

Low Carbon Transportation Investments and Air Quality Improvement Program

Public Workshop on the Heavy-Duty Three-Year Plan

Sacramento, California
February 10, 2017

California Environmental Protection Agency
 **Air Resources Board**



Heavy-Duty Three-Year Plan

- “Roadmap” for longer-term heavy-duty investments
- Identify areas to prioritize LCT/AQIP funding
- Develop a strategy for investment
- Develop metrics to measure success of investments
- Help guide our efforts in coordinating with other funding programs

Process for Developing Plan

- Overall framework
 - Guiding principles and goals for the plan
- Preliminary concept
- Process for development and stakeholder interaction
 - Identify key partners for development of the plan
 - Provide opportunities for stakeholder feedback

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Vision – Where We Need to Go

- Reduce GHG emissions
 - Reduce to 1990 levels by 2020
 - Reduce 40 percent below 1990 levels by 2030
 - Reduce transportation GHGs by 80 percent below 1990 levels by 2050
- Support Governor's Pillars
- Meet federal ozone and PM standards by 2023 and 2031

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Goals/Outcomes for Investments

- Ensure clean air for all Californians
- Help meet the State's long-term climate change and clean air goals
- Create green jobs
- Achieve and maintain healthy and sustainable communities

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Guiding Principles to Achieve Goals

- Prioritize LCT/AQIP funding so that it spurs and leverages increased private investment
- Accelerate heavy-duty vehicle and equipment technology advancement in targeted areas
- Move technologies through early commercialization process and meet emerging market demand
- Invest in a combination of transformation strategies for on-road and off-road heavy-duty vehicles, equipment, and fueling infrastructure

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Strategies

- California's Framework for M/HD Transformation
 - Employ zero-emission vehicles and equipment everywhere feasible, and
 - Near zero-emissions with renewable fuels everywhere else
- Focus on Key Pathways to Achieve Transformation
 - Greater or full electrification
 - Low Nox engines with low carbon fuels
 - Greater efficiencies (both engine and operational)
- Identify funding opportunities for projects at all stages of commercialization arc

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Pathways

- Key Pathway Technologies
 - Electrification
 - Battery Electric Vehicles and equipment (BEV)
 - Fuel Cell Electric Vehicles and equipment (FCEV)
 - Hybrid vehicles and equipment
 - Low NOx engines
 - Efficiencies
 - Engine Efficiencies
 - Operating Efficiencies

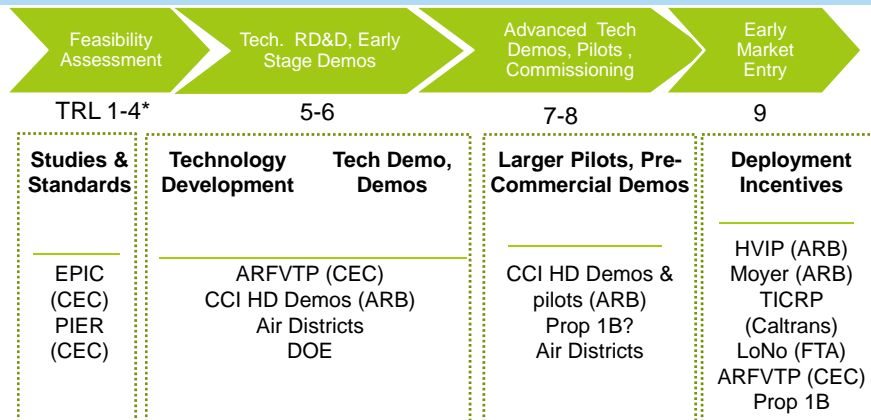
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Main Components of Plan

- Plan to prioritize LCT & AQIP investments
 - Move needed technologies through commercialization stages
 - Make use of “beach heads” (first launch markets)
- Case Studies
- Identify investment priorities for the next 3 years
- Metrics for measuring the success of these investments

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Commercialization Arc: Stages, Needs, and Programs



*TRL: Technology Readiness Level

CONCEPTUAL DISCUSSION ONLY - DRAFT

Status of Technologies

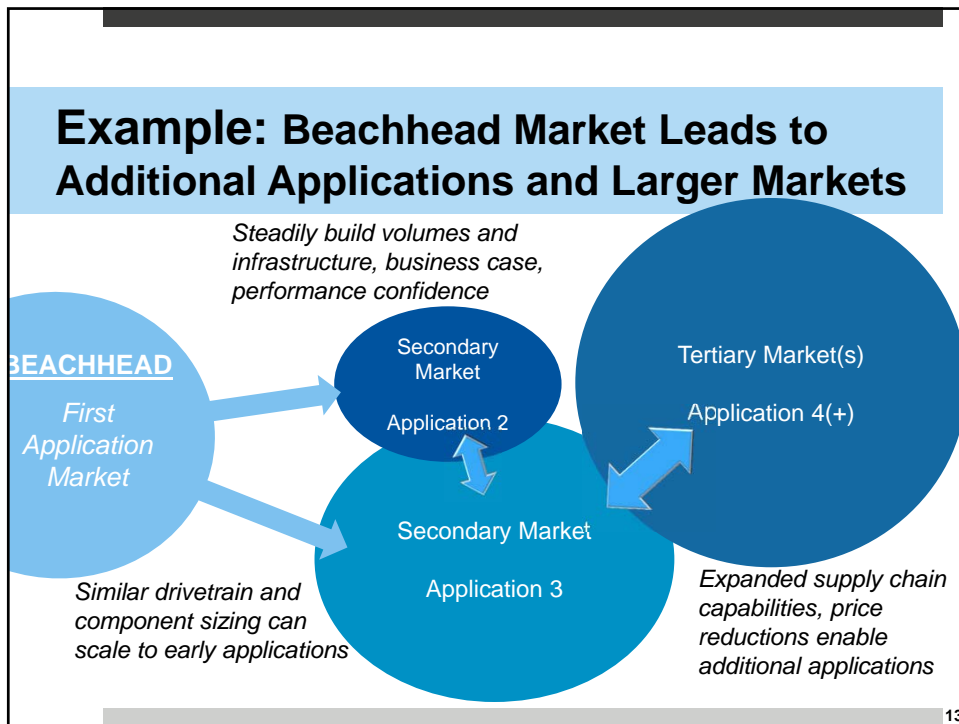
- For each technology category, a discussion of:
 - Technology – general overview, the spectrum of applications across technology readiness levels, etc.
 - Current policies in place to spur technology advancement – local, state, and federal levels
 - Economic/market assessment
 - Specific applications in the on-road and off-road sectors

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Strategic Investments – the “Beachhead” Concept

- Identify and leverage key early markets where technology can be successful; use as launching point to then support additional applications
- Success comes from growth of core supply chain, transferring similar powertrain and components
- Beachheads help establish first success cases
 - As technologies mature, they can expand in application and get more affordable
- Each succeeding market builds greater volume
 - Example: transit buses → Refuse trucks → drayage and regional haul

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- ### Case Studies
- Highlight early success stories
 - Show cases where technology advancement is taking place
 - Demonstrate measurable achievements
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Potential Metrics for Demonstrating Benefits of Investments

- Potential to reduce emissions once fully commercialized
- Disadvantaged community benefits
- Ability to advance technology along commercialization arc
- Technology transferability
- Job, education, and training opportunities

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Heavy-Duty Three-Year Plan Development Schedule

Milestone	Date
Work group meetings*	Feb – March 2017
Final Workshop <ul style="list-style-type: none"> • Discussion document with draft project allocations, project details, and draft heavy-duty three-year plan 	April 6, 2017
Release proposed Funding Plan	May 19, 2017
Board consideration of proposed Funding Plan	June 22, 2017
Start implementing 2017-18 projects	July 2017

*Handout lists preliminary work group meeting schedule

Additional information available at:

<http://www.arb.ca.gov/aqip/>

<http://www.arb.ca.gov/msprog/aqip/meetings/meetings.htm>

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Comments and Discussion

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Additional Comments or Questions

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