Second Work Group for the Long-Term Heavy-Duty Investment Strategy
May 25, 2022
Agenda

• Introductions and background
• Heavy-Duty Investment Strategy for fiscal year 2022-23
  • Integrating equity into the process
  • Technology status snapshot and market readiness discussion
  • Emerging opportunities/next generation technologies discussion
  • Metrics of success
  • Three-year priorities table
  • Industry examples
• SB 372 overview
• California Energy Commission update
Purpose of the Long-Term Heavy-Duty Investment Strategy

• Annual three-year investment strategy for Clean Transportation Incentives
• Roadmap for transforming the heavy-duty transportation sector
• Outlines priorities for investment
• Includes annual report on the State’s school bus fleet
Program Implementation Begins December

Legislature appropriates funding June/July

Board adopts Funding Plan November

Governor’s May Revise Budget May

Governor proposes Budget January

Governor proposes Budget January

Select Program Administrator

Execute Grant Agreement

Program Development

Distribute Incentives

Release Grant Solicitation

Funding Timeline

CARB
How Can I Participate?

**Kick-off Workshop**  
March 2022  
Broad, high-level discussion on Governor’s proposed budget, Funding Plan process, and program updates

**Work Group Meetings**  
March – June 2022  
Project specific discussions on proposed funding allocations and program changes

**Final Workshop**  
July 21, 2022  
Discuss staff’s draft proposals for the Funding Plan

**Public Comment Period**  
October 7 – November 7, 2022  
Submit written comments on Funding Plan through CARB’s online portal

**Board Hearing**  
November 17-18, 2022  
Board considers staff’s proposal and listens to public testimony prior to adopting Funding Plan

**One-on-one Meetings**  
Request meetings with CARB to discuss a specific topic or variety of topics

**Community Engagement Meetings**  
Targeted meetings with community groups to discuss community-identified topics
Today’s Objectives

Solicit feedback on:

• Equity as part of the process
• Market readiness indicators
• Emerging opportunities
• Metrics
• Draft Three-Year Priorities Table
• Industry Examples
Integrating Equity

• Integrating equity more fully into the Heavy-Duty Investment Strategy development process
• Ongoing outreach and community engagement
• Shifting from strictly first-come first-served to a more strategic focus on small fleets/businesses and underserved communities
Market Readiness Indicators

• **Production Capacity** – Is this technology in commercial production, or is it limited to prototypes, retrofits, upfits? Is commercial production significant?

• **Cost Parity** – Is the total cost of ownership (TCO) of this technology comparable to internal combustion alternatives (without incentives)?

• **Cost Parity with Incentives** – When factoring in available incentive programs (e.g., HVIP, CORE), is the TCO of this technology comparable to internal combustions alternatives?
Market Readiness Indicators (cont.)

- **Duty Cycle Applicability** – Can this technology sufficiently meet the range, payload capacity, and power requirements of common duty cycles within this application?
- **Infrastructure** – Is appropriate charging/refueling infrastructure commercially available? Does it face challenges such as cost, permitting, utility connection/coordination, and/or electricity/fuel prices?
- **Workforce/Services Network** – Are professional technicians capable of repairing and/or maintaining zero-emission vehicles readily available?
### Market Readiness Indicators Snapshot

**Concept Graphic**

<table>
<thead>
<tr>
<th>Category</th>
<th>Infrastructure</th>
<th>Service Network</th>
<th>Production Capacity</th>
<th>Cost Parity</th>
<th>Cost Parity with Incentives</th>
<th>Duty Cycle</th>
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Note: Indicators shown here do NOT represent actual market readiness.
Emerging Opportunities

- DC fast charging-capable batteries
- Higher power on-board chargers
- Fuel Cell Efficiency
- Advanced battery chemistries (solid state, reduced critical minerals, etc.)
- Battery swapping
- Vehicle-to-everything (V2X, V2B, V2G, etc.)
Metrics

- Supporting Technology Evolution
- Growing the Green Economy
- Creating Healthy Communities
Metrics of Success (2021)

Creating Healthy Communities

58 PERCENT
DAC VOUCHERS
Fifty-eight percent of vouchers in HVIP have funded vehicles deployed in Disadvantaged Communities, as identified in CalEnvironScreen 3.0.

63 PERCENT
FLEET SUPPORT
Sixty-three percent of vouchers were given to small or public fleets (public entities with <$15 million annual revenue or fewer than 50 people).

Supporting Technology Evolution

12 THOUSAND
JOBS CREATED
The incentive dollars spent through HVIP have created nearly 3,000 jobs from HVIP funding and spurred close to 9,000 jobs from private investment, totaling almost 12,000 jobs.

222 MILLION
MILES TRAVED
There were 222,066,801 cleaner-than-diesel miles traveled in California by HVIP-funded vehicles between 2010 and 2021.

Growing the Green Economy

197 VEHICLES
MANUFACTURERS
There are 43 HVIP and CORE-eligible manufacturers offering 197 vehicles.

$500+ MILLION
VEHICLE PURCHASE
HVIP and CORE have funded $575+ million toward the purchase of nearly 9,000 clean vehicles since 2010.
## Long Term-Heavy Duty Investments Strategy Update*

<table>
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<tr>
<th>Program</th>
<th>FY 2023-24</th>
<th>FY 2024-25</th>
<th>FY 2025-26</th>
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</table>
| **Demos** | $XX-$XX Million  
Focus: ZE Construction Equipment, ZE Heavier Cargo Handling Equipment, ZE Line-Haul Rail, ZE Marine | $XX-$XX Million  
Focus: ZE Construction and Mining Equipment, ZE Heavier Cargo Handling Equipment, ZE Line-Haul Rail, ZE Marine | $XX-$XX Million  
Focus: ZE Construction and Mining Equipment, ZE Heavier Cargo Handling Equipment, ZE Line-Haul Rail, ZE Aviation |
| **Pilots** | $XXXX-$XXXX Million  
Focus: Strategic Range Extenders, ZE Ag-Construction-Heavier Cargo Handling Equipment, ZE/Hybrid Marine, ZE Facilities/Communities/Corridors | $XXXX-$XXXX Million  
Focus: Strategic Range Extenders, ZE Ag-Construction-Heavier Cargo Handling Equipment, ZE Line-Haul Rail, ZE/Hybrid Marine, ZE Facilities/Communities/Corridors | $XXXX-$XXXX Million  
Focus: ZE Longer Range Trucking, Strategic Range Extenders, ZE Ag-Construction-Heavier Cargo Handling Equipment, ZE Switcher Rail, ZE/Hybrid Marine, ZE Facilities/Communities/Corridors |
| **Commercial** | $XXXX-$XXXX Million  
Focus: ZE Drayage, ZE Long-Haul Trucks, ZE Transit, ZE Heavier Cargo Handling Equipment, ZE/Hybrid Marine, ePTOs, ZE Small Fleets | $XXXX-$X,XXX Million  
Focus: ZE Drayage, ZE Long Haul Trucks, ZE Transit, ZE Heavier Cargo Handling Equipment, ZE/Hybrid Marine, ePTOs | $XXXX-$X,XXX Million  
Focus: ZE Drayage, ZE Long Haul Trucks, ZE Transit, ZE Heavier Cargo Handling Equipment, ZE/Hybrid Marine, ePTOs |
| **Total Funding** | $XXXX-$X,XXX Million* | $X,XXX-$X,XXX Million* | $X,XXX-$X,XXX Million* |

*The vehicle and equipment types listed in the table above are a prioritized selection of the project types that CARB would invest in, given sufficient available funds. These focus areas are identified following the strategy laid out in this document and take into consideration a wide number of factors. This is not an exhaustive list of technologies or applications that Low Carbon Transportation would fund and indeed funding numbers are inclusive of a much broader set of vehicle and equipment investments CARB hopes to make.
Industry Examples

- Driver health improvements from zero-emission heavy-duty regional trucks
- “Electrification-as-a-service" business models
- Battery-electric locomotives
- Zero-Emission TRUs
- Zero-Emission Facilities (including multiple vehicle types)
- Zero-Emission Transit Buses
- Zero-Emission Truck Showcase and Ride & Drive
SB 372 Overview
California Energy Commission Update
Next Steps

• Final Funding Plan workshop: July 21
• Draft Funding Plan and Heavy-Duty Investment Strategy released
• Public comment period: October 7 – November 7, 2022
• Board Meeting: November 17-18, 2022
Contact Us

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