



SAN PEDRO BAY PORTS CLEAN AIR ACTION PLAN

Clean Truck Program Update
3rd Quarter 2019

Tim DeMoss
Port of Los Angeles



Joint Ports CTP Statistics

- 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**



CTP Rate Setting Process

- 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

An aerial photograph of a coastal city and harbor. The city is densely packed with buildings and roads, extending to the water's edge. The harbor is filled with ships and boats, and the water is a deep blue. In the background, there are mountains under a blue sky with some clouds.

Thank you!

Questions?

CTP Email Address:
trucks@cleanairactionplan.org



SAN PEDRO BAY PORTS CLEAN AIR ACTION PLAN

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





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



JCCC MICROGRID PROJECT – CEC \$5 MILLION

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



C-PORT PROJECT – CARB \$5.3 MILLION

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



PAVE PROJECT – CEC \$8 MILLION

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





POLA Grant-Funded Technology Demo - Update

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

AID Project CEC \$7.8 Million WBCT (China Shipping)

- 10 battery-electric yard tractors
- 12 Wireless charging stations
- Peak-shaving storage system

Status Update:

- Contract approved
- Yard tractor manufacturer selected
- Initial design work underway



POLA Grant-Funded Technology Demo - Update

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



An aerial photograph of a large port and city. The port features numerous piers, docks, and a large area filled with shipping containers. Several large cargo ships are docked at the piers. The city is visible in the background, with a dense urban area and a large body of water. The sky is blue with some clouds.

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 website on September 20, 2019






Drayage Truck Feasibility Study Status

- Final Truck Feasibility Assessment was posted on 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

An aerial photograph of a large port and city. The port area is filled with numerous ships, including large cargo vessels and smaller boats, docked at various piers. The city is visible in the background, with a dense urban landscape. The water is a deep blue, and the sky is clear with some light clouds. A semi-transparent teal box is overlaid on the center of the image, containing the text "Thank you! Questions?".

Thank you!
Questions?

The background of the slide is a wide-angle photograph of a busy port. In the foreground, there are numerous stacks of colorful shipping containers (blue, red, yellow, green) and several large blue gantry cranes. In the middle ground, there are more containers and a few trucks. In the background, there are hills and a bridge. The sky is clear and blue.

SAN PEDRO BAY PORTS **CLEAN AIR ACTION PLAN**

2018 San Pedro Bay Ports Air Emissions Inventory Results

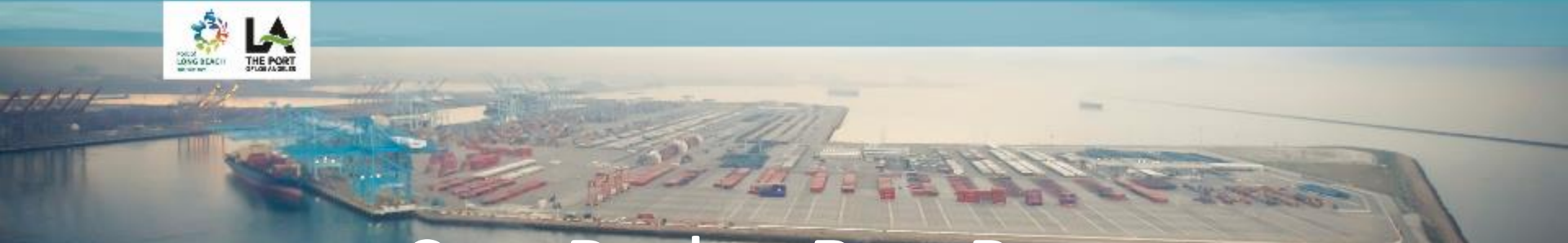
Conor Langlois
Port of Los Angeles

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%

Up

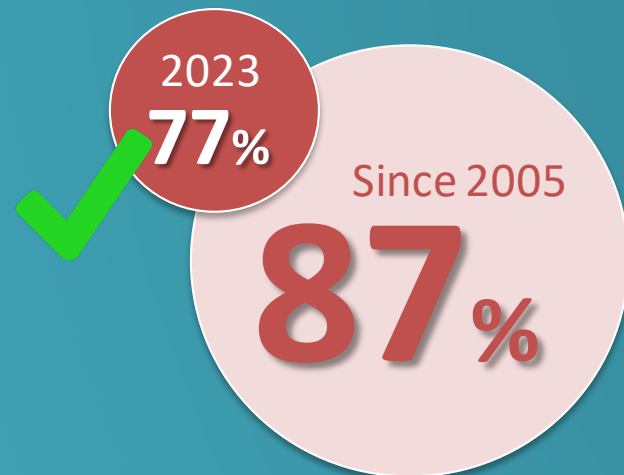
24%

TEUs

*Compared to 2005 Levels

**GHG emissions (CO₂e) are reported in metric tons (MT) per year; all other pollutants are shown in tons per year.

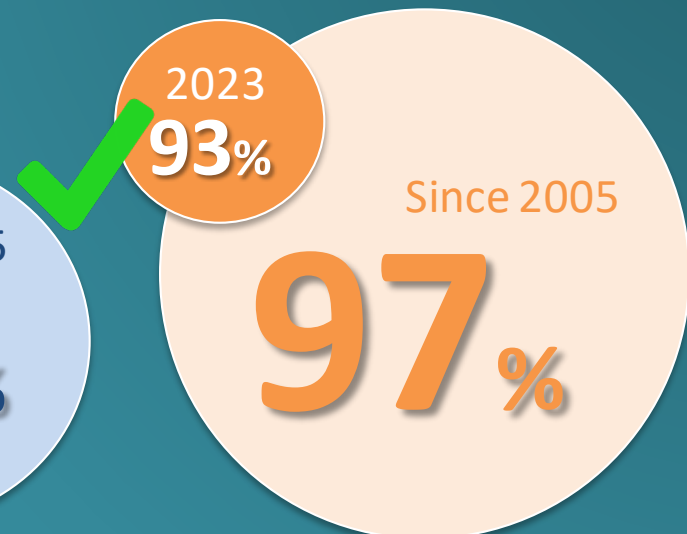
CAAP Clean Air Goals



**Diesel
Particulate
Matter**



**Nitrogen
Oxides**



**Sulfur
Oxides**



Moving Forward

State and Federal Regulations
Feasibility Assessments
Technology Advancement



PORT OF LOS ANGELES INVENTORY OF AIR EMISSIONS - 2018

THE PORT OF LOS ANGELES

Technical Report
APPH 181029-521 A
September 2019


Prepared by:
STARCREST CONSULTING GROUP, LLC



AIR EMISSIONS INVENTORY - 2018

September 2019

Prepared by:
STARCREST CONSULTING GROUP, LLC

An aerial photograph of a large port and city. The port area is filled with numerous ships, including large cargo vessels and smaller boats, docked at various piers. The city is visible in the background, with a dense urban landscape. The water is a deep blue, and the sky is clear with some light clouds. A semi-transparent teal box is overlaid on the center of the image, containing the text "Thank you! Questions?".

Thank you!
Questions?



SAN PEDRO BAY PORTS **CLEAN AIR ACTION PLAN**

At Berth Emission Reduction Update
October 3, 2019

Morgan Caswell
Port of Long Beach

2005 vs. 2018

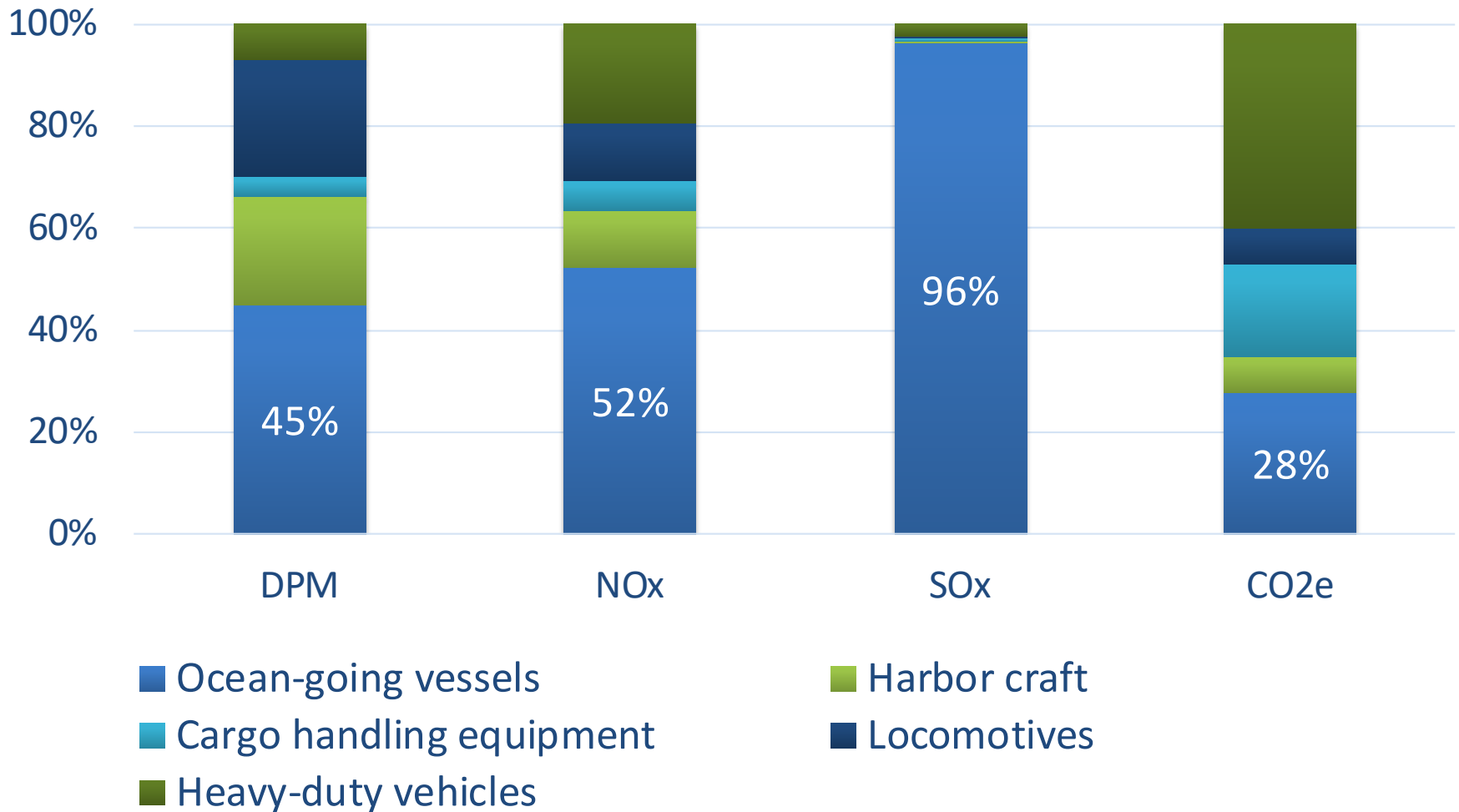
Overall Container Volumes up 24%

Containers (TEUs) per container ship calls
up 65%

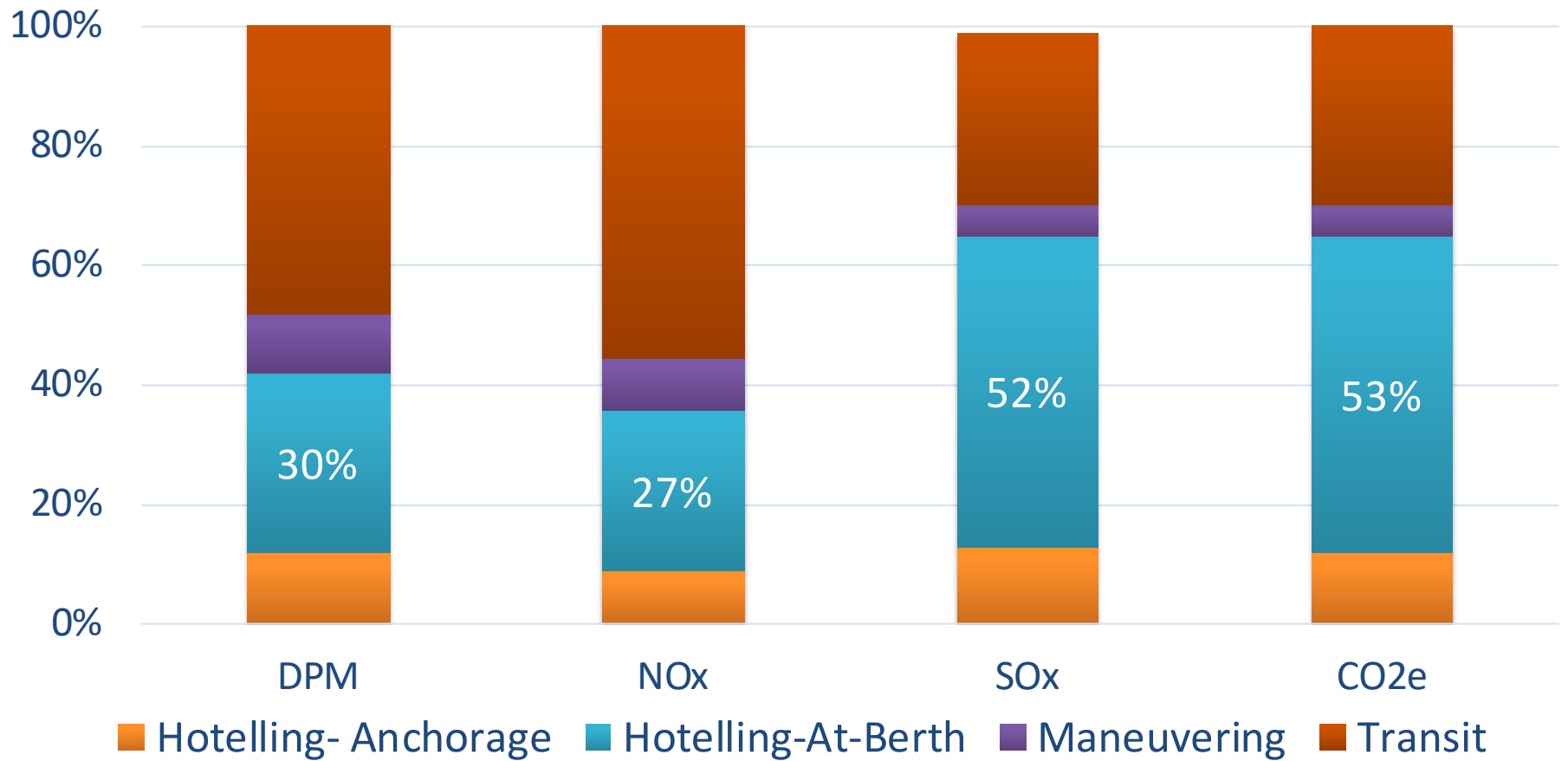
Container ship calls down 25%

All ship arrivals down 25%

Emissions Today



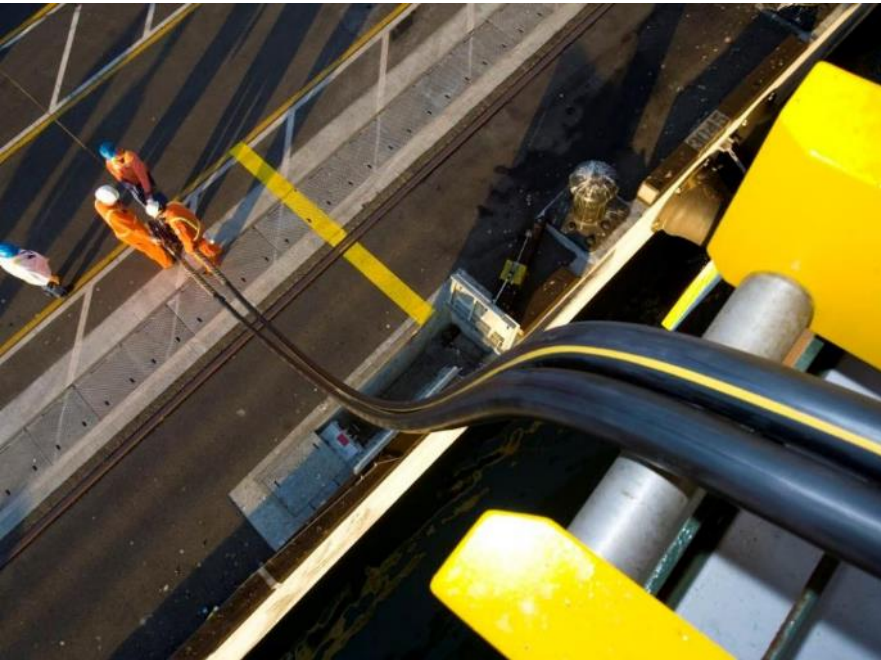
Emissions By Mode



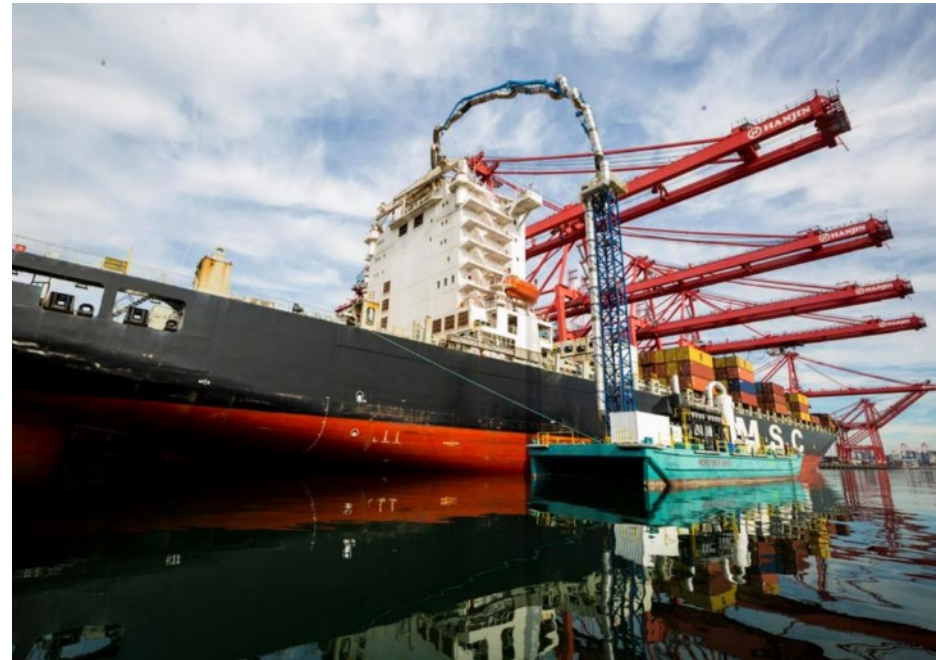
At Berth Regulation



At Berth Strategies



Shorepower



Emission Capture &
Control Technology

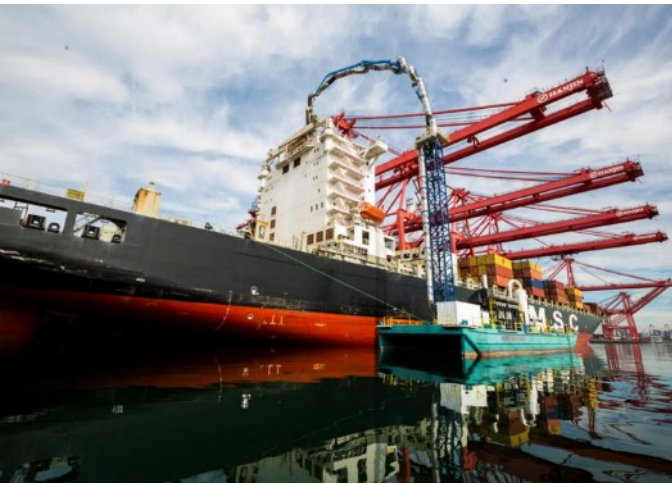
Infrastructure

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



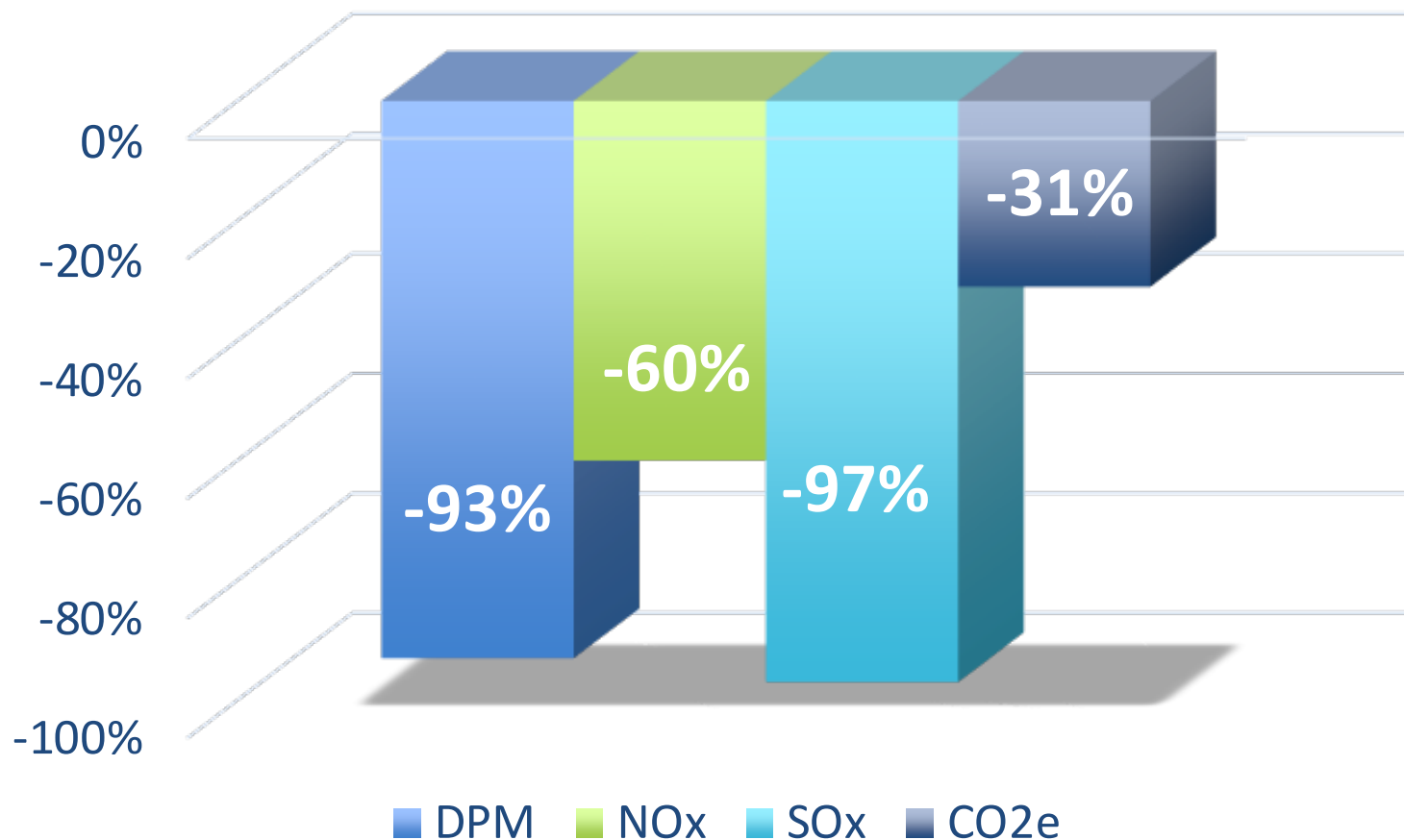
METS-I



ShoreKat

Emission Reductions

At Berth Emission Reductions Since 2005



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

An aerial photograph of a large port and city. The port features numerous piers, docks, and a large area filled with shipping containers. Several large cargo ships are docked at the piers. The city is visible in the background, with a dense urban area and a large body of water. The sky is blue with some clouds.

Thank you!
Questions?