



SAN PEDRO BAY PORTS CLEAN AIR ACTION PLAN

Clean Truck Program Rate Workshop
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Overview

An aerial photograph of a city waterfront, likely San Francisco, showing a dense urban area on the left and a large body of water on the right. A prominent blue semi-transparent rectangular box is overlaid in the center, containing white text. The background shows a mix of residential buildings, industrial areas, and a marina with many boats.

CLEAN TRUCKS PROGRAM BACKGROUND

NEAR-TERM MILESTONES

RATE ESTABLISHMENT PROCESS

DISCUSSION QUESTIONS AND COMMENTS



Background

- History of the original Clean Trucks Programs
- Circumstances that affected success of the program
 - CARB regulation
 - Low cost differential for clean trucks, and available used market
 - Didn't require a technology change
 - Financing mostly provided by LMCs
 - Early interest by larger trucking companies



Joint Ports' CTP Today

- 18,251 trucks are in the PDTR
- 1,895 2014+ trucks registered in the PDTR since October 1, 2018
- 56% trucks in the PDTR are 2010 EPA compliant trucks
- 44% trucks in the PDTR are 2007 EPA Compliant
- 48% of the moves are being done by 2010 EPA compliant trucks
- 628 LNG trucks are in the PDTR
- 3.7% of the moves are being done by LNG trucks
- 32 trucks with the natural gas fueled 0.02g/bhp-hr NOx engines are in the PDTR
- >10 ZE trucks in the PDTR

Clean Trucks Program

2017 CAAP Goal of 100% Zero Emissions Trucks by 2035



New Registration Requirements and Clean Truck Fund Rate

Other Strategies: Truck Reservation System, Pilot Smog Check Program, Early Action for Near-Zero-Emissions Trucks

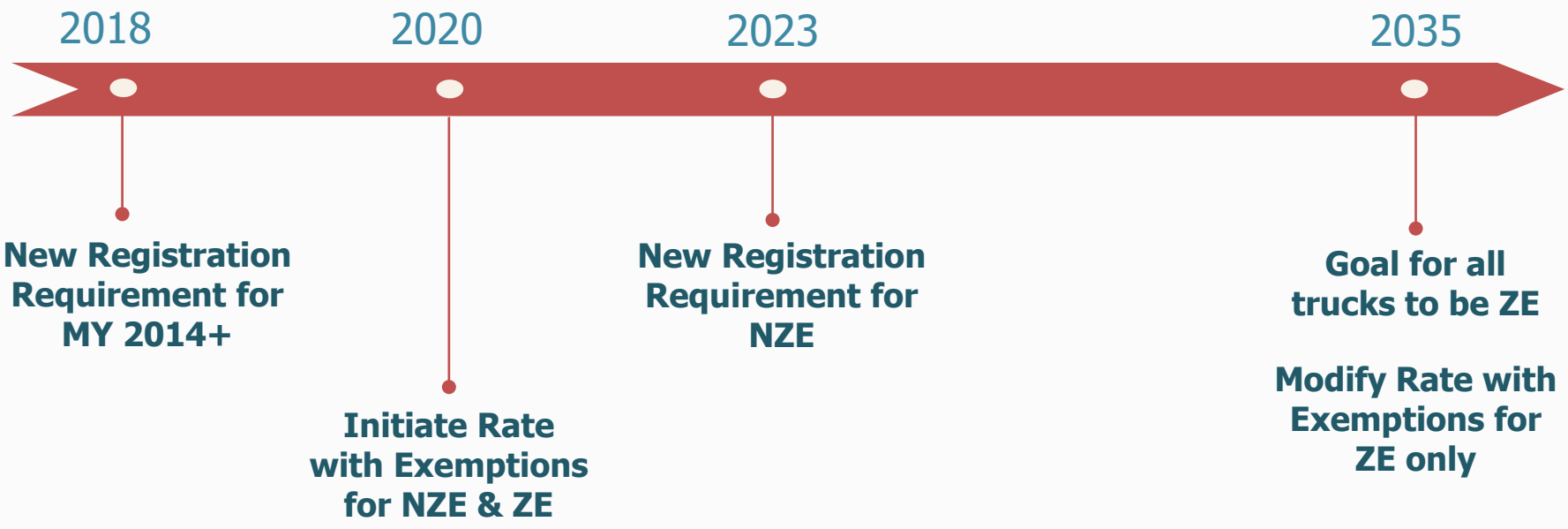


2017 CAAP Proposal for the CTP Rate

- Beginning in 2020, a rate will be charged to the beneficial cargo owners for loaded heavy duty trucks to enter or exit the ports' terminals, with exemptions for trucks that have CARB-certified near zero engines or better
 - Contingent on:
 - Completion of Truck Feasibility Assessment, including evaluation of availability of trucks - **Complete**
 - Establishment of rate collection mechanism - **Underway**
 - Completion of Clean Truck Rate Study - **Underway**
 - CARB adoption of NZE manufacturing standard – **Anticipated March 2020**



Clean Trucks Program Timeline





Truck Feasibility Assessment

- Snapshot in time, 2018-2021
- Assessed for technical viability, commercial availability, operational feasibility, infrastructure availability, economic workability
- No technologies fully feasible today
- Ultra-low NOx natural gas trucks are nearly feasible
- Battery-electric trucks could also be feasible soon
- Availability is different than anticipated when CAAP was adopted



Rate Collection Mechanism

- Request for Statement of Qualifications issued mid-February
- Proposals received late-March
- Contracts with selected vendor to respective Boards anticipated by late-summer/early-fall



Economic Study for the CTP Rate

- Analyze range of rates from \$5/TEU to \$70/TEU
- Estimate cargo diversion from the range of rates, considering other costs and fees, different cargo types, etc.
- Estimate potential impact on local drayage industry, including potential effect on supply and disruption in service
- Project amount of revenue collected taking into account expected turnover and discuss how funds could mitigate potential impacts of the rate
- Final report expected early-fall 2019



Engine Manufacturing Standard

- CARB White Paper (April 2019) indicates phased implementation timeline for NZE standard
 - Feasible standard of 0.05-0.08 g/bhp-hr NO_x for MY 2024-2026
 - Standards TBD for MY 2027+
- Continued need to harmonize with federal standards
- Approach is different than anticipated when CAAP was adopted



CTP Rate Public Process

- Launching public engagement process
 - Focused breakout meetings
 - 2 Public Workshops in summer
 - CAAP Quarterly Stakeholder Meetings
 - Periodic information booth at Clean Trucks Center
 - Email: trucks@cleanairactionplan.org
- Anticipate staff proposal on rate by November
- Harbor Commissions' decision to adopt rate



Challenges for Discussion

- Currently very limited availability of NZE and ZE trucks
 - Manufacturing delays
 - Delay in timeline for final NZE standard
 - Technologies not feasible today
- Requires technology transformation
 - Resistance due to history of unsuccessful early LNG trucks
 - Workforce/training considerations
 - Lack of regional fueling/charging infrastructure
- No statewide in-use requirement for cleaner trucks beyond 2023



Challenges for Discussion

- High cost differential for new technologies
 - Low margin for drayage and limited ability to pay for new trucks, and more expensive technologies
 - Lack of access to loans
 - Uncertain availability of subsidies
- Potential for setting up an unlevel playing field with subsidized trucks competing against unsubsidized trucks
- Balancing near-term investment in NZE with meeting long-term goal for ZE

An aerial photograph of a coastal city and harbor. The image shows a dense urban area on the left, a large harbor with numerous piers and docks in the center, and a large body of water on the right. The sky is blue with some clouds. A semi-transparent teal rectangle is overlaid on the center of the image, containing the text "Discussion and Comments" in white, bold, sans-serif font.

Discussion and Comments



Questions for Discussion

Categories

- Balancing Priorities
- Potential Affect on Business
- Truck Purchasing Decision Factors
- Adoption of New Technology
- Other



Questions for Discussion

Balancing Priorities:

- What is the most important consideration for establishing the rate proposal – minimizing impacts to trucking industry, meeting near-term air quality needs, meeting long-term zero emission goals, other?



Questions for Discussion

Potential Affect on Business:

- What impacts (to cargo owners, to truck owners/drivers, to community, etc.) need to be considered when establishing the rate proposal?
- How will a rate imposed on the beneficial cargo owners potentially affect your business?



Questions for Discussion

Truck Purchasing Decision Factors:

- What factors currently influence your decision to replace your truck?
- Will a rate imposed on beneficial cargo owners cause you to consider purchasing a NZE or ZE truck?
- How do you currently finance the purchase of a truck for drayage services?
- How important are incentives when choosing to purchase a NZE or ZE truck?



Questions for Discussion

Adoption of New Technology:

- What concerns do you have with adopting NZE and/or ZE truck technologies for drayage?



Questions for Discussion

- Additional comments or questions?



Additional Comments

- Second public workshop anticipated in a few months
- CAAP Quarterly Stakeholder Meeting – next meeting to be held in September
- Email: trucks@cleanairactionplan.org

An aerial photograph of a large harbor area, likely in Seattle, showing a dense urban landscape, a large marina filled with boats, and a deep-water port with several large cargo ships docked. The water is a deep blue, and the sky is clear with some light clouds. A semi-transparent teal banner is overlaid across the center of the image, containing the text "Thank you!" in white, bold, sans-serif font.

Thank you!

Extra Slides



Early Action Efforts

- Funding for Ultra-Low NOx Trucks
 - Joint incentive program with AQMD, with grant from CEC
 - Up to 140 ultra-low NOx emission trucks
 - \$14 million total, \$2 million from each Port
 - Anticipate trucks on the road by end of the year

Feasibility Assessment: Structure

- Feasibility Assessment follows the November 2017 “Framework” document
- Emerging **ZE** and **NZE** fuel-technology platforms* are evaluated according to the following five basic parameters:
 1. Technical Viability
 2. Commercial Availability
 3. Operational Feasibility
 4. Availability of infrastructure and Fuel
 5. Economic Workability

***ZE** refers to platforms with *no direct emissions of regulated pollutants*; **NZE** refers to platforms that are *significantly lower emitting on NOx than the EPA 2010 standard* (not necessarily restricted to lowest-tier of OLNS @ 0.02 g/bhp-hr). Ultimately, the Ports will rely on new emissions standards promulgated by CARB to determine near-zero emission levels.



Technical Viability: Summary (Leading Platforms)

TRL	Relative Stage of Development	Late-2018 TRLs for Leading Fuel-Technology Platforms (Drayage)	~2021: Educated Prognoses (by or before)	Comments / Basis for 2021 Educated Prognosis
TRL 9	Systems Operations		NZE NG ICE (TRL 9)	NZE NG ICE: to reach TRL 9 in Class 8 port drayage, new NZE 12-liter engine <u>needs operational time</u>
TRL 8	Systems Conditioning	NZE NG ICE (TRL 8)	ZE Battery (TRL 8)	ZE Battery Electric: strong progress in transit bus / MDV sectors is likely to advance Class 8 drayage use; ongoing range challenge may <u>limit</u> to short-haul applications
TRL 7		ZE Battery (TRL 6 to 7)	ZE Fuel Cell or NZE Plug-in Hybrid (TRL 7??)	ZE Fuel Cell: biggest remaining hurdles relate to total cost of ownership, including access to / on-board storage of hydrogen fuel; NZE Plug-in Hybrid: prognosis is a wild card; OEM interest is hard to gauge, but plug-in architecture enables valued "zero-emission mile" capability
TRL 6	Technology Demonstration	ZE Fuel Cell or NZE Plug-in Hybrid (TRL 5 to 6)	NZE Diesel ICE (TRL 5, or higher?)	NZE Diesel ICE: could "leapfrog" to TRL 8 or 9, but <u>only if</u> suitable diesel engine(s) get certified to 0.02 g/bhp-hr NOx (or other CARB OLNS)
TRL 5	Technology Development	NZE Diesel ICE (TRL 5)		
TRL 4				

Source: TRL methodology adapted from U.S. DOE, "Technology Readiness Assessment Guide, Table 1: Technology Readiness Levels, September 2011 (see footnote). TRL ratings estimated based on input from 1) OEM surveys, 2) various technical reports, 3) demonstration activities, and 4) meetings with agency technical personnel (CARB, CEC, SCAQMD).









- **NZE Natural Gas:** TRL 8, moving to TRL 9
- **ZE Battery Electric:** TRL 6-7, moving to TRL 8
- Other technologies fall below TRL 8 by 2021

Commercial Availability: Summary

- Early commercial launch of ZE battery-electric technology of one Class 8 truck model by start-up OEM BYD.
- All six major OEMs are offering Class 8 NZE trucks powered by the 12-liter Cummins Westport ISX12N natural gas engine.
- The other three core fuel-technology platforms did not meet the basic criteria and considerations to be deemed commercially available in late 2018.

Commercialization Criteria	Base Considerations	Assessment of Criteria Achievement in 2018 by Leading ZE and NZE Fuel-Technology Drayage Truck Platforms				
		ZE Battery-Electric	ZE Fuel Cell	NZE Hybrid Electric	NZE NG ICE	NZE Diesel ICE
Production and Sales with Major OEM Involvement	Production and full certification by either a major Class 8 truck OEM, or by a proven technology provider that has partnered with the major OEM.					
Proven Network / Capabilities for Sales, Support and Warranty	Demonstrated existing (or near-term planned) network of sufficient dealerships to sell, service, warranty and provide parts for all commercially deployed drayage trucks.					
Sufficient Means and Timeline for Production	Demonstrated capability to manufacture sufficient numbers of Class 8 trucks (suitable for drayage) within timeline to meet existing or expected demand.					
Existence of Current and/or Near-Term Equipment Orders	Demonstrated backlog of orders, or credible expression of interest from prospective customers to submit near-term orders.					
Legend: Commercial Availability (2018) Little/No Achievement Fully Achieved						
Source of Ratings: based on OEM survey responses, OEM product information, various government sources, and consultant's industry knowledge.						

Summary of 2018 overall feasibility (all five key parameters)

Feasibility Parameter / Criteria	Overall Achievement* of Criteria in 2018 (Commercially Available / Technically Viable Truck Platforms)	
	ZE Battery-Electric	NZE NG ICE
Commercial Availability		
Technical Viability	TRL 6 to 7 (moving to 7 or 8)	TRL 8 (moving to 9)
Operational Feasibility		
Infrastructure Availability		
Economic Workability		

Legend: Achievement of Each Noted Parameter / Criteria (2018)



Little/No Achievement

Fully Achieved

*These ratings for overall achievement of each five feasibility parameter are based on the analysis of several criteria within that parameter. Because each criterion is important for the success of a given fuel-technology platform in drayage, the overall achievement ratings are based on the lowest criterion score for each feasibility parameter.