18,237 trucks signed up in the PDTR (as of September 17, 2019)
2,316 MY 2014+ trucks registered in the PDTR since October 1, 2018
57% trucks in the PDTR are 2010 EPA compliant trucks
43% trucks in the PDTR are 2007 EPA Compliant
674 LNG trucks are signed up in the PDTR
3.6% of the moves are being done by LNG trucks
There are 124 Low NOx trucks that use the .02 Cummins natural gas engines in the PDTR (2nd Quarter = 32 trucks)
There are approximately 10 Zero Emission Trucks in the PDTR
Near-Term CTP Milestones

2020 - Clean Truck Rate with exemptions on NZE and ZE Trucks

Contingent on:

- Completion of Truck Feasibility Assessment, including evaluation of availability of trucks - **Complete**
- Completion of Clean Truck Rate Study – **Expected Completion in October 2019**
- CARB adoption of a near-zero-emissions manufacturing standard – **Expected Completion in March 2020**
- Establishment of a Rate Collection Mechanism – **Expected Contract Completion in November 2019; Rate Collection System expected to be ready in July 2020**
Ports held a CTP Rate Workshop on August 1
Final Clean Truck Rate Study Report to be released to the public mid-October
Individual Stakeholder Meetings on-going
Ports plan to hold a 2nd Rate Workshop in late-October
Ports plan to propose a CTP Rate amount for adoption at our respective Board Meetings in November
Other Strategies

• Early Action for Near-Zero-Emissions 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
  – 6 ultra-low NOx Trucks have been delivered
Thank you!

Questions?

CTP Email Address: 
trucks@cleanairactionplan.org
Status Update on Current Technology Demonstrations
3rd Quarter 2019

Rose Szoke
Port of Long Beach
Teresa Pisano
Port of Los Angeles
Current Technology Demonstrations at the Ports

- Port of Long Beach Grant-Funded Technology Demonstrations
- Port of Los Angeles Grant-Funded Technology Demonstrations
- Update on the Ports’ Technology Advancement Program
POLB Funding Partners

- CALIFORNIA AIR RESOURCES BOARD
- CALIFORNIA CLIMATE INVESTMENTS: Cap and Trade Dollars at Work
- FUNDING PROVIDED BY THE CALIFORNIA ENERGY COMMISSION
- UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
- SOUTHERN CALIFORNIA EDISON®: Energy for What’s Ahead®
- South Coast AQMD
ZE TERMINAL EQUIPMENT TRANSITION PROJECT
CEC $9.75 MILLION

LBCT, Pier E / SSA, Pier J / ITS, Pier G / TTSI
• 10 Electric Yard Tractors w/200 kW AC Chargers
• 2 Electric Yard Tractors with Smart-Plug Capability w/150 kW AC Chargers
• 9 Electric Rubber Tire Gantry Cranes
• 4 LNG Plug-In Hybrid Electric Trucks
• Workforce Development and Training Initiatives

Status Update
• BYD 200 kW EVSEs and Cavotec 100 kW SPS installed at ITS and LBCT
• BYD Electric Yard Tractors at facility built and ready to be delivered upon EVSE certification (expected late Fall)
• BYD/Cavotec Electric Yard Tractor delivered to LBCT with SPS certification in progress
• Civil work by POLB and SCE near completion at all sites
• Technology integration for the first of nine eRTGs underway at SSA
• US Hybrid LNG Hybrid Electric Trucks undergoing technology integration before delivery to TTSI
• Long Beach City College ZE Port Equipment Workforce Assessment Final Report – Posted online!
• Demonstration Start: ~November/December 2019
Joint Command and Control Center
• Solar Carport (300 kW)
• Install Energy Control Center – Microgrid Controls and Stationary Battery Energy Storage System (330 kW)
• Integrate Microgrid-Extending Mobile Battery Energy Storage System (200 kWh)
• Workforce Development and Training Initiatives

Status Update
• 50% of the design phase is complete
• Launched workforce development with Long Beach City College and South Orange County Community College District
• Construction Start: ~March 2020
LBCT, Pier E and SSA, Pier J
• 3 Electric Top Picks w/200 kW AC Chargers
• 1 Electric Yard Tractor w/70 kW Charger
• 1 Fuel Cell Yard Tractor

Status Update
• Kalmar-TransPower Electric Yard Tractor currently in operation at LBCT
• Hydrogen Sinotruk Fuel Cell Yard Tractor undergoing additional modifications
• One Taylor-BYD Electric Top Handler delivered to Pier E and two to Pier J
• BYD EVSE awaiting final approval by the City with commissioning anticipated for late Fall 2019
• Demonstration Start: ~September 2019 – December 2019
TTI, Pier T
• 6 Battery-Electric Yard Tractors
• Install Electric Charging Infrastructure, DC Fast Charging System and 384-kWh/375-kW Battery Storage

Status Update
• 100% design phase is complete; advertisement anticipated for December 2019
• Coordination with ChargePoint, TransPower on design specifications is in progress
• TransPower Energy Storage System design underway
• Data collection test plan development underway
• Demonstration Start: ~January 2021
START PROJECT – CARB $50 MILLION

SSA, Pier C and Shippers Transport
• 33 Electric Yard Tractors w/175 kW DC Fast Chargers
• 1 Electric Top Handler w/200 kW AC Fast Charger
• 1 Near-Zero Emission Tugboat
• 2 Tier 3 Ships
• 5 Electric Trucks w/150kW DC Fast Chargers
• 2 Public Access Electric Drayage DC Fast Chargers (150 kW)

Status Update
• SCE Charge Ready Transport Program to support infrastructure installation
• Electric yard tractors currently in production with an anticipated delivery for Spring 2020
• POLB selecting EVSE provider for the electric drayage trucks; EVSE provider for electric yard trucks formally announced in July 2019
• Finalizing purchase contract between Peterbilt and Shippers Transport for Electric Drayage Trucks
• Demonstration start: ~2020
Electric Vehicle Supply Equipment (EVSE) Update
BYD/Cavotec Yard Tractor
Kalmar Battery Electric Yard Tractor
Matson Tier 3 OGV
Green Omni Terminal Project
CARB $14.5 Million
Pasha
• 4 electric yard tractors (BYD and TransPower)
• 2 electric Class 8 on-road trucks
• 3 electric heavy duty forklifts
• ShoreKat land-based at-berth emissions control system
• Solar rooftop array with microgrid controls and battery storage

Status Update:
• TransPower yard tractors are in use
• BYD yard tractors charger certification is still being reviewed
• On Road Trucks are at terminal and are being commissioned
• 1 Forklift is at the terminal and is in use
• ShoreKat had been used against 4 ships
• Pasha is contracting with Solar providers
POLA Grant-Funded Technology Demo - Update

**Advanced CHE Demonstrations**

**CEC $10.3 Million**

**Everport**

- 20 RNG yard tractors
- 5 electric yard tractors (BYD), standard chargers
- 3 electric yard tractors (BYD), advanced charging system
- 2 electric top handlers, standard chargers

**Status Update:**

- RNG Fueling equipment certified
- 20 RNG fueled yard tractors delivered
- 2 electric top handlers delivered
- 5 electric yard tractors delivered
- BYD chargers being certified for use
POLA Grant-Funded Technology Demo - Update

Status Update:
• Contract approved
• Yard tractor manufacturer selected
• Initial design work underway

AID Project
CEC $7.8 Million
WBCT (China Shipping)
• 10 battery-electric yard tractors
• 12 Wireless charging stations
• Peak-shaving storage system
Shore to Store Project
CARB $41 Million
Various Partners off-Port Property

- 10 H₂-electric Class 8 trucks
- 2 heavy duty H₂ fueling stations
- 2 electric yard tractors with charging infrastructure at Port of Hueneme (POH)
- 2 Zero-emission forklifts

Status Update:
- First 5 trucks in development
- Expected Delivery in November
- Equipment orders for H₂ stations submitted
- Infrastructure design at POH complete
Kenworth Toyota Zero Emissions Truck
Battery Electric Yard Tractors
Taylor Battery Electric Top Handler
Ports’ Technology Advancement Program Update

- Effenco Rapid Deployment of Electric Active Stop-Start™ Technology for Zero-Emission Idling from Port Yard Tractors Project - Contract Executed
- Harley Marine Electric Drive Tugboat Design Project - Contract Finalized/POLA Board Approval Pending
- PASHA C9 Class LNG Powered Container Vessel Repower Project – Contract Finalized/Board Approval Pending
- PASHA Ohana Class LNG Powered Container New Build Project – Contract Finalized/Board Approval Pending
Nett Technologies BlueMAX™ Harbor Craft Demo
Thank you!
Questions?
SAN PEDRO BAY PORTS
CLEAN AIR ACTION PLAN

UPDATE ON TECHNOLOGY FEASIBILITY STUDIES
October 3, 2019

Jacqueline Moore
Port of Long Beach
Feasibility Assessments

- Cargo Handling Equipment (CHE)
- Drayage Trucks
CHE Feasibility Study Status

- Presentation on the DRAFT CHE Feasibility Assessment provided at the June 25, 2019 Stakeholder Meeting
- Stakeholder Comments incorporated into the Final Report
- Final CHE Feasibility Assessment was posted on the [www.cleanairactionplan.org](http://www.cleanairactionplan.org) website on September 20, 2019
Drayage Truck Feasibility Study Status

- Final Truck Feasibility Assessment was posted on [www.cleanairactionplan.org](http://www.cleanairactionplan.org) on April 3, 2019
Future Feasibility Assessments

• Ports committed to preparing Feasibility Assessments at least every 3 years
• The Ports are discussing how to address technologies that become feasible or infrastructure advances between now and 2021
• Next Assessments will evaluate commercial availability, technical viability, operational feasibility, infrastructure availability, economic workability beginning in 2021
Thank you!
Questions?
SAN PEDRO BAY PORTS
CLEAN AIR ACTION PLAN

2018 San Pedro Bay Ports
Air Emissions Inventory Results

Conor Langlois
Port of Los Angeles
2005 vs. 2018

Container throughput up 24%
Containers (TEUs) per call up 65%
Container ship calls down 25%
San Pedro Bay Ports
2018 Air Emissions Reductions

Diesel Particulate Matter
- Down 87%

Nitrogen Oxides
- Down 58%

Sulfur Oxides
- Down 97%

Greenhouse Gases
- Down 13%

*Compared to 2005 Levels
**GHG emissions (CO₂e) are reported in metric tons (MT) per year; all other pollutants are shown in tons per year.
Diesel Particulate Matter

Nitrogen Oxides

Sulfur Oxides

CAAP Clean Air Goals

Since 2005

2023

Since 2005

2023

Since 2005

2023

87% 77%

58% 59%

97% 93%
CTP Implementation

- Clean Truck Rate Study
  - Goals:
    - Establish rate to influence purchasing behavior of drayage truck operators and generate revenue to support purchase of new trucks
    - Assist transition to near zero and eventually zero emission equipment
    - Avoid cargo diversion
    - Maintain adequate supply of drayage trucks for Port service

Moving Forward

State and Federal Regulations
Feasibility Assessments
Technology Advancement
CTP Implementation

• Clean Truck Rate Study (Continued)
  – Draft scope of work has been developed
  – RFP to be refined and re-released in early Summer 2018
  – Study expected to begin in late Summer 2018
  – Estimated completion 2nd Quarter 2019
Thank you!
Questions?
2005 vs. 2018

Overall Container Volumes up 24%
Containers (TEUs) per container ship calls up 65%
Container ship calls down 25%
All ship arrivals down 25%
Emissions Today

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<th>Ocean-going vessels</th>
<th>Harbor craft</th>
<th>Cargo handling equipment</th>
<th>Locomotives</th>
<th>Heavy-duty vehicles</th>
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<tr>
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<tr>
<td>CO2e</td>
<td>28%</td>
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</tbody>
</table>
Emissions By Mode

- **DPM**: 30%
- **NOx**: 27%
- **SOx**: 52%
- **CO2e**: 53%

- **Hotelling- Anchorage**
- **Hotelling-At-Berth**
- **Maneuvering**
- **Transit**
At Berth Strategies

Shorepower

Emission Capture & Control Technology
Infrastructure

Over $400 million invested in infrastructure to date

13 Terminals utilizing shorepower
42 Berths with built infrastructure
144 Vaults/outlets
Technology Deployed

AMECS Generation 3

METS-I

ShoreKat
At Berth Emission Reductions Since 2005

- DPM: -93%
- NOx: -97%
- SOx: -60%
- CO2e: -31%
Future Emission Reductions

Prop 1B Requirements for the Regulated Fleet

New At Berth Regulation

- Increased requirements for existing regulated fleet (container, passenger, refrigerated cargo vessels), beginning January 2021
- New requirements for RoRo and tanker fleets, beginning January 2025, and January 2027, respectively
- Process for terminal and vessel related exceptions, decreasing over time
Regulatory Participation

Ports have participated in the regulatory process and provided comments

- Ports support additional at-berth emission reductions
- Engineering analyses of supplemental infrastructure needed at container terminals estimates additional $253 - $299 million investment
- More time needed for technology development of alternatives for tankers and RoRos, and for engineering and construction of shorepower infrastructure
- CARB should perform a technology feasibility assessment
- Increased public investment in shorepower and alternative capture and control technologies for all vessel categories
Thank you!
Questions?