



# **Heavy-Duty Vehicle Inspection and Maintenance (HD I/M) Workgroup Meeting:**

**Senate Bill 210 Pilot Program Activities and  
On-Board Diagnostics (OBD) Specifications**

**November 16, 2020**

# Today's Agenda

- SB 210 Pilot
  - Purpose
  - HD I/M review
  - Senate Bill (SB) 210 HD I/M pilot program
    - SB 210 pilot program requirements and stakeholder engagement
    - Pilot program
    - Additional HD I/M support studies
    - Q&A
- Technical specifications for HD on-board diagnostics (OBD) data collection and submission systems and tools
  - Q&A

# HD I/M Review



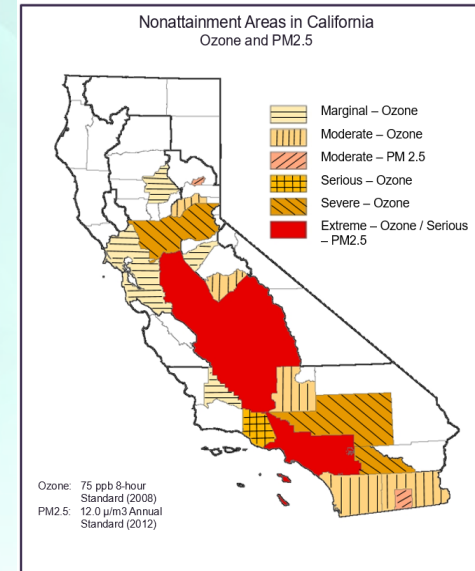
# HD I/M Review

- SB 210 (Leyva; Statutes of 2019) directs CARB to develop and implement a new, comprehensive HD I/M program, in coordination with partner State agencies
  - Target excess NOx and PM emissions from in-use vehicles
  - Require all vehicles operating in California to comply
  - Allow OBD system checks to identify malfunctioning emissions-related components in applicable engines
- Program objectives:
  - Maintain low emissions throughout a vehicle's life
  - Ensure emissions control systems are functioning properly
  - Minimize inspection downtime for vehicle owners
  - Ensure quick and adequate repair of malfunctioning parts



# HD I/M Review - continued

- Heavy-duty vehicles remain one of the largest emissions contributors in the state
- HD I/M is a key measure in California's State Implementation Plan (SIP) statewide strategy
- In San Joaquin Valley region, HD I/M is one of the largest proposed near-term reduction measures
  - SJV SIP Commitment: 6.8 TPD NO<sub>x</sub> reduction in 2024
- In South Coast region, action needed beyond current programs by 2031
  - Further NO<sub>x</sub> reductions on order of 80% needed



# SB 210 Pilot Program Requirements and Stakeholder Engagement Efforts





# SB 210 Pilot Program Requirements

- Consult with partner state agencies and stakeholders in public process to demonstrate technologies that show potential for bringing vehicles into the HD I/M program – Health and Safety Code (H&SC) §44156(a)
  - Report findings on CARB website before Board adoption
- Adopt and implement the HD I/M program no later than two years after completion of the pilot program – H&SC §44152(a)
- Beyond pilot effort itself, CARB plans to further test components of HD I/M system prior to the roll out of each implementation phase

# Stakeholder Engagement

- January 29, 2020: CARB workshop discussed SB 210 pilot concepts and solicited ideas from stakeholders
- February 19, 2020: CARB HD I/M workgroup meeting to continue discussion of pilot
- Individual meetings with interested parties throughout 2020
- Continued coordination with participants on pilot testing efforts
- Today November 16, 2020: Update on Pilot Efforts



# Coordination with State Agency Partners

- Bureau of Automotive Repair (BAR): expert consultant on I/M implementation, OBD data collection tools, testing device requirements, and certification process
- Department of Motor Vehicles (DMV): California vehicle registration hold process for non-compliant vehicles; learning and improving on SB1 process; future outreach/education strategies
- California Highway Patrol (CHP): enforcement strategies coordination
- California Department of Transportation (Caltrans): assistance with equipment siting and permitting: Remote sensing devices (RSD), CARB's Portable Emissions AcQuisition System (PEAQS), Automated license plate recognition (ALPR) cameras
- California Department of Food and Agriculture (CDFA): assistance with equipment siting; future outreach/education strategies

# SB 210 Pilot

- SB210 pilot designed to test how the future HD I/M program components can best operate together to ensure an efficient and effective rollout during program implementation
- **OBD Efforts**
  - Piloting of OBD data collection tools and submission options
  - Piloting of OBD data processing
- **Vehicle Monitoring Infrastructure Efforts**
  - Piloting of remote sensing emission detection equipment
  - Piloting of ALPR cameras for non-compliance identification
  - Piloting of vehicle/emissions data processing
- **Program Enforcement Efforts**
  - Piloting enhancements to enforcement design processes

# Details on Pilot Effort



# OBD Data Collection and Device Testing Efforts

- Pilot and evaluate HD vehicle OBD collection and monitoring methods
  - Test and demonstrate OBD submission tools to ensure effective incorporation into the HD I/M program
  - Validate internal database processing functions for the incoming OBD data

# Testing Potential OBD Data Collection and Submission Tools

- Validating OBD data collection methods
  - Telematics equipment
  - Plug in dongle devices
  - Kiosk submission
  - OBD scan tools
- Testing Efforts
  - Working with CA fleets to test and demonstrate potential OBD submission options
  - Collaborating with certified PSIP testers to use OBD collection devices in the field
  - Equipment vendors developing and testing prototype devices
  - Consulting with telematics providers
  - Surveying fleets on preferred submission options
  - Coordinating with other state agencies in development and testing efforts
- Contract with ERG supporting some of these testing efforts



# Areas to be Further Explored

- Ensure the feasibility and effectiveness of the different data acquisition platforms to collect and submit HD I/M required OBD data
- Better characterize fleet testing preferences of these different platforms
- Further constrain potential vehicle downtime necessary to complete testing through these various platforms
- Evaluate potential costs and lead time required to bring devices to the marketplace
- Identify best testing approaches to maximize program effectiveness



# Internal OBD Data Processing Efforts

- Verify internal systems adequately incorporate data submissions from the multiple platforms
- Verify data submission processes and data validity
- Establish automated processes to collect, store, and assess data submissions for program compliance
- Ensure robust security protocols and privacy protection for incoming data submissions

# Next Steps

- Continue testing and fleet outreach efforts through Spring 2021
- Continue collaboration with device vendors, manufacturers, and OBD experts to further refine testing device requirements based on testing results
  - OBD specifications discussion later in this workgroup meeting
- Continue analysis to refine database design

# HD Enforcement using Roadside Monitoring Systems

## Pilot Goals:

- Evaluate how best to establish a RSD and complimentary ALPR network to identify potential high-emitters/non-compliant vehicles and to better understand vehicle operations in the State
- Evaluate how best to establish a data-driven enforcement process

## Pilot Components:

- Pilot long-term unattended PEAQS deployments
- Evaluation of different RSD technologies
- Pilot stand-alone ALPR cameras
- Pilot a data-driven enforcement process

# HD Enforcement using Roadside Monitoring Systems: Long-Term, Unattended PEAQS Deployments

Pilot of permanent PEAQS deployment for unattended and continuous operations.

- Collect emissions and ALPR data to design a streamlined enforcement process
- Evaluate system durability under harsh environment conditions
- Establish secure data transmission pipeline
- Assess system deployment, operation and maintenance requirements, and costs



# HD Enforcement using Roadside Monitoring Systems: Long-Term, Unattended PEAQS Deployments

## Current Progress

- Currently testing two unattended PEAQS systems at CDFA Border Inspection Stations
- Emissions and license plate data remotely transferred to CARB continuously via secure connection
- Collecting emissions data from tens of thousands of vehicles each month
- Testing methods to detect TRU presence and DOT numbers
- Pilot efforts to continue through Spring of 2021

# HD Enforcement using Roadside Monitoring Systems: RSD Testing Campaign – Mt. Pass

Two-week field test (Nov 2 – Nov. 13) to compare available RSD robustness of measuring critical emissions (**PM**, **NO<sub>x</sub>**, **CO<sub>2</sub>**) and optimal RSD set-up conditions. Concurrent OBD and opacity data collected to determine correlation between RSD and control tests.

## Systems tested:

- Hagar Environmental Atmospheric Technology (**HEAT**)'s Emission Detection and Reporting (**EDAR**) system
- **OPUS AccuScan**
- **CARB** Developed Portable Emissions Acquisition System (**PEAQS**)
- All systems utilize ALPR to pair vehicles to emissions





# HD Enforcement using Roadside Monitoring Systems: RSD Testing Campaign – Mt. Pass

## NEXT STEPS

- Evaluate results from RSDs for robustness in measuring PM, NO<sub>x</sub>, & CO<sub>2</sub>
- Determine strengths and weakness of each system
- Evaluate each RSD for suitability in varied settings (e.g. traffic speeds, existing support infrastructure, etc.)
- Ensuring compatibility between RSD screening assessments and potential follow up emissions testing mechanisms
- Expected completion early next year dependent on data returned from HEAT and OPUS

# HD Enforcement using Roadside Monitoring Systems: Stand-Alone ALPR Cameras

This is a potential means of supplementing an ALPR equipped RSD network to identify vehicles operating without a compliance certificate

- CARB has contracted UC Irvine for this portion
- Data collection for SB 210 pilot through spring 2021
- Total of 3 locations along CA border
  - 1 system installed on CA/NV border near Mt. Pass
  - 2 additional systems to be installed on CA/AZ and CA/MX borders.



*Cameras installed near Mountain Pass*

# HD Enforcement using Roadside Monitoring Systems: Stand-Alone ALPR Cameras

## Goals

- Assess feasibility and effectiveness of establishing a near border monitoring infrastructure to ensure compliance of out of state vehicle traffic
- Assess systems durability for long-term permanent installations
- Improve understanding of out-of-state truck travel characteristics in California

# Enhancing the Design of HD Enforcement Processes

## Enforcement process development will include:

- Evaluation of methods to identify non-compliance using RSD, ALPR, vehicle registration data, vehicle test data, and other CARB internal data sources
- Design of data-driven, targeted enforcement processes
- Evaluation of the effectiveness of enforcement and behavior change as a result of new processes in partnership with Energy & Environmental Lab/University of Chicago Urban Labs



# Additional HD I/M Support Studies Outside of the SB210 Pilot



# Initial HD I/M Feasibility Assessment

- University of California at Riverside, Center for Environmental Research and Technology – Contract #15R0D22
  - January 2019 final report:  
<https://ww2.arb.ca.gov/sites/default/files/classic//research/apr/past/15rd022.pdf>
- Study purpose: Evaluate options for a more comprehensive HD I/M program
- Conclusions:
  - Repairs are needed to keep emissions at low levels
    - 12 out of 47 vehicles (26%) came in for repair with MIL on
    - 50-75% NOx reductions achieved via repairs
  - Recommended primary test methods
    - OBD data scans for OBD-equipped engines as a quick and convenient test method
    - Couple with RSD/PEAQS roadside monitoring for program validation



# HD I/M Repair Impacts

- Evaluate potential impacts to fleet business operations as a result of a HD I/M program
- Work with HD repair shops and fleets to evaluate potential changes to vehicle repair process due to HD I/M
  - Assess vehicle downtime as a result of HD I/M related repairs
- Estimate costs associated with HD I/M related repairs
  - Working with several repair facilities/other sources to identify most common emission-related fault codes and necessary repairs to extinguish MIL-on
  - Link specific repairs to repair costs
- Expected completion date: Spring 2021

# Evaluating Need for HDV Repair Assistance

- Determining if repair assistance program is needed in a fully implemented HD I/M program
- Qualified small fleet owners paid for part of emissions-related repair bill with remainder of costs covered through funding grant
  - In 2018 \$1 million grant to San Joaquin Air Pollution Control District to administer pilot
  - Cooperating HD Repair facilities in Stockton, Fresno, and Bakersfield
  - \$850,000 expended on 156 repairs.
  - Data from repair strategies and cost currently being analyzed.
- Report from SJV APCD expected later this year

## Next Steps: HD I/M Development

- December 2020 HD I/M workgroup meeting to discuss detailed regulatory concepts
- Additional HD I/M workgroup meetings and workshops in 2021
- SB 210 Pilot Program report to be posted on CARB website in summer 2021
- Board hearing: December 8-9, 2021
- Implementation: phase in starting in 2023

## For More HD I/M Program Information

- Visit CARB's website at: <https://ww2.arb.ca.gov/our-work/programs/heavy-duty-inspection-and-maintenance-program>
- Subscribe to receive HD I/M email updates at: [https://public.govdelivery.com/accounts/CARB/subscriber/new?topic\\_id=hdim](https://public.govdelivery.com/accounts/CARB/subscriber/new?topic_id=hdim)
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