



Second Work Group for the Long-Term Heavy-Duty Investment Strategy

May 25, 2022

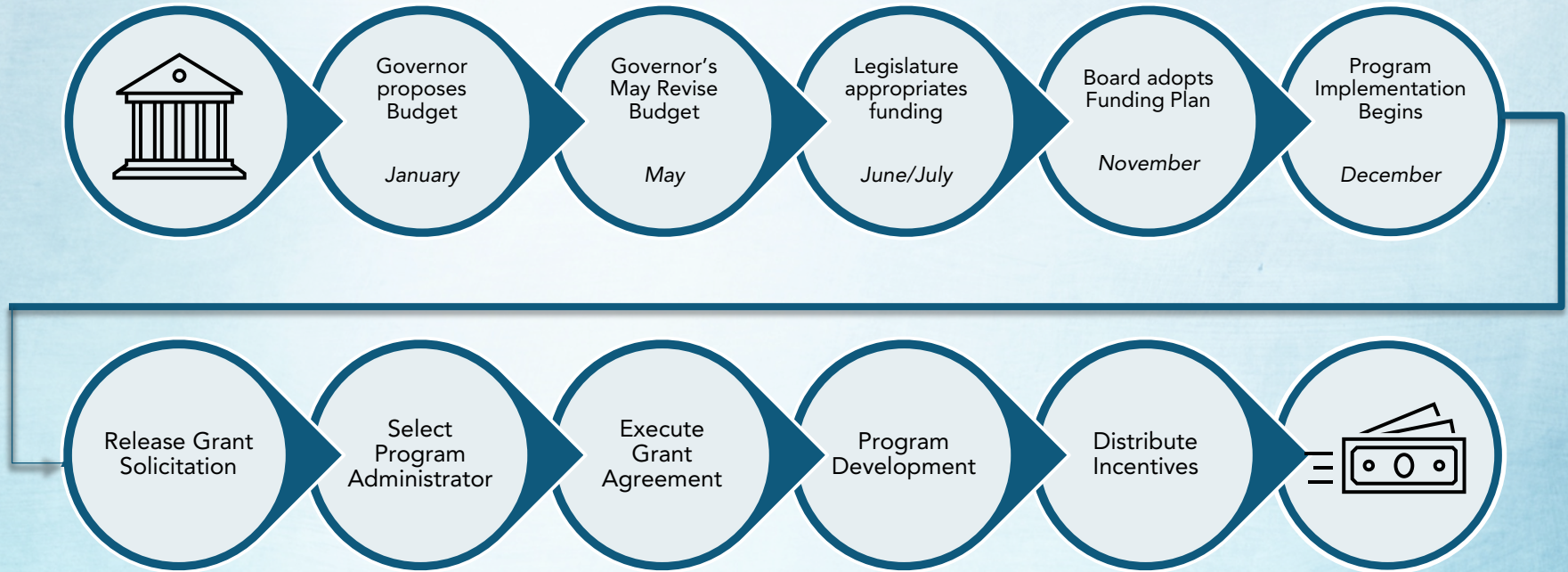
Agenda

- 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

Funding Timeline



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:

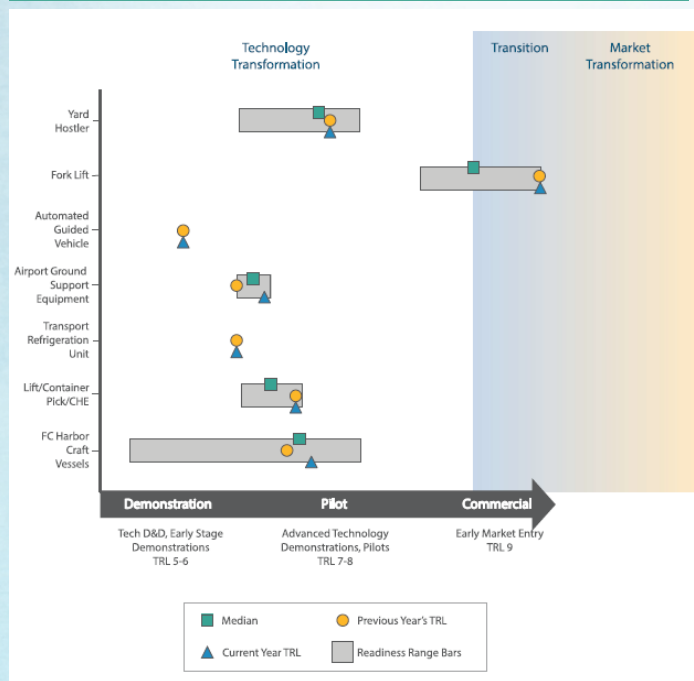
- Equity as part of the process
- Market readiness indicators
- Emerging opportunities
- Metrics
- Draft Three-Year Priorities Table
- Industry Examples

Integrating Equity

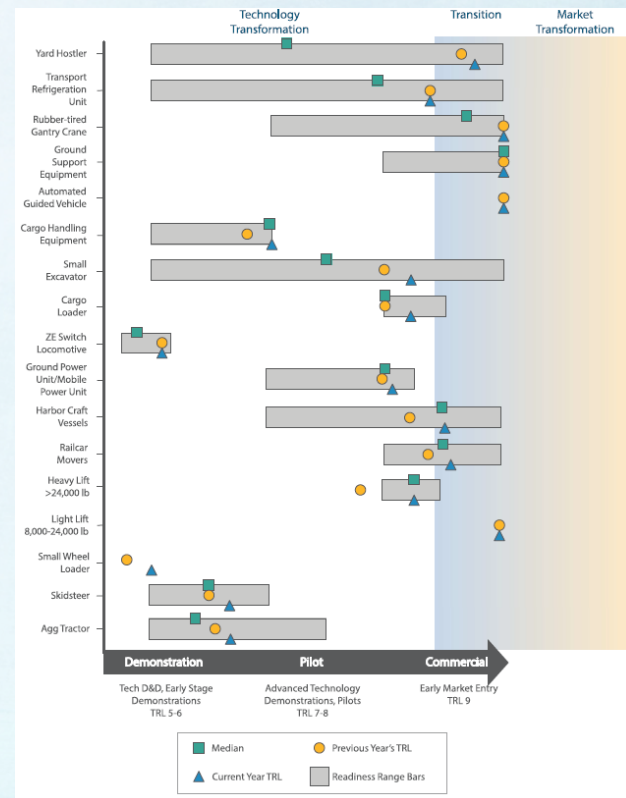
- Integrating equity more fully into the Heavy-Duty Investment Strategy development process
- Ongoing outreach and community engagement
- Shifting from strictly first-come first-served to a more strategic focus on small fleets/businesses and underserved communities

Technology Status Updates

Off-Road Fuel Cell Electric Vehicles Technology Status Snapshot (2021)



Off-Road Battery Electric Vehicle Technology Status Snapshot (2021)



Market Readiness Indicators

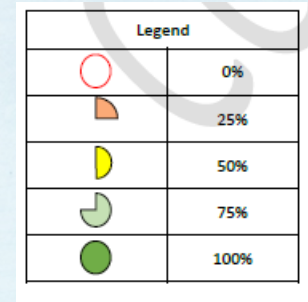
- **Production Capacity** – Is this technology in commercial production, or is it limited to prototypes, retrofits, upfits? Is commercial production significant?
- **Cost Parity** – Is the total cost of ownership (TCO) of this technology comparable to internal combustion alternatives (without incentives)?
- **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



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 CalEnviroScreen 3.0.



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.



Growing the Green Economy

197
VEHICLES

MANUFACTURERS

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



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).



222
MILLION

MILES TRAVELED

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



\$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*

Program	FY 2023-24	FY 2024-25	FY 2025-26
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	\$XXX-\$XXX Million Focus: Strategic Range Extenders, ZE Ag-Construction-Heavier Cargo Handling Equipment, ZE/Hybrid Marine, ZE Facilities/Communities/Corridors	\$XXX-\$XXX Million Focus: Strategic Range Extenders, ZE Ag-Construction-Heavier Cargo Handling Equipment, ZE Line-Haul Rail, ZE/Hybrid Marine, ZE Facilities/Communities/Corridors	\$XXX-\$XXX 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	\$XXX-\$XXX Million Focus: ZE Drayage, ZE Long-Haul Trucks, ZE Transit, ZE Heavier Cargo Handling Equipment, ZE/Hybrid Marine, ePTOs, ZE Small Fleets	\$XXX-\$X,XXX Million Focus: ZE Drayage, ZE Long Haul Trucks, ZE Transit, ZE Heavier Cargo Handling Equipment, ZE/Hybrid Marine, ePTOs	\$XXX-\$X,XXX Million Focus: ZE Drayage, ZE Long Haul Trucks, ZE Transit, ZE Heavier Cargo Handling Equipment, ZE/Hybrid Marine, ePTOs
Total Funding	\$XXX-\$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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