



Next-Generation Heavy-Duty Vehicle Enforcement

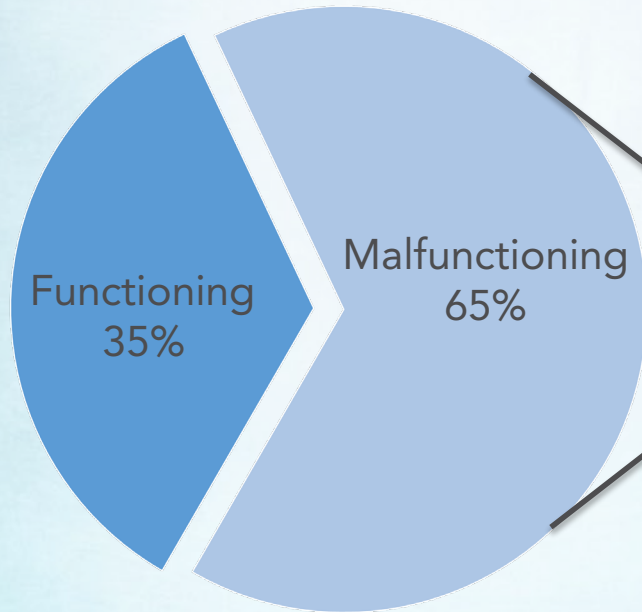
October 22, 2020

Background

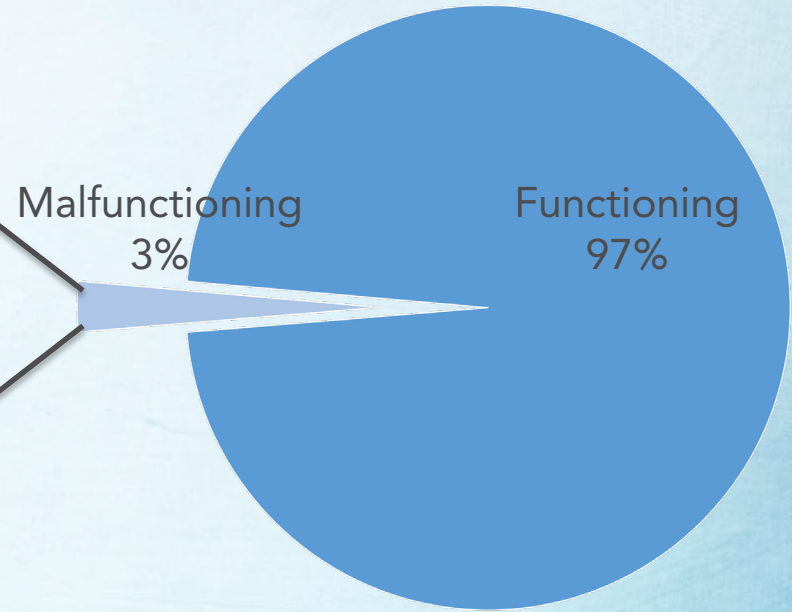
- CARB regulations are modernizing truck fleets
 - Diesel particulate filters, NOx catalysts, and OBD
 - Eventually all heavy-duty trucks will be zero emission
- Compliance with Truck and Bus Regulation has improved dramatically
 - From 72% in 2015 to 86% in 2019
- Remaining emissions are caused by a small fraction of malfunctioning/poorly maintained vehicles

Emissions Due to Malfunction - PM

Statewide PM2.5 Emissions
from HD Truck in 2031

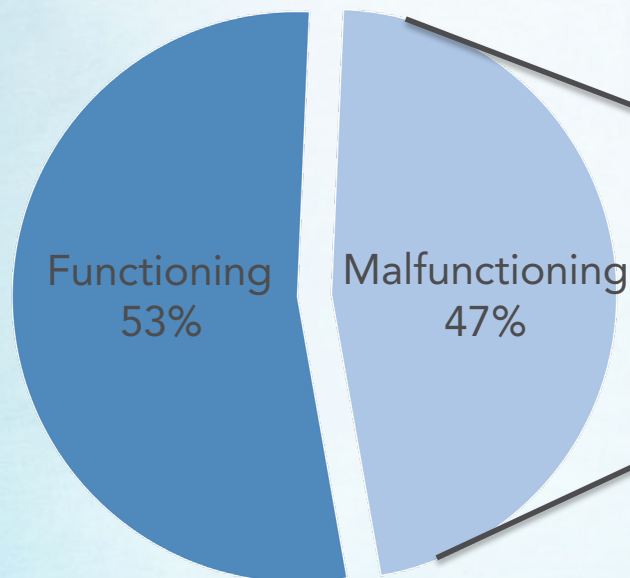


Statewide HD Truck
Population in 2031

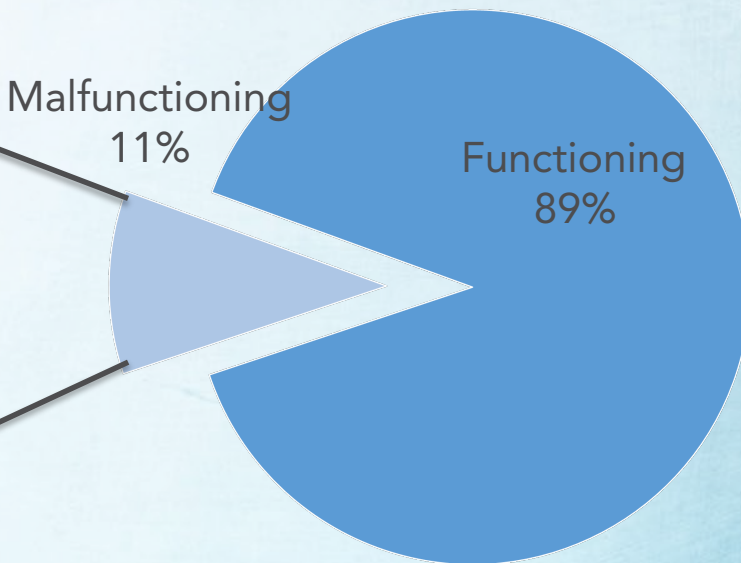


Emissions Due to Malfunction - NOx

Statewide NOx Emissions
from HD Truck in 2031



Statewide HD Truck
Population in 2031



Presentation Outline

- Current Enforcement Implementation
- New Enforcement Approach – Roadside Emissions Monitoring
- Progress towards a new/comprehensive Heavy-Duty Inspection and Maintenance Program

Inspections

- Conducted by CARB staff
- Important part of enforcement program
- 15,000 truck inspections per year
- More than 50% conducted in environmental justice communities



Fleet Investigations

- Combine data sources to identify non-compliant fleets and trucks
- Bring fleets into compliance
- 200 cases and 3,000 trucks per year
- Truck and Bus Regulation compliance was <80%

Streamlined Truck Enforcement

- Implemented in 2018 and 2019
- Compliance achieved for 36,000 trucks
- 24,000 DMV registration holds
- Built on principle of due process
- Coupled with extensive CARB outreach, compliance rates improved to 86%

New Registration Requirements

- Starting in 2020, only compliant trucks may register with California DMV
- Allows shift in enforcement efforts to
 - Non-California registered trucks
 - New Lower smoke opacity requirements adopted by the Board in 2018

Lessons Learned

- Streamline enforcement mechanisms in program design
- Understand the problem - assess compliance rates
- Develop efficient enforcement approaches appropriate to the problem
 - Multiple data sourcing cross reference and analysis
 - Evidence and documentation requirements
 - Use of administrative processes

New Challenges

- Enforcement on non-California fleets requires identification of vehicle and evidence of use in California
 - 23% of total truck vehicle miles traveled in California are from out of state
- Fewer than 5% of trucks represent more than half of all PM emissions, and they can be hard to find

Next-Generation Enforcement

- Screen a large number of vehicles
- Quickly identify trucks with excess emissions, especially operating in impacted communities
- Target enforcement on those trucks
- Prove out-of-state truck operation in California
- Include effective enforcement tools in regulation

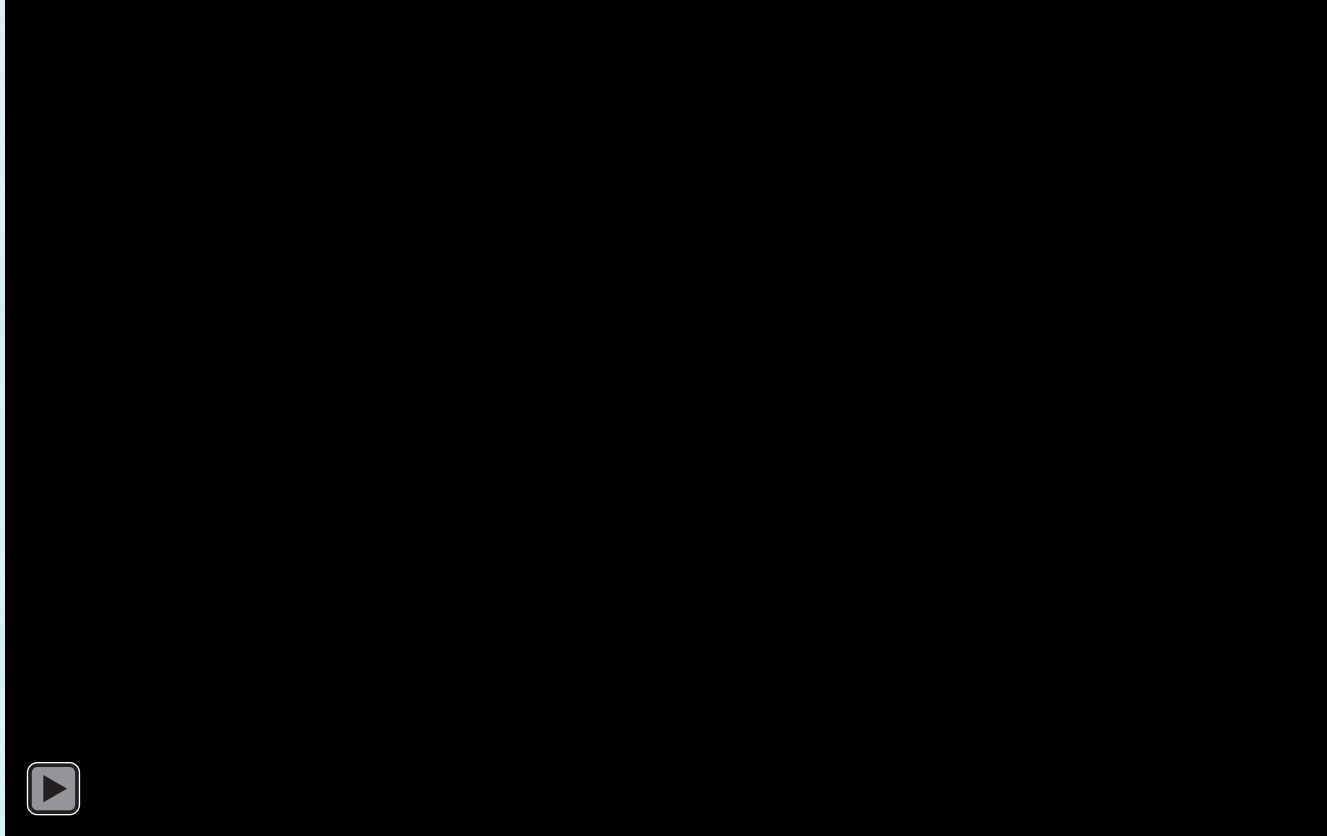
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Roadside Emissions Monitoring

- Technology to measure individual trucks emissions is well established
- CARB developed Portable Emissions Acquisition System (PEAQS), but other products available
- Captures license plate with Automated License Plate Reader (ALPR) cameras

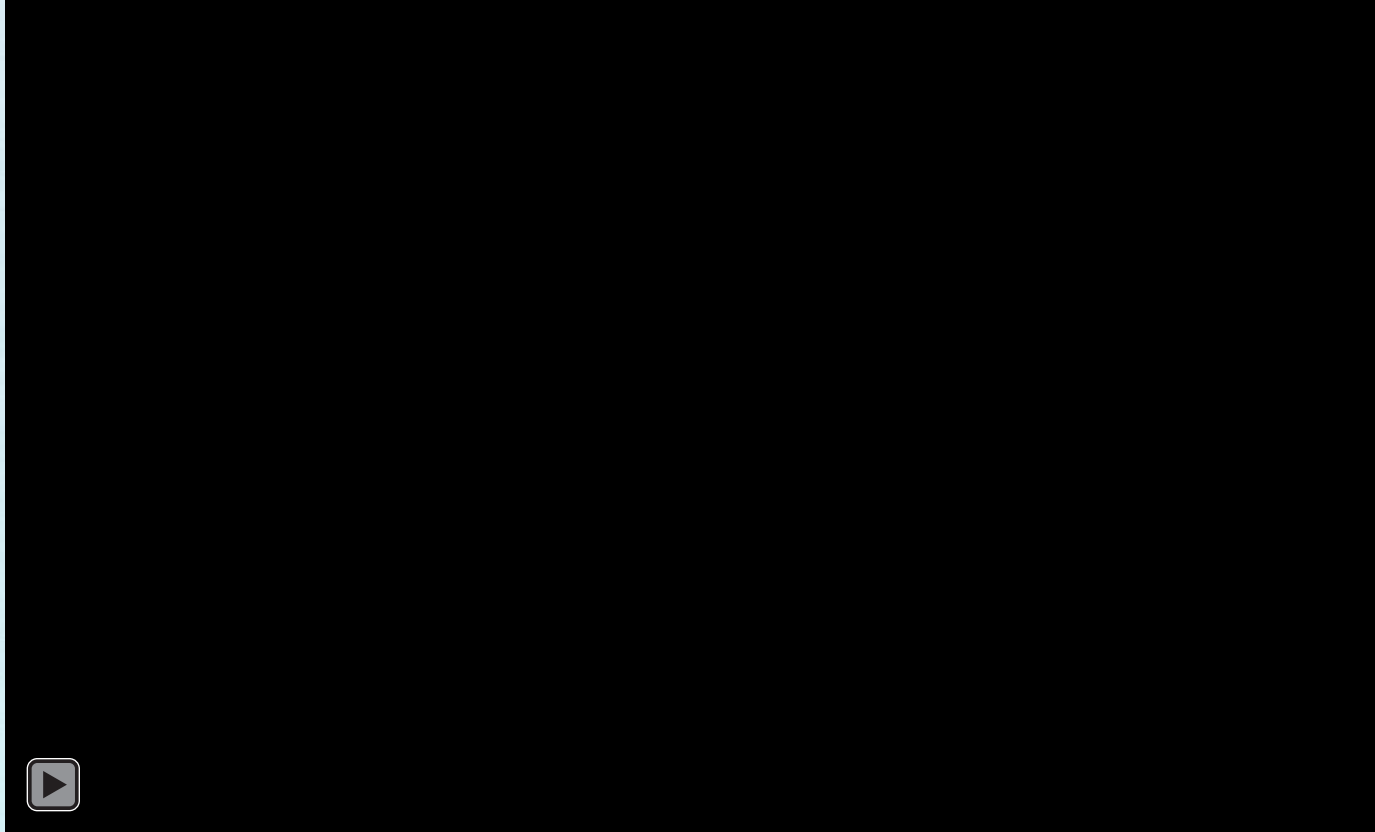
PEAQS Overview



PEAQS Testing

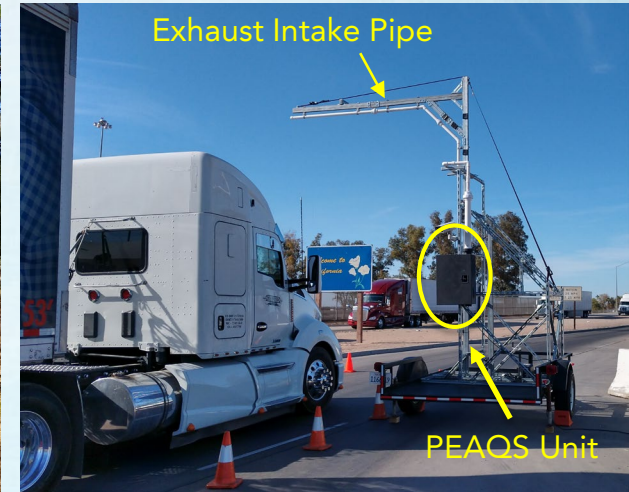
- Principle began after early research contracts
- Multi-divisional effort to develop prototype
- Design, durability, and approach refined after 5+ years of screening >20,000 vehicles
- Ready to scale up deployments for enforcement in collaboration with other State agencies

Designing PEAQS for Real World Operation



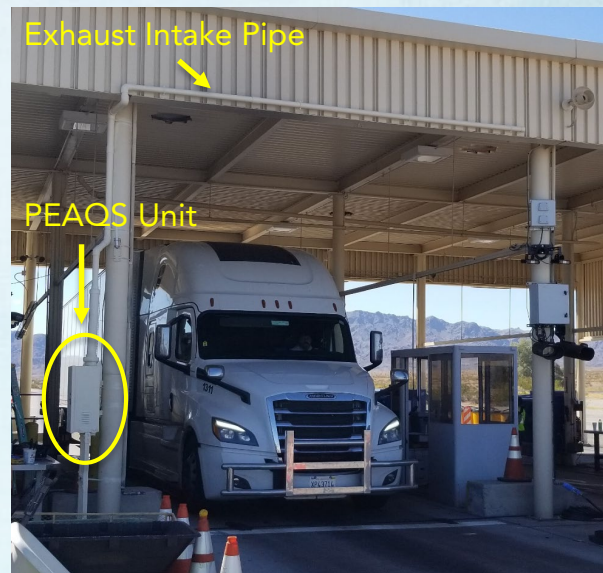
Mobile PEAQS System

- Installed on mobile trailer
- Set up on local roadways in communities



Unattended PEAQS System

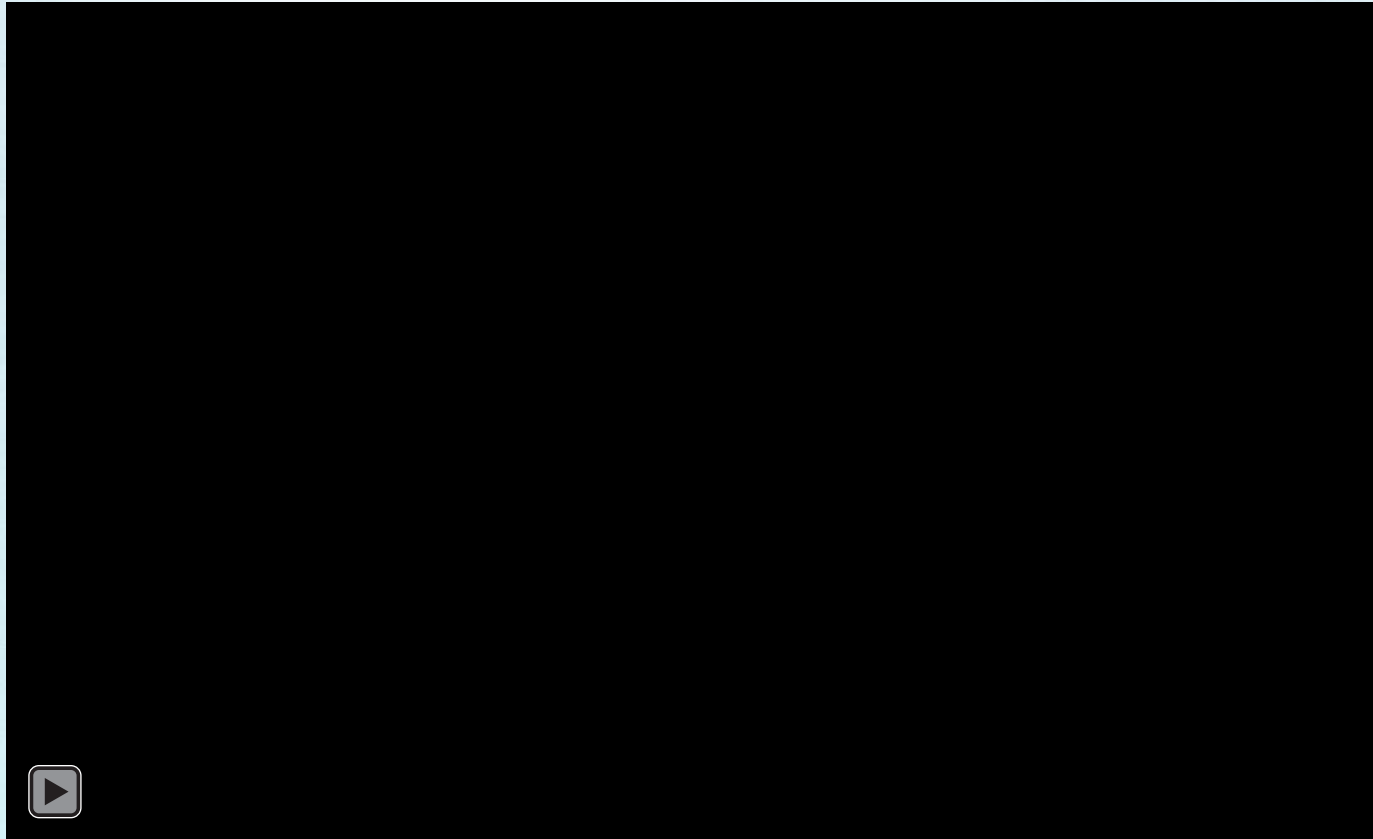
- Installed on existing fixtures
- Continuously collects data
- Captures truck traffic along California highways



Evaluating Data to Identify High Emitting Vehicles

- Emissions data paired with license plate data
- High emitting vehicles flagged for investigation, especially repeat offenders
- Non-compliant vehicles subject to enforcement
- Engine families with patterns of high emissions referred for in-use compliance testing

Enforcement Decision Support System



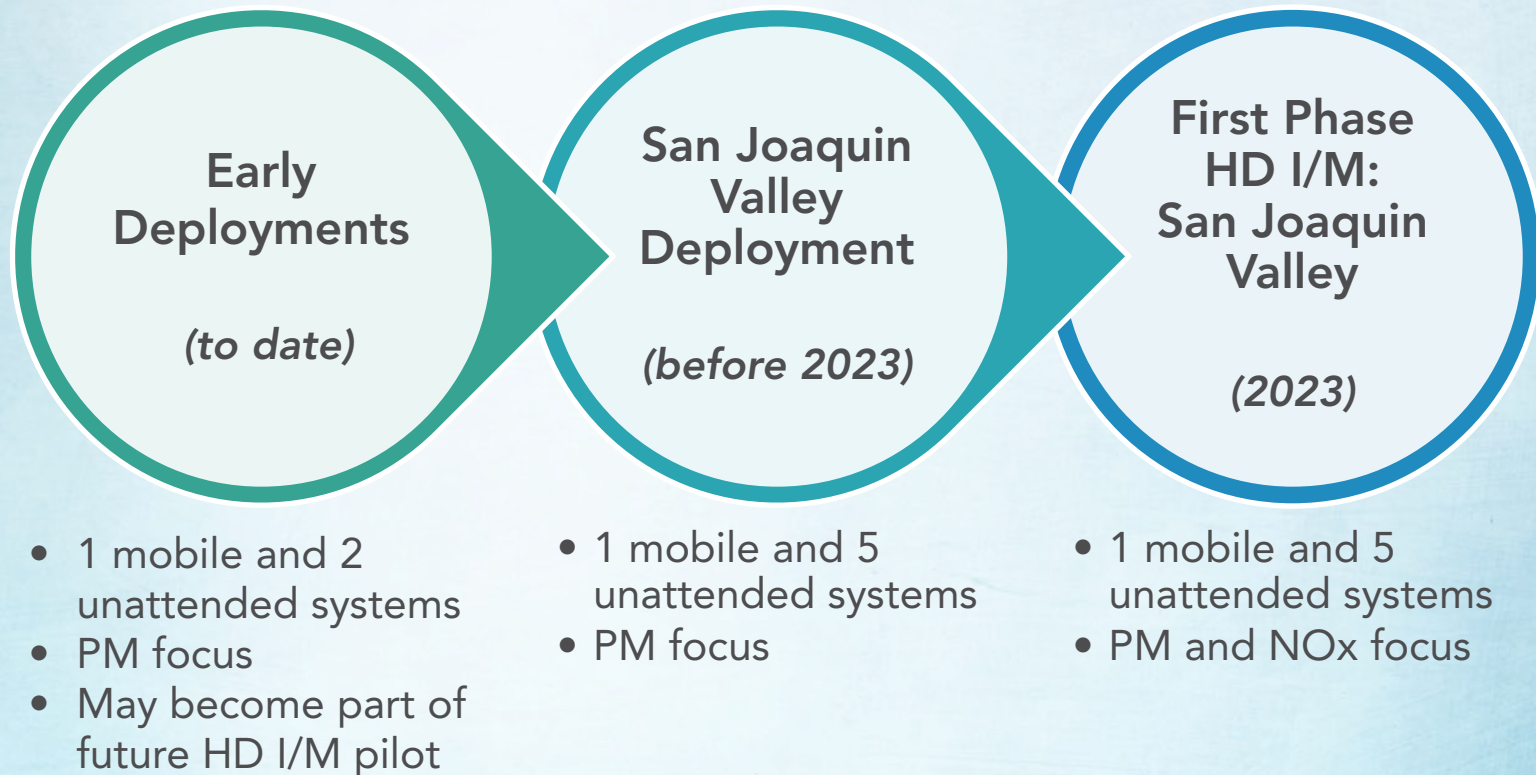
Targeted Fleet Enforcement

- Vehicle owner notified and must demonstrate compliance
- Failure to demonstrate compliance leads to further enforcement action
- Streamlined enforcement procedures to efficiently manage high volume

PEAQS Deployment Strategy

- Deploy PEAQS in multiple stages
- Focus on PM high emitters and existing opacity limits first
- Add detection of high NOx emitters for a future Heavy-Duty Inspection and Maintenance Program

PEAQs Deployment Strategy



Supporting Goals of AB 617

- Disadvantaged communities experience cumulative exposure burden
- Enforcement inspections and efforts have been focused to promote environmental justice
- CARB has been and will continue working with local jurisdictions to address truck related issues such as idling
- Objectives for PEAQS and next-generation enforcement align with goals of AB 617

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Heavy-Duty Inspection and Maintenance Program

- Directed by Senate Bill 210 (Leyva; Statutes of 2019)
- Target excess PM and NO_x emissions from in-use vehicles
- Require all non-gasoline HDVs >14,000 lbs. GVWR operating in California to comply
- Important SIP commitment for San Joaquin Valley

Objective: Maintain Low Emissions Over a Vehicle's Life

- Ensure emissions control systems are functioning properly
- Ensure quick and adequate repair of malfunctioning parts
- Minimize inspection downtime for vehicle owners



Two-Pronged Testing Approach

- Periodic testing requirements for emissions related vehicle components
 - On-board diagnostics (OBD) testing
 - Smoke opacity testing for non-OBD vehicles
- Detection of high emitting vehicles through roadside emissions monitoring (e.g. PEAQS)

First Phase HD I/M Implementation

- Effective January 1, 2023
- Focus on PM and NO_x emissions reductions in San Joaquin Valley using roadside emissions monitoring
- Owners of high emitting vehicles required to demonstrate compliance
- Citation issued if compliance not demonstrated

Ramping up to Full Program

- Periodic testing requirements proposed to begin on Jan. 1, 2024
 - OBD data submitted via telematics, at truck stops, or third-party testers
 - Smoke opacity data for non-OBD vehicles
- Expand roadside emissions monitoring network



Program Development and Implementation Timeline

- Public workshops and workgroup meetings will continue through 2021 to refine program details
- Expected Board hearing date: December 2021

Conclusions

- Roadside emissions monitoring using PEAQS proven effective at finding high emitting heavy duty vehicles
- PEAQS used today for targeting enforcement, and near-term deployments in San Joaquin Valley and other impacted communities
- Importance of Heavy-Duty Inspection and Maintenance Program
- Roadside emissions monitoring for heavy duty expected to be integral part of CARB program in coming years
- Proposed regulation in 2021