state?
- For infrastructure projects, should grant funds be limited to equipment-only costs?
- Which of the proposed concepts should take priority in being further developed?

Zoom Participants:

- Use the "raise hand" feature to make verbal comments
- Use the Q&A feature to type in your comment/question

Telephone Participants:

- Dial *9 to raise your hand
- Dial *6 to mute/unmute your phone line

Submit Comments to Docket 19-TRAN-02

Electronic Commenting System

Visit the comment page for this docket at:
https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=19-TRAN-02

Comment by E-mail

E-mail: docket@energy.ca.gov

Subject Line: "19-TRAN-02 MD/HD Allocation"

All comments due by 5:00 pm on March 18, 2022

Thank you for participating remotely.