



Sustainable Supply Chain Advisory Committee *July Meeting Summary*

Date: July 17th | 11 am – 3 pm

Location: In-person at Port of Long Beach and via phone conference

Attendees: Attachment A

Meeting Agenda: Attachment B

Key Discussion Items (Action items in green)

1. **POLA / POLB Opening Remarks**

- Chris and Heather kicked off the meeting by noting that the ports continue to work towards the goals outlined in the CAAP.
- Ray Familathe was introduced as the new committee member to replace Peter Peyton.

2. **Review & Finalize May SSCAC Meeting Summary**

- Meeting summary was circulated during the meeting, and committee members approved it after the meeting via email. **See Attachment C.**
- The following edits were made to the May Meeting Summary:
 - Item 6, Update on Feasibility Assessments (GNA), bullet no. 2: the reference to “charging infrastructure” has been corrected to “charging and fueling infrastructure.”
 - Item 8, Update on 2019 Legislative Session (Erick Martell): the reference to “Skinner and O’Donnell bills” has been clarified to refer to SB 44 and AB 1262, respectively.

3. **Committee Vote on Funding Prioritization Recommendation & Discussion of Next Steps**

- The committee approved the final version of the recommendation (**Attachment D**). The recommendation is being prepared to share with the port executive team and the mayors’ offices of Los Angeles and Long Beach, and then to publish on the SSCAC’s website.
 - The committee observed that the website for the SSCAC is not current with all of the latest meeting summaries and recommendations. GNA and the Ports will review in advance of the next meeting to develop an updated approach to keeping the website updated.
- The committee discussed actions that it could take to advance the funding prioritization recommendation, including delivering presentations for funding agencies, advocacy



organizations and legislators that highlight the group's consensus on areas of necessary action in both the near- and long- term.

- The committee also discussed using the prioritization recommendation to inform agenda items for future meetings.
 - The committee expressed interest in convening truck manufacturers for a roundtable to discuss their near- zero and zero emissions technologies.
 - GNA to work with port staff to identify upcoming harbor commissioners' meetings where port staff and/or committee members can provide a summary of key issues that the multi-dimensional group has reached consensus on.

4. **Workforce Development Presentation (Long Beach Community College)**

- The Long Beach Community College presented on the findings of their Zero Emission Port Equipment Workforce Assessment (**Attachment E**), which was conducted as part of a demonstration project with the Port of Long Beach funded by the California Energy Commission (CEC). Based on information gathered through interviews and surveys with OEMs, terminal operators, and labor unions, and research of local college and educational program offerings, the project team identified training needs and opportunities to transition the workforce to support electrified equipment. The study's recommendations included:
 - Expanding existing electrical and advanced transportation training programs to support the rising and existing workforce in community and city colleges.
 - Develop partnerships between schools and local labor unions to provide trainings.
 - Make funding available at the state level to support trainings and program development, including faculty growth.
 - Continue to assess workforce gaps and share knowledge of zero emission equipment performance and maintenance as technology is deployed at ports.
- The presenters commented that there is a strong appetite for this work in other cities across the U.S., but that there are few examples of it to date.
- The committee noted that the study provides a valuable baseline of available resources and the anticipated training needs.
 - It was agreed that the Ports and committee members would work together to identify opportunities to fund a wider, regional study in the future, and consider training requirements in their conversations with electric equipment vendors.
 - The committee recommended including training needs on their agenda for a future truck manufacturer roundtable (see Agenda Item 3).

5. **AMP Alternative Presentation (POLA & POLB)**

- Morgan Caswell (POLB) presented on the AMP alternative technologies that the ports have demonstrated and deployed since 2008, when ships began using shore power at berth (**Attachment F**). The presentation reviewed the emissions reduction effectiveness of these technologies, and highlighted the need for more solutions suitable to a wider range of vessel types in order to meet the expected CARB at-berth and at-anchor rules.



- Caswell pointed out that retrofitting tankers for shore power is rarely done, and that the one project that achieved this was at POLB and revealed the distinct challenges for that vessel type, including fire hazards.
- Caswell also pointed out the pros and cons of land- and barge- based emissions capture systems, including connection times and spatial requirements.
 - The committee discussed a need to understand the broader landscape of marine emission reduction strategies; the Ports agreed to provide a presentation on strategies and technologies other than AMP and bonnets at a future meeting.
- Caswell and Heather Tomley said that the ports understand which available technology achieves the required emissions reductions, and that the most significant challenge today is accessing sufficient funds to move it forward due to the equipment's cost.
- The committee discussed the challenge of funding marine and non-stationary projects due to funding agency restrictions.
 - The committee agreed to develop a coordinated approach to recommend to key funding agencies that incremental marine and non-stationary funds be made available.

6. Electric Utility Infrastructure Study (POLA)

- An engineer from POLA described the port's 20-year electricity demand forecast, which indicates a supply shortage over the long term, although the shortage is expected to be less severe than preliminary estimates had indicated.
- The forecast indicates that the majority of electricity can be obtained from the grid, with the remainder being provided from anticipated solar resources. Considerations of future traffic flow and cargo volumes were made.
 - The port indicated that management of demand peaks and valleys was an important area of research and that they are evaluating technology solutions.
- The committee discussed the assumptions behind the port's study, and the need to collect data on all demonstration projects at the ports over the next several years so that electricity supply forecasts may be founded on the most recent information.
 - The committee supported developing a clearinghouse where all demonstration projects could be tracked, and regular updates could be made available for decision makers.
 - The ports noted that they currently produce monthly reports, which may be shared with the committee.

7. Future Agenda Items

- Next SSCAC Meeting: September 25th
- Agenda Topics:
 - Mayor Garcetti and Mayor Garcia's participation at the September meeting
 - The Mayors' offices and ports' government affairs teams are coordinating to confirm this.
 - Discussion of CARB timeline to adopt a low NOx standard
 - Update on Truck Rate Study
 - Truck manufacturer roundtable



8. Conclusion & Next Steps

- Committee members and the ports will pursue the actions recommended in this meeting, including developing resources to facilitate action on the prioritization recommendation, assembling truck manufacturers and stakeholders for a roundtable in September to focus on NZE and ZE early action deployments and issues related to the CARB low NOx standard.



Attachment A

Meeting Attendees

SSCAC Committee Members	
Michele Grubbs	PMSA (by phone)
Matt Miyasato	SCAQMD
Cynthia Marvin	CARB (by phone)
Joe Lyou	CCA
Jerilyn Lopez Mendoza	CCA
Ray Familathe	ILWU Local 13
Los Angeles Port & City Staff	
Chris Cannon	Port of Los Angeles
Erick Martell	Port of Los Angeles
Michael DiBernardo	Port of Los Angeles
Michael Samulon	City of LA, Mayor's Office
Max Reyes	City of LA, Mayor's Office
Irene Burga	City of LA, Mayor's Office
David Reich	City of LA, Mayor's Office
Long Beach Port & City Staff	
Morgan Caswell	Port of Long Beach
Heather Tomley	Port of Long Beach
Justin Ramirez	City of Long Beach, Mayor's Office
Other Stakeholders	
Jacob Haik	Councilman Buscaino's Office
Melissa Infusino	Long Beach City College
Dana Friez	Long Beach City College
Meeting Facilitation Staff	
Erik Neandross	GNA
Lexi Wiley	GNA
Eleanor Johnstone	GNA



Attachment B

Meeting Agenda

1. POLA / POLB Opening Remarks
2. Review & Finalize May Meeting Summary
3. Committee Vote on Funding Prioritization Recommendation & Discussion of Next Steps
4. Workforce Development Presentation (Long Beach Community College)
5. Lunch
6. AMP Alternative Presentation (Morgan Caswell, POLB)
7. Electric Utility Infrastructure Study (POLA)
8. Future Agenda Items
9. Conclusion & Next Steps



Attachment C

May SSCAC Meeting Summary

Sustainable Supply Chain Advisory Committee *May Meeting Summary*

Date:	May 29th 11 am – 3 pm
Location:	In-person at Port of Los Angeles and via phone conference
Attendees:	Attachment A
Meeting Agenda:	Attachment B

Key Discussion Items (Action items in green)

1. **POLA / POLB Opening Remarks**

- Chris and Heather kicked off the meeting by noting that the ports continue to work towards the goals outlined in the CAAP.
- Lauren from Mayor Garcetti's Office outlined the core tenets of the recently-announced Green New Deal for Los Angeles, and emphasized that the committee is a powerful example of LA's potential to lead in priming the market to do the work described under the Mayor's plan.

2. **Review March SSCAC Meeting Summary**

- Meeting summary was approved. **See Attachment C**

3. **Update on Funding Prioritization Recommendation**

- The committee reviewed edits provided by stakeholders during and since the previous committee meeting. Due to time constraints, the committee was not able to finalize its discussion and reach an agreement on the recommendations.
 - A subcommittee will work collaboratively to complete the recommendation and present a finalized version at the next committee meeting.

4. **LNG as a Marine Fuel – Well-to-Wake Report Results (Steve Cadden – SEA/LNG)**

- Committee member Steve Cadden, who also serves as the executive director of SEA\LNG - an industry association advocating for LNG in marine fueling applications - presented findings on the greenhouse gas (GHG) emission benefits of LNG-fueled marine vessels as compared to conventionally fueled vessels. **See Attachment D.**



- Modeling of a 14,000 TEU vessel operating the Asia Pacific route under several engine and fuel type scenarios revealed that LNG offers a 21% to 28% GHG emissions reduction compared to scrubber-equipped diesel engines and low sulfur fuel-based engines.
- From a NOx and DPM perspective, although the study's focus was on GHG, the report notes that LNG as a shipping fuel offers significant air quality benefits to port communities due to dramatic reductions in these pollutant categories.
- LNG bunkering capability is increasingly available in major ports worldwide. Steve provided the committee with two resources for tracking this industry's development in the port context: SEA\LNG's [Bunker Navigator](#), and DNV GL's [Alternative Fuels Interface](#).
- The POLB noted that they are working to update a previously issued white paper on LNG and, in parallel, are working to put out an RFI related to LNG bunkering in the Port.
- The POLA noted that one of its tenants will soon deploy two LNG-powered container vessels.
- The committee noted the need for further discussion and likely future recommendations on LNG bunkering issues in the San Pedro Bay Ports. *It was agreed that the Committee would revisit these issues in the near term, likely after the POLB issues its updated white paper. Cost-effective marine emission reductions and CEQA considerations for LNG bunkering were identified as two specific areas the committee will likely want to revisit.*

5. Lunch

6. Update on Feasibility Assessments (GNA)

- Patrick Couch presented a summary of the findings of the technical feasibility assessments on drayage trucks and cargo handling equipment which are in the process of being completed on behalf of the ports. The drayage truck report was published on April 3, 2019; the cargo handling equipment report draft has been published and is in comment period through May 31, 2019.
- In both reports, uncertainty around the charging and fueling infrastructure development in the next three years was flagged as a key concern for fleets and operators.
- In the cargo handling equipment report, the high level of project activity was flagged as an opportunity to collect meaningful data in the next two years, which will inform a second-stage feasibility assessment in 2021 per the CAAP.
 - The difference in electricity costs between both ports, due to differences in utility rate structures, was raised as a concern by the committee.
- *The committee determined that it will invite LADWP and SCE representatives to a meeting in the near future to clarify its rate structures, and discuss the committee's concerns about the effect of LADWP's electricity prices being higher than those of SCE.*

7. Update on Truck Rate Study (POLA/POLB)



- The ports updated the committee that they are currently processing the responses to an RFP on rate collection, and pursuing a study on the effects of several truck rates on the larger San Pedro Bay Port community. A draft is expected to be published by late summer.
- The ports noted that the recent white paper issued by CARB on establishing a low NOx truck engine standard has an uncertain impact on the establishment of a truck rate. The ports will be setting up meetings with SCAQMD, CARB, EPA and other agency stakeholders to gain better consensus on these issues.

8. Update on 2019 Legislative Session (Erick Martell)

- An update on the proposed SB 44 and AB 1262 legislation was provided to the committee, together with an update on key timeline issues on bills related to ports and goods movement.
- The committee agreed to immediately submit a letter to the appointed 2019-2020 budget committee expressing its support of continued and long-term funding for clean technology demonstrations and deployments in the San Pedro Bay Ports complex.

9. Discussion of the Committee's Role in:

- **Workforce Development Engagement:** Due to time constraints, this item was not discussed in detail.
- **Addressing fueling gaps in trucking corridors outside of the Ports' domain:** Due to time constraints, this item was not discussed in detail.

10. Preparing for VW funding for ZE trucks (Q4 2019)

- The committee discussed opportunities to partner on proposals to capture a share of the available funds for drayage truck technologies.

11. Future Agenda Items

- Next SSCAC Meeting: July 17th
- Agenda Topics:
 - Mayor Eric Garcetti's participation at July meeting
 - A scheduling request has been submitted for the July meeting
 - Truck OEM / Financing Roundtable
 - Further discussion of this item will take place after finalization of the prioritization recommendation.
 - Workforce Gap Assessment (POLB)
 - POLB will deliver a presentation at a future SSCAC meeting
 - Harbor Craft presentation
 - Further discussion of this item will take place after finalization of the prioritization recommendation.
 - AMP Alternative Roundtable / Discussion
 - POLB will deliver a presentation on a recent study at the July meeting

12. Conclusion & Next Steps



- Follow up discussion on the draft Funding Prioritization Recommendation, and preparation for further committee review



Attachment D
Funding Prioritization Recommendation

Sustainable Supply Chain Advisory Committee
Funding & Resource Prioritization Recommendation
July 2019

The Committee submits the following recommendations for reducing emissions at the San Pedro Bay Ports to the Mayor of Long Beach, Robert Garcia; the Mayor of Los Angeles, Eric Garcetti; the Executive Director for the Port of Long Beach, Mario Cordero; and the Executive Director for the Port of Los Angeles, Gene Seroka. As the Committee previously adopted in its Mission & Vision, the following values and guidelines have been considered:

- Focus on the largest sources of emissions with near-term and currently available technologies that meet economic and commercial needs
- Near term pilots that are scalable, advance zero emissions targets, and help transform markets
- Cost-effective investments with environmental, economic, and technological sustainability that also drive long-term market transformation
- Protecting human health, especially in port-adjacent communities that are disproportionately impacted by freight emissions, by accelerating the deployment of zero and near-zero emission technologies

The recommendations are anchored in the following key factors identified through extensive analysis and stakeholder dialogue:

- The Committee aims to prioritize emissions categories according to the availability of cost-effective and meaningful reduction solutions and technologies that could be deployed in the near term for an immediate impact, and would also achieve long-term air quality benefits for the ports and their surrounding communities.
- The Committee recognizes that the ports and their stakeholders are constrained by the relationship between their financial resources and operating obligations, the generally higher incremental costs for new technologies that have not yet reached commercial maturity, and the need for significant supporting infrastructure investment for some technologies.
- The Committee recognizes that the availability of commercial zero- and near-zero emission equipment varies widely across the five identified equipment categories.

Technical Analysis

In considering the host of factors described above, the Committee reviewed a consultant's analysis of zero- and near-zero emission technologies and products for a subset of equipment types. The intent of this analysis was to assess potential emissions reductions, technology availability, costs, and the cost effectiveness of technology investments for each of five identified equipment categories. This analysis included consideration of potential regulatory timelines for emissions compliance and public health obligations.

Committee Recommendations for Near-Term Port Action

The Committee recommends that the joint SPBPs leverage the collective resources from the ports, Mayoral offices, other available financial resources – and work to create new funding sources – to prioritize investment in the following equipment areas where immediate positive impact is achievable.

- **Forklifts** – Replace smaller capacity forklifts with zero emission equipment where such equipment is commercially available and viable.
- **Harbor Craft** – Repower and retrofit tug boats and other harbor craft to the Tier 4 standard, or better, where applicable.
- **Locomotives** –
 - Complete the upgrade of Pacific Harbor Line’s (PHL) locomotives to the Tier 4 standard, or better, and explore opportunities to deploy zero emission capable technologies within the PHL fleet.
 - Work with Union Pacific and BNSF to identify strategies and opportunities to maximize use of their Tier 4 or better locomotives into port related activities to allow increased on-dock rail to provide an air quality benefit for communities as measured by a net reduction in port-related locomotive emissions of diesel particulate and nitrogen oxides, regardless of activity levels.
- **Trucks** –
 - Continue to carefully monitor and extract lessons learned from the ongoing zero emission demonstrations at the ports and throughout California.
 - Pursue the deployment of zero and near-zero emission drayage technology in the port fleets with an emphasis on replacing inventory in the pre-2014 model year category.
 - The Committee recommends that the Ports continue to engage truck OEMs, regional dealerships, finance and leasing companies, beneficial cargo owners, truck drivers and their associations, and other relevant stakeholders to develop innovative approaches to accelerate deployment while maintaining the competitiveness of the ports and the jobs of current drayage truck drivers. These approaches will align with the elements identified in the CAAP as critical for meeting the current Clean Trucks Program’s 2020, 2023 and 2035 deadlines in a manner that provides tiered incentives starting with zero emission trucks being at the top tier. In parallel, the ports need to aggressively collaborate with the elected officials and agencies able to contribute financial resources towards this goal, including the Governor, the California Legislature, CARB, SCAQMD, CEC, DOE, EPA, and others, which is necessary to achieve a large-scale deployment in 3-5 years.

While the Committee recognizes that prioritization of certain technologies may suggest a de-prioritization of others, it wants to be clear that this is not the intent of this recommendation. The Committee’s intent is to identify areas for immediate action consistent with the above guidelines, while balancing the need to continue to invest in areas where additional research, demonstration and validation of zero and near-zero emission technologies is needed.

These additional areas are:

- **Cargo Handling Equipment** – Continue to carefully monitor and extract lessons learned from the ongoing zero and near-zero emission demonstrations at the ports and throughout California, including a focus on in-use emission levels achievable with each technology. In addition, the Committee recommends that the ports continue to implement the CHE recommendation approved in May 2017.
- **Ocean-Going Vessels** –
 - Continue to support the vessel speed reduction (VSR) program by adapting incentives to maximize participation by all vessels transiting within 20 and 40 nautical miles of Point Fermin.

- Seek partners to develop and demonstrate new fuels and on-board technologies to reduce OGV emissions in transit, and additional systems to reduce OGV emissions from both auxiliary engines and boilers at berth, beyond the requirements of existing regulations. Continue to assess and invest in fuel supply solutions, and demonstrations and deployment of viable solutions.
- Continue to work with CARB to inform pending shore power regulations by assessing how to maximize the air quality benefits and minimize the costs of expanded investments in both vessel and terminal infrastructure upgrades that these rulings would require.
- In parallel, continue to assess the needs and development opportunities for alternative emissions capture systems for OGVs.



Attachment E
Workforce Development Presentation

Zero-Emissions Port Equipment Workforce Assessment



Long Beach City College

July 17, 2019

Assessment Team

Melissa Infusino

Workforce Development Director Long Beach City College

Dana Friez

Workforce Devp. Training Manager Long Beach City College

Michael Boehm

Managing Director Advanced Sustainability Institute

Jennifer Bredell

Project Manager Advanced Sustainability Institute



Background

The Port of Long Beach recently updated their Clean Air Action Plan

The plan established a major goal to transition to zero emissions terminal equipment by 2030



Partnership

The Port of Long Beach is piloting new technology to achieve **zero-emissions**

Long Beach City College was invited to report on the impact technology would have on the **workforce**



CA Energy Commission Award

Alternative and Renewable Fuel and Vehicle Technology Program

Demonstration of Zero Emission Cargo-handling Equipment at Port of Long Beach

- 25 new and converted electrified cargo handling vehicles for use by terminal operators

Workforce skills and training gap analysis



Key Stakeholders

- ▷ California Energy Commission
- ▷ Port of Long Beach
- ▷ Long Beach City College
- ▷ Vendors: Cavotec, BYD and US Hybrid
- ▷ Terminal Operators: ITS, LBCT, and SSA Marine as well as TTSI
- ▷ IBEW Electrical Workers Union
- ▷ Long Beach Unified School District



Long Beach City College Role

- ▷ Technology adoption **projections**
- ▷ Identify **workforce skills** to manufacture, operate and maintain electrification equipment and infrastructure
- ▷ Identify **gaps** in workforce skills and education and training programs to address these gaps
- ▷ Make **recommendations** for future training



Long Beach City College Activities

Projections

Inventory

Final Report

Technology adoption
projections -

Interviews with
stakeholders

Original research

Training Inventory -

Identify and survey
colleges

And high schools

Final Report -

Adoption Projections
Gap analysis

Training
Recommendations

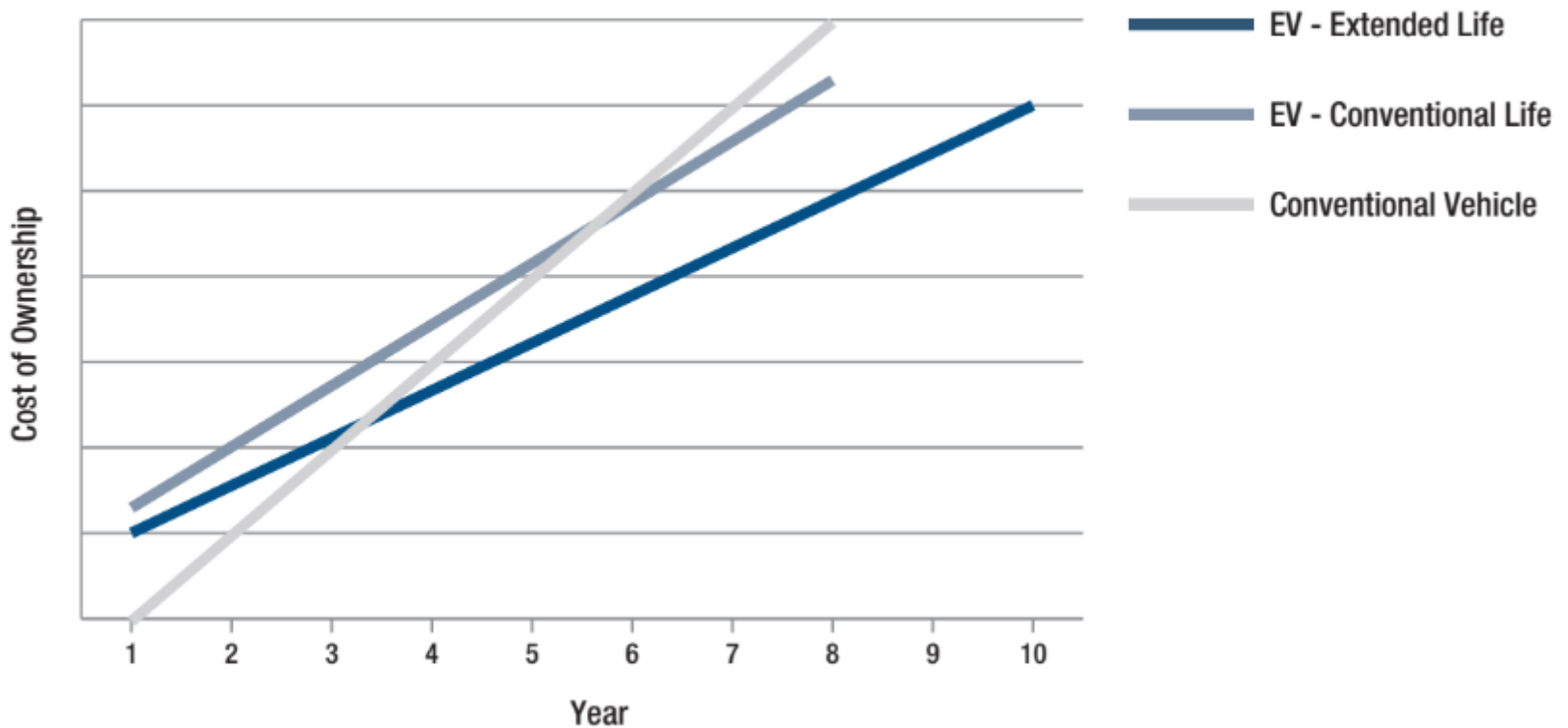


Adoption Projection Updates



Fleet BEV Total Cost of Ownership

ESTIMATED TOTAL COST OF OWNERSHIP



Yard Hauler Adoption

ADOPTION OF ELECTRIC YARD HAULERS														
YEAR	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	TOTAL
% ADOPTION		0%	4%	5%	5%	6%	7%	8%	10%	12%	13%	14%	16%	100%
BEV YARD HAULER	9	0	33	41	41	50	57	62	82	98	107	115	132	830

- Projected units and labor component of install and manufacture
- Maintenance will see up to 50% decrease in labor hours compared to diesel
- Maintenance will need training in BEV to support new vehicles



eRTG Adoption

ADOPTION OF ELECTRIC RUBBER TIRE GANTRIES														
YEAR	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	TOTAL
% ADOPTION		0%	4%	5%	5%	6%	7%	8%	10%	12%	13%	14%	16%	100%
eRTG	9	0	2	3	3	4	4	5	6	7	8	9	10	71

- Projected units and labor for install and manufacture
- Maintenance will have up to 50% decrease in labor hours compared to diesel
- Maintenance will need training in BEV to support new vehicles



Class 8 Truck Adoption

ADOPTION OF PHET CLASS 8 TRUCKS

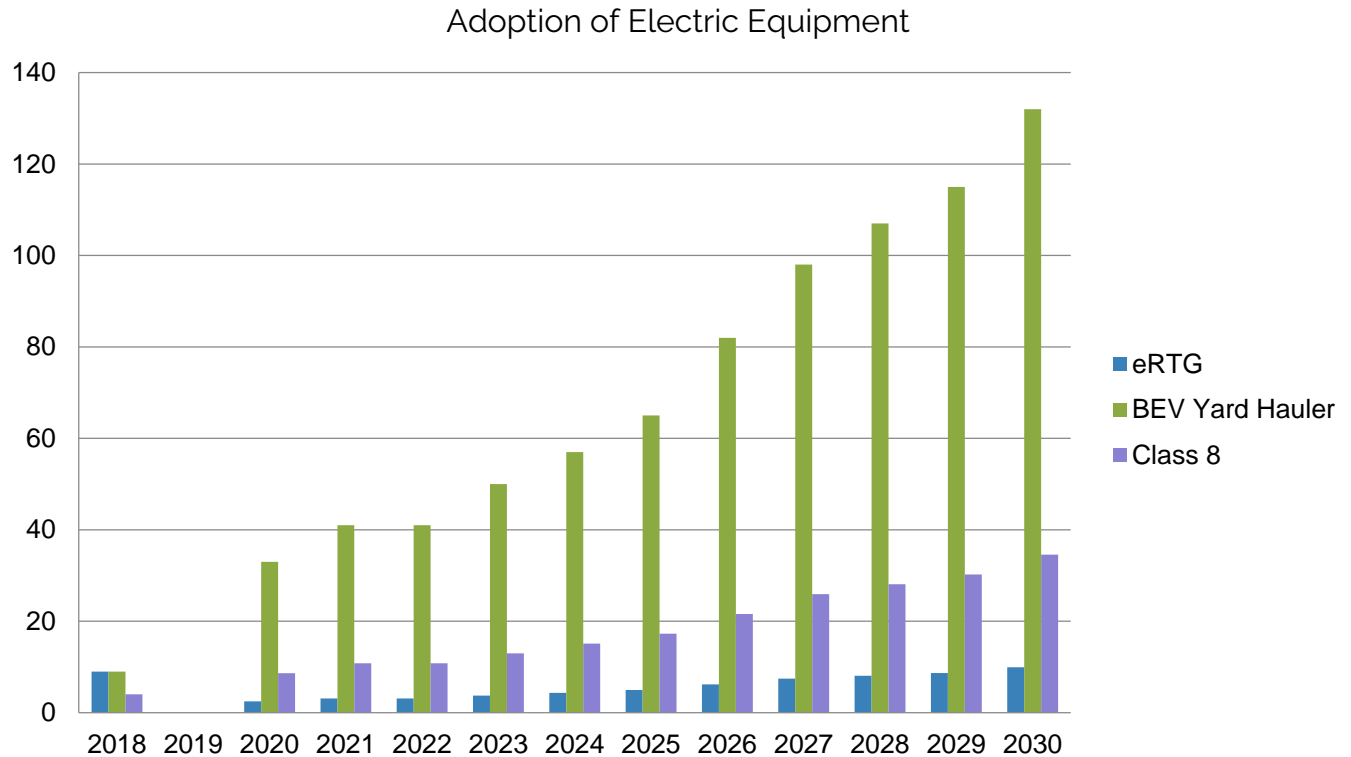
YEAR	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	TOTAL
% ADOPTION		0%	4%	5%	5%	6%	7%	8%	10%	12%	13%	14%	16%	100%
CLASS 8 TRUCKS	4	0	9	11	11	13	15	17	22	26	28	30	35	71

- Only includes TTSI fleet
- Projected units and labor for install and manufacture
- Maintenance will see up to 50% decrease in labor hours compared to diesel
- Maintenance will need training in BEV to support new vehicles



Equipment Projections

- POLB data used for infrastructure to vehicle total population
- Fuel Cell may emerge but this study focuses on pilot equipment
- Adoption curve slow at start, builds to meet 2030 target



Gap Analysis



Stakeholder Interviews

Grant Partner Interviews for Skills and Competencies

Organization	Role
BYD	OEM/Vendor
Cavotec	OEM/Vendor
IBEW Local 11	Labor
International Transportation Service	Terminal Operator
Long Beach Container Terminal	Terminal Operator
SSA Marine	Terminal Operator
Total Transport Services	Logistics Company
US Hybrid	OEM



Identified Competencies

In total, 29 competencies were identified and grouped into eight broad areas including:

Identified Areas of Needed Skills
Battery Safety
Battery Theory
Charging Components
Electrical Connections in Corrosive Environments
Equipment Maintenance
General Electrical
Mechanical Aptitude
Zero Emission Technology



Vendors - Skills Needed

- ▷ Most skills not new - combination required is new
 - Electrical safety + automotive repair skills + schematic reading and battery theory
- ▷ Stakeholders identified these general skills across the board:
 - Technicians skilled in electronics
 - Battery theory and safety
 - Schematic reading
 - Basic automotive repair skills



Infrastructure - Skills Needed

- ▷ Almost all infrastructure installed in the Port by a handful of contracting firms already qualified
- ▷ Stakeholders identified higher level skills as important:
 - High voltage safety (existing workforce has this skill)
 - Battery and charging station training
 - Electrical systems in corrosive environment



Education and Training Inventory



Community College Assets

Through interviews, surveys and certificate and degree course content reviews of regional community colleges we found:

Overview of Relevant Community College Programs

Programs and Content	Yes	No
Does college have an Advanced Transportation degree and or certificate?	13	10
Does college have an Electrical Technology degree and or certificate?	6	17
Does the Advanced Transportation program include electric/hybrid vehicles or zero emissions technology content?	13	0
Does the Electrical program include zero emissions technology content?	4	2



Community Colleges with ZEV Content

Advanced Transportation Programs Including ZEV Content

College	ZEV Content
Cerritos College	Alternative fuel service and electric vehicle technology courses
Citrus College	Hybrid and electric vehicle courses including Toyota Prius sponsorship
Cypress College	Toyota T-Ten program working with Toyota hybrid and electric vehicles
East LA College	Hybrid service and technology course*
El Camino College	Electric and hybrid technology courses
Golden West College	Electric and hybrid technology courses
LA Pierce College	Hybrid and electric service and safety course and an alternative fuels course
LA Trade Tech	Intro to alternative fuels course and several hybrid and electric courses*
Long Beach City College	Hybrid and electric vehicle courses and an Associate degree in Alternative Fuels and another in Electric Vehicles*
Pasadena College	Hybrid repair and diagnostic certification program
Rio Hondo College	Alternative Fuels Associate degree for hybrid and electric vehicle technology and Electric Vehicle and Fuel Cell Technician program*
Saddleback College	Alternative Propulsion Systems course and a hybrid and electric vehicle course
Santa Ana College	Alternative Fuels and hybrid vehicles courses



*Both Electrical and Advanced Transportation with ZEV

Community College Not-for-Credit Trainings

Not-for-Credit Trainings	
Colleges	Content Area
Long Beach City College; LA Trade Tech; Cerritos	Electrical - Understanding electrical systems; reading schematics; diagnosis and repair; introduction to PLC (programmable logic controller computers) and data networks
LA Trade Tech; Long Beach City College	Hybrid Safety - safety and familiarization; understanding of high voltage and standard safety practices for battery removal
LA Trade Tech	Hybrid Preventative Maintenance and Diagnostics - understanding requirements for PM for industrial hybrid vehicles; diagnostics software use and diagnostic skills
Cerritos College	A/C Systems in Hybrid Electric Vehicles - understanding, diagnosis, and repair of air conditioning systems in hybrid electric vehicles
LA Trade Tech	Electrical Zero Emission Familiarization - introduction to working on wholly electric ZEV vehicles



IBEW Apprenticeships and Training

- ▷ Local 11 represents 11,700 members in the greater LA area
- ▷ Represent most of the electrical workers in and around the Port
- ▷ Accepted 600 new apprentices last year
- ▷ Also offers the Electric Vehicle Infrastructure Training Program (EVITP)
 - Highest standard in training and certification for the installation of electric vehicle infrastructure
 - EVITP is a partnership of stakeholders from the electric vehicle industry with over 3,000 certified electricians.



LBUSD High School Pathways

Best match to engage high school students in zero emissions content:

Related Industry Themed High School Pathways in LBUSD	
High School	Pathway
Cabrillo High School	Engineering and Architecture
CAMS High School	Engineering and Architecture
Jordan High School	Engineering and Architecture, and Building and Construction Trades
Long Beach Polytechnic High School	Engineering and Architecture
McBride High School	Engineering and Architecture
Sato High School	Engineering and Architecture



Recommendations



Community Colleges Serving Entry Level Workers

- ▷ Share this report with colleges regionally
- ▷ Create regional workgroups
- ▷ Within colleges, develop cross-disciplinary programs as well as non-credit programs
- ▷ Expand college partnerships with IBEW
- ▷ Seek funding for faculty professional development
- ▷ Seek partnerships with the LAEDC and other regional industry associations
- ▷ Actively follow the Port's of LB and LA's implementation



Long Beach Unified School District and Long Beach City College

- ▷ Expand dual enrollment efforts on electrical and or advanced transportation programs
- ▷ Engage high schools in LBCC career fairs and industry events focused on zero emissions technology



Incumbent Worker Training

- ▷ Update not-for-credit offerings
 - Skills needed to work on high voltage vehicles, interacting with new types of batteries, and installing new infrastructure
- ▷ Expand ETP-funded trainings
 - Colleges can apply for an ETP contract, or partner with an ETP funded partner to offer subsidized training to qualifying employers
- ▷ Partner with IBEW to offer EVITP training



California Energy Commission

- ▷ Provide new funding to colleges and labor partners
 - Short term entry level and incumbent worker training
- ▷ Continue funding workforce assessments
 - Connecting workforce needs with adoption at the systems level and on the ground partner evaluations
- ▷ Create convening opportunities
 - Grantees, adopters of new equipment and infrastructure, and the educational, labor, and workforce development partners



Port of Long Beach

- ▷ Provide training funding to educational institutions and labor partners
 - Create short term training for entry level positions and retraining incumbent workers
- ▷ Continue to partner with educational and labor partners on workforce studies
- ▷ Continue to share zero emissions work
 - With K-12 and higher education systems through symposiums or workshops for educators



New Partnerships

Port of Long Beach and Long Beach City College

California Energy Commission award funding new microgrid project

- ▷ LBCC to provide workforce impact analysis

Maritime Center of Excellence

- ▷ Short term not for credit workforce training in supply chain and logistics



▶ Thank you!
▶ Questions?





Attachment F
AMP Alternatives Presentation

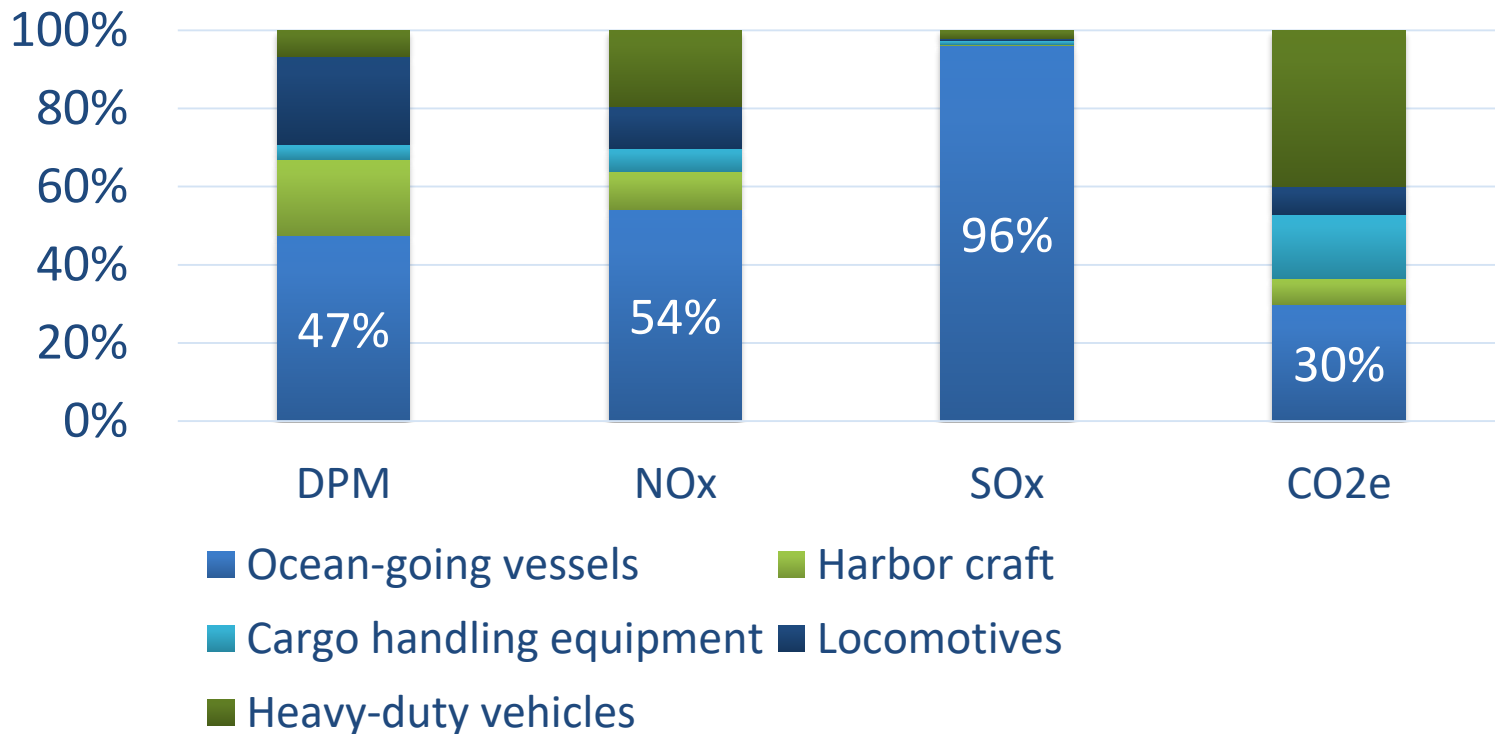
The background of the slide is a wide-angle photograph of a busy port terminal. In the foreground, there are numerous stacks of colorful shipping containers (red, blue, yellow, green) and several large blue gantry cranes. In the middle ground, there are more containers and a paved area with some vehicles. In the background, there are hills and a city skyline under a clear sky.

SAN PEDRO BAY PORTS
CLEAN AIR ACTION PLAN
**Alternative Emissions Capture and
Control Technologies for
Vessels At-Berth**

July 17, 2019

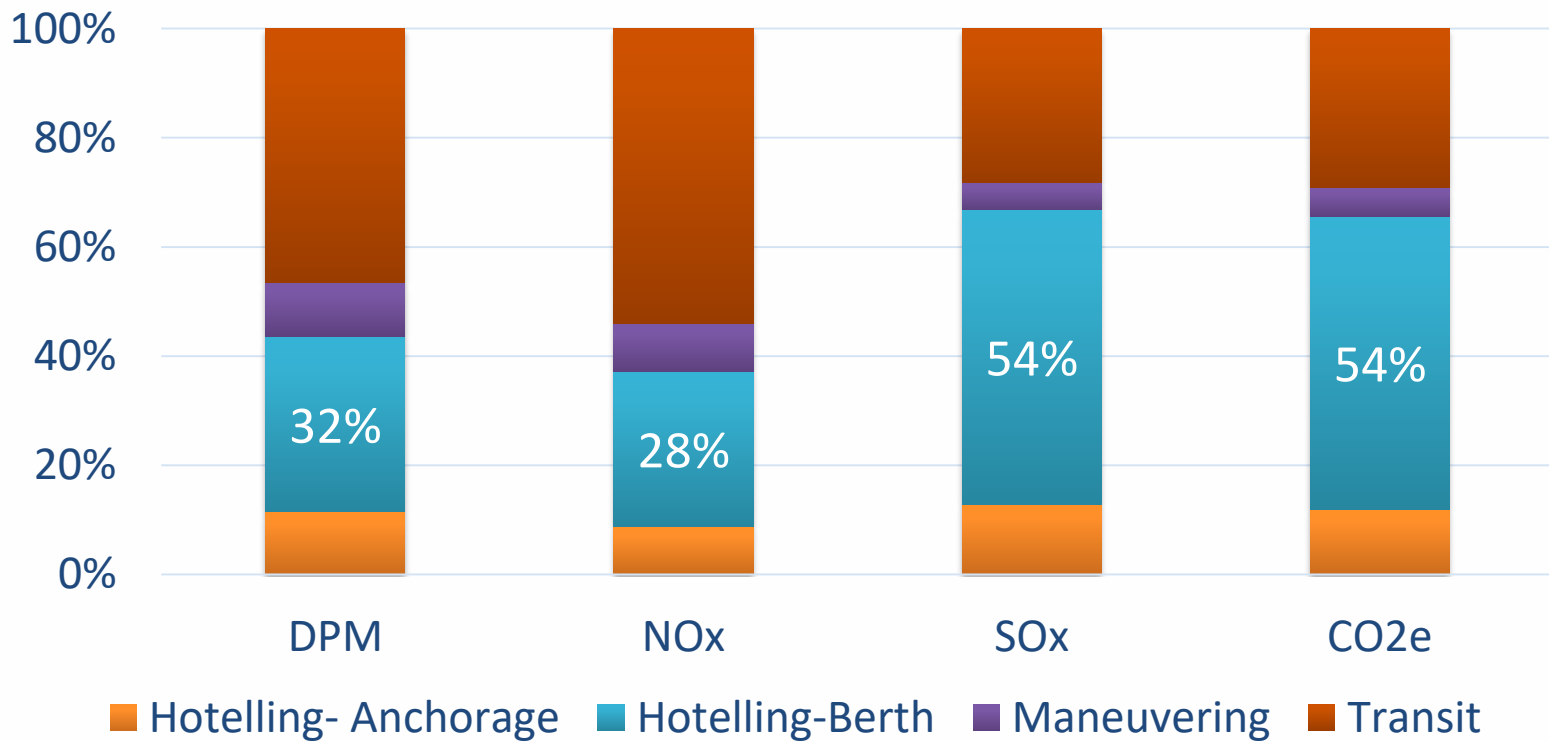


2017 Emissions Inventory





2017 OGV Emissions by Mode





Shore Power

Ships have been plugging in since 2008



Alternative Emissions Capture and Control Technology



Alternative Maritime Emission Control System - ACTI

2008

- 1st generation system undergoes performance & emissions testing at Metropolitan Stevedoring
- \$149,527 contributed per Port under TAP
- NO_x, SO_x, and PM reduced by at least 95%

2009

- POLB recommends funding up to \$2.39M for a 1-year demonstration at Metropolitan Stevedoring

2010-2013

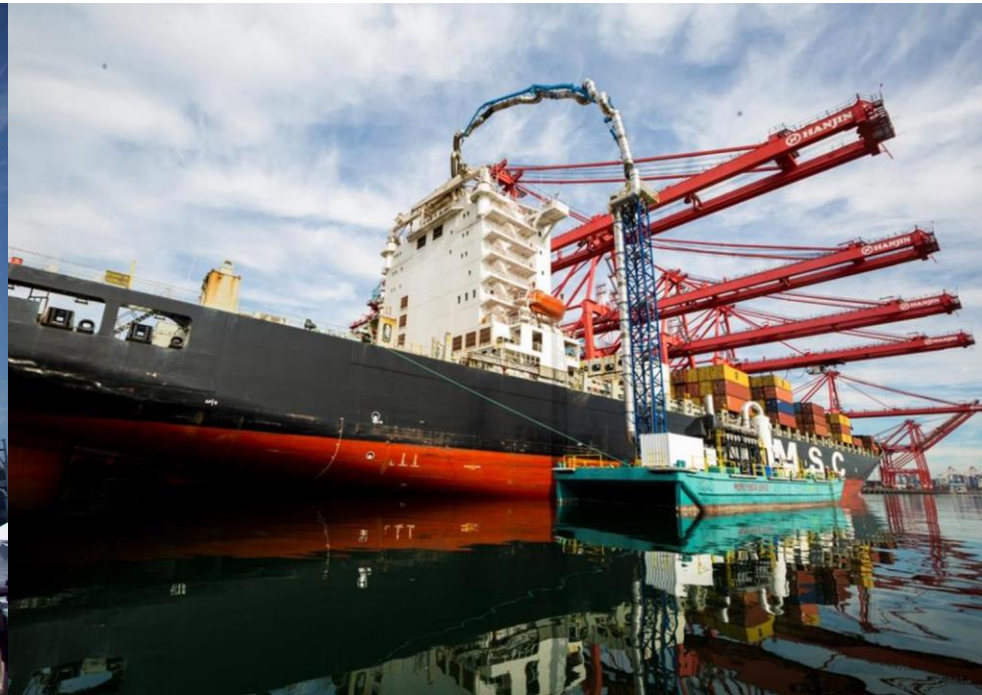
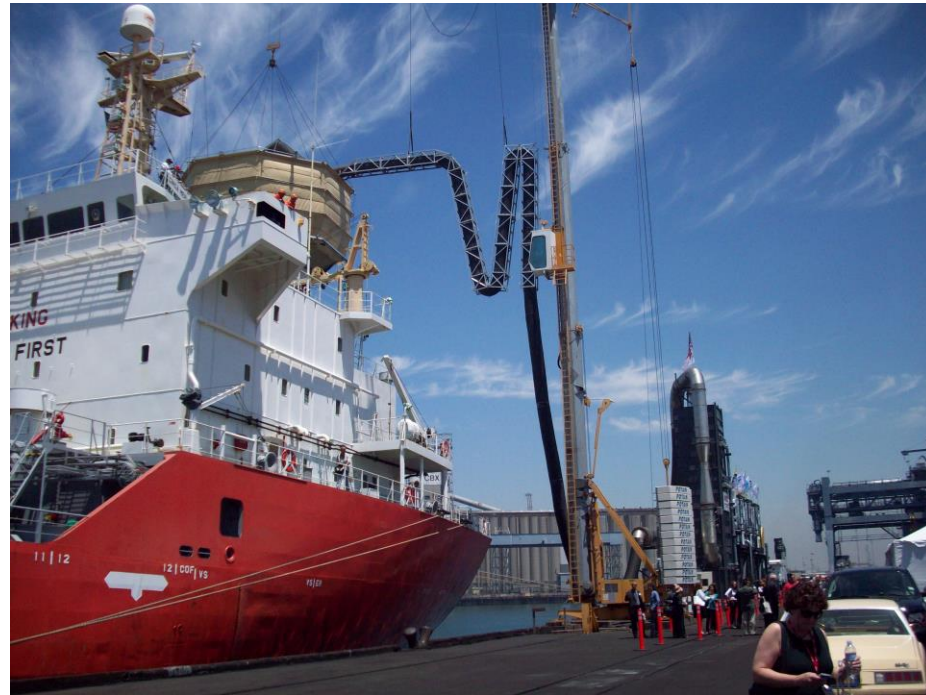
- Contract for 1-year demonstration not executed
- RFI, the RFP for demonstration of at-berth technology

2014

- 2nd -3rd generation
- POLB contracts with AQMD for \$2,063,624; pays \$703,390
- Phase 1: successfully developed CARB approved test plan, operations protocol, & safety plan; completed proof of concept
- Phase 2: full-scale durability demonstration and emission testing; some testing done, but never completed
- Later receives CARB Executive Order



Generation 1 vs. Generation 3





METS-I

- Clean Air Engineering-Maritime, Inc. (CAE-M)
- Barge-based system
- CARB certification received for container vessels
- CARB Rated capture efficiencies for one auxiliary engine
 - a) 90% Nitrogen Oxides (NO_x)
 - b) 95% Particulate Matter 2.5 (PM_{2.5})
 - c) Overall 90% capture efficiency
- Waste generated is solid waste





ShoreKat

- Clean Air Engineering-Maritime, Inc. (CAE-M)
- Land-based system
- Being demonstrated at the Pasha terminal as part of a CARB grant
- Will seek CARB approval for use on bulk vessels



TAP Requests for Proposals

- Ports released 2 RFPs
 - December 5, 2017
 - March 20, 2018
- \$1 million available
- 50% match required; 10% cash
- Non-container vessels
- 4 applicants (March 2018)

*Land or Barge-Based Ocean-Going Vessel At-Berth
Exhaust Emissions Capture & Treatment Systems:
In-Use Demonstration at the San Pedro Bay Ports*

REQUEST FOR PROPOSALS

THE PORT OF LONG BEACH AND PORT OF LOS ANGELES
CLEAN AIR ACTION PLAN – TECHNOLOGY ADVANCEMENT PROGRAM
MARCH 20, 2018



Evaluation Criteria

- Emission Reductions
- Technical Readiness
- Proposal Team's Qualifications
- Vessel & Operations Compatibility
- Cost and Co-Funding
- Business Case
- Secured Partner

Review Results

- Advisory Committee
 - 8 reviewers (AQMD, CARB, EPA, POLA, POLB)
- Median scores: 53.5-69.5%
- Missing information
- Incorrect assumptions
- Insufficient funding to move project forward



Future Demand



- Two certified systems today in-use
- Greater future demand due to new CARB At Berth and At Anchor Rule
 - Increased compliance for the currently regulated fleet
 - Inclusion of RoRo and tanker vessels



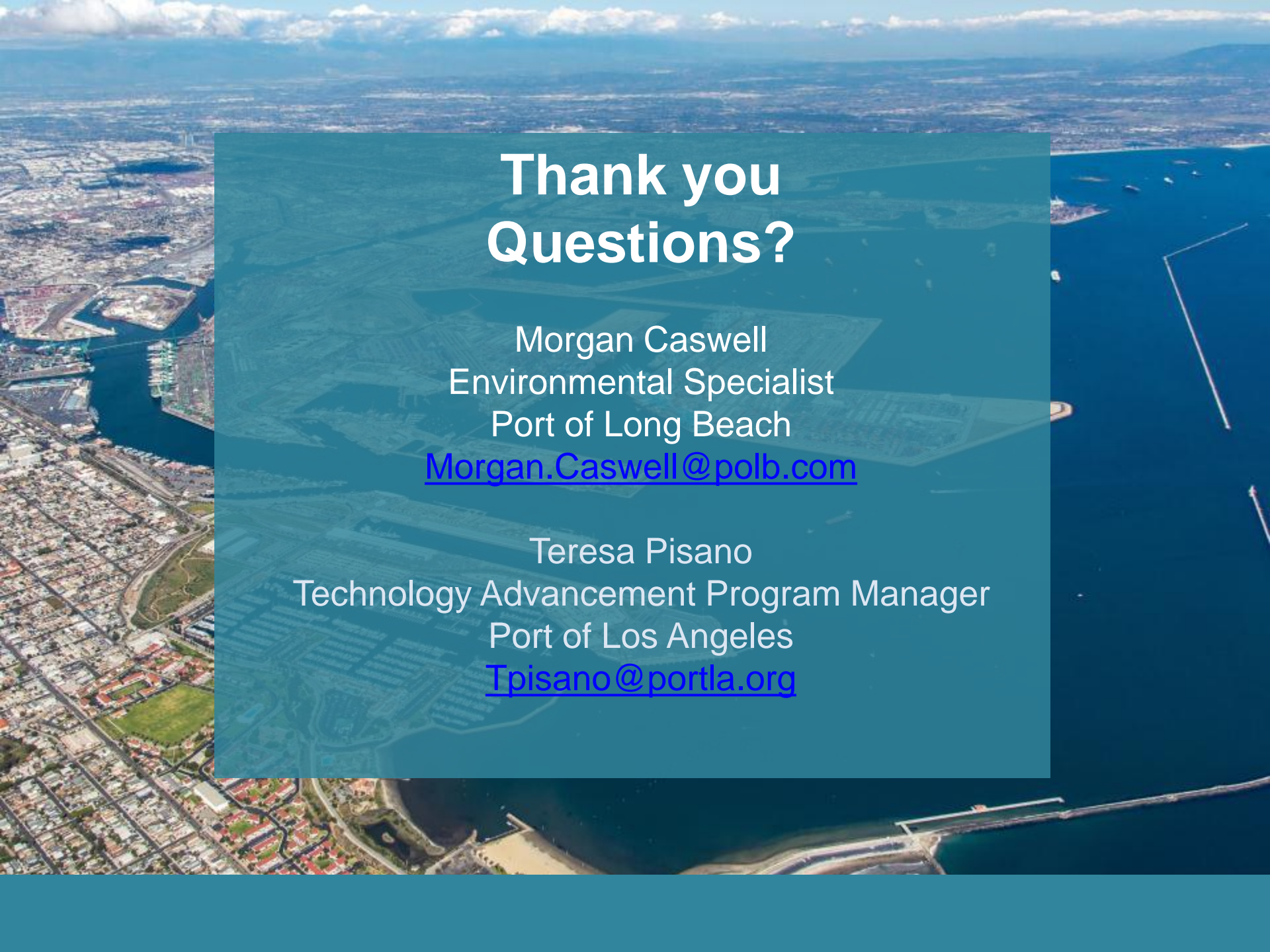
Challenges

- Lack of public/private investment
- Market for this technology has not expanded
- Few deployments
- Financial challenges with vendors
- Likely GHG increase near-term
- Expensive capital & operational costs
- Lack of storage space



Opportunities

- Less infrastructure required terminal-side
- Zero infrastructure required vessel-side – suited for infrequent callers
- Land-based technology potentially safer solution for tankers
- Reductions in GHGs possible in the long-term

An aerial photograph of a coastal city and harbor, likely Long Beach and Los Angeles, with a teal semi-transparent overlay. The text is centered on the overlay.

Thank you Questions?

Morgan Caswell
Environmental Specialist
Port of Long Beach
Morgan.Caswell@polb.com

Teresa Pisano
Technology Advancement Program Manager
Port of Los Angeles
Tpisano@portla.org