

SAN PEDRO BAY PORTS

CLEAN AIR ACTION PLAN

Clean Air Action Plan Implementation Progress Report 2023 Annual Report

ACCOMPLISHMENTS

GENERAL

- The Ports of Long Beach and Los Angeles (Ports) held their sixteenth, seventeenth, and eighteenth CAAP Implementation Stakeholder Advisory Group meetings on March 8, July 25, and November 8, 2023, respectively.
- The Ports experienced lower cargo throughput in the first two quarters of 2023 compared to 2022, mainly due to diminishing consumer demand, full warehouses, and inflation concerns. This changed in the last two quarters of 2023 due to ratification of a labor pact between dockworkers and terminal management as well as heightened consumer confidence and demand for holiday-related goods.
- Some COVID-19 related congestion was still occurring at the Ports in the first half of 2023, but was diminishing over time. At this time, effects from COVID-19 and associated supply chain disruptions are no longer impacting schedules for the Ports' technology demonstrations.

TRUCKS

Clean Truck Fund (CTF) Rate. The Port of Los Angeles (POLA) and Port of Long Beach (POLB) continued implementation of the CTF Rate, which commenced collection on April 1, 2022. On April 27, 2023, POLA staff provided a CTF Rate spending plan update to their Board of Harbor Commissioners (Board), and on May 22, 2023, the POLB Board approved the spending plan for Year 2 of the CTF Rate. Combined, the Ports are currently on track to collect between \$70 and \$80 million each year throughout the first few years of the program as zero emission (ZE) trucks begin to be purchased and operated at the Ports.

To protect against any cargo owners or shipping lines passing along payment of the CTF Rate to motor carriers, in December 2023, the Ports sent a letter to all payers of the CTF Rate, including container shipping lines, reminding them that the CTF Rate is not to be passed onto drayage truck operators.

At the end of 2023, 213 ZE trucks were registered in the Port Drayage Truck Registries. Of which, 208 were electric and 5 were hydrogen fuel cell.

CTF Rate Incentive Programs. As part of the CTF Rate spending plans approved by each Port's Board in March 2022, the Ports committed to partnering with CALSTART to implement a Ports'-specific Zero Emission Truck Voucher Incentive Program (Voucher Incentive Program). The Ports worked with CARB and CALSTART to allow a voucher supplement from the Ports on top of the current CARB Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) voucher amount. Small drayage fleets, as defined by CARB, would get a \$100,000 supplement,

with all other drayage fleets receiving a \$75,000 supplement to the base HVIP voucher amount and any other eligible supplements (e.g., 15% supplement if domiciled in a disadvantaged community). The POLB Board approved an agreement with CALSTART to implement the Voucher Incentive Program on April 19, 2023. The POLA Board approved an amendment to their CALSTART agreement on September 3, 2023 to adjust for the voucher supplement modification. Both Ports released a combined \$60 million allocation in November 2023.

In 2023, both Ports prioritized zero-emission infrastructure projects in their CTF Rate spending plans in an effort to address some of the observed hesitancy to purchase zero emission trucks. The Ports preliminarily identified a set of zero emission infrastructure projects to fund in partnership with the Mobile Source Air Pollution Reduction Review Committee (MSRC), based on responses to their Request for Information soliciting public zero emission infrastructure projects serving heavy duty vehicles, including drayage trucks. Contracting with MSRC and Board approvals to fund drayage serving infrastructure projects will take place in 2024.

Large-Scale Zero Emission (ZE) Truck Deployment Pilot Project. The California Joint Electric Truck Scaling Initiative (JETSII) Project, which is receiving \$1.5 million in match funding from each Port under a 2022 Memorandum of Understanding (MOU) between South Coast AQMD and the two Ports, will deploy 100 battery-electric trucks from original equipment manufacturers (OEMs), Daimler Truck North America (DTNA) and Volvo Trucks North America (Volvo), for a one-year demonstration period at two sites--NFI Interactive Logistics, Inc. (NFI) and Schneider National, Inc. (Schneider). The project will also involve installing 54 chargers at NFI and Schneider, as well energy storage and solar at NFI.

In 2023, under the Schneider deployment, 50 DTNA trucks were placed into service. The total fleet count at the end of 2023 was 92 with 50 of these trucks from the JETSII project. The fleet has accrued over one million miles since its deployment. Other than one truck that was taken out of service due to a collision that required replacement of a high voltage battery, the fleet has generally been operating well. However, the downtime rate for these trucks was typically 10-15% (compared to 2-5% with conventional diesel trucks) mostly due to delays in service, parts availability, and minor early deployment issues that were impacted by the pandemic-related supply chain disruptions. Until fleet reliability is fully achieved, Schneider has maintained a small set of diesel trucks for back up to maintain its 24/7 operation. All 16 DC fast chargers were charging trucks at Schneider's El Monte site. With the exceptions of a few instances of software issues, all chargers were functional following commission.

Also in 2023, under the NFI deployment, 30 DTNA trucks were placed into service and 20 Volvo trucks will be deployed in early 2024. These trucks are using existing chargers at the Chino and Paramount sites as well as the recently opened WattEV site at the Port of Long Beach. However, availability of charging remains limited, thus these trucks performed limited operations during 2023. Availability of charging infrastructure should not continue to be an issue because the Ontario depot is expected to have temporary charging with ten 350 kW charging ports utilizing low voltage switchgear in early 2024. Permanent power charging will be deployed in August 2024 once the custom medium voltage switchgear arrives in May 2024. Once permanent power charging is in place, then 1 MW solar and 7.7 MWh of energy storage will be deployed to minimize on peak demand at this site.

Early Deployment and Demonstrations. The Ports continue to manage several grant-funded demonstrations of ZE trucks, including over 20 hydrogen fuel cell and battery electric trucks as part of supply chain pilots. At the end of 2023, 213 ZE trucks were registered in the Ports' Drayage Truck Registry with access to both Ports. There continues to be extended delivery times of ZE trucks and challenges installing infrastructure. On November 23, 2021, POLA released a Request

for Proposals (RFP) for projects to deploy at least 10 zero emission trucks. POLA's Board of Harbor Commissioners (Board) awarded \$6 million to two companies for 22 ZE battery electric trucks in December 2022. One project has completed delivery and deployment of 10 trucks by 2023. The other project has delayed deployment due to utility infrastructure delays.

At POLB, all four LNG plug-in hybrid electric trucks (PHETs) funded under a California Energy Commission (CEC) grant have been out of service. Cummins, the engine manufacturer, identified pressure cracks in the engines and proposed a costly reconstruction. Cummins suggested potential causes, such as poor engine oil management and excessive idling, though both reasons were disputed by the operators. It was suspected that the remaining three LNG PHETs may have had similar engine issues. Discussions between US Hybrid, Total Transportation Services, Inc. (TTSI), and Cummins regarding responsibility for the engine failures did not yield a commitment from Cummins to entirely cover the repair of the engines as was hoped. Since TTSI has stated that they will not incur additional cost to fix the engines for these trucks, the Port made the decision to shift the focus away from the demonstration phase to data analysis. This included processing available truck data logger information to evaluate performance and emissions during the time the trucks were in revenue service. The data was included in the final report which was submitted to CEC in December 2023. The demonstration was part of the CEC funded Port of Long Beach Zero-Emission Terminal Equipment Transition Project, which officially closed out in December 2023.

Kickstart Incentive Program. In June 2023, three low-NOx trucks were delivered as a part of the "Kickstart Incentive Program" that had been initiated in 2021 by AQMD and supplemented with \$1 million in funding by POLB. AQMD had initially identified five fleets to participate in the Kickstart program and contracted with those fleets to fund a total of six low-NOx and two battery electric trucks. As manufacturing delay issues still exist to a certain degree, many natural gas drayage grantees are indicating that they may not proceed with the projects as they have not been guaranteed by dealerships that they will receive their combustion truck to register for port entry by December 31, 2023, as required by the Advanced Clean Fleets (ACF) regulation. As a result, an additional fleet was identified as a back-up in the event any remaining fleets drop out of the program.

Advanced Clean Trucks/Fleets Regulation. As a companion to the Advanced Clean Trucks (ACT) Regulation that CARB passed in June 2020, CARB approved the Advanced Clean Fleets (ACF) regulation in April 2023, which established ZE requirements for large entities and fleets. Specifically for drayage, ACF requires any new truck registered with the state after January 1, 2024 to be ZE and all drayage trucks must be ZE by 2035. Legacy combustion engine drayage trucks can continue to operate in drayage until the end of their useful life, the earlier of 18 years or 800,000 miles, as long as they are registered into the CARB system by December 31, 2023 and visit a port or intermodal railyard at least once per year. On December 28, 2023 CARB issued an [Enforcement Notice](#) indicating that enforcement of the drayage and high priority fleet portions of the regulation would be put on hold pending issuance of a waiver from the United State Environmental Protection Agency (USEPA). The Ports will continue to monitor the status of the USEPA waiver to CARB.

Feasibility Assessment for Trucks. As part of the 2017 CAAP update, the Ports committed to developing assessments for drayage trucks every three years. The Feasibility Assessments evaluate the current snapshot of emerging zero-emission and near-zero emission truck technologies. The first report, [2018 Feasibility Assessment for Drayage Trucks](#), was released in April 2019, with an update later in May 2020. The Ports began work on the second Feasibility Assessment for Drayage Trucks in Q1 2021. The [Final 2021 Feasibility Report for Drayage Trucks](#) was released February 2023.

Public Truck Charging. POLB completed and released a [Public Charging and Fueling Study](#) in September 2021. To build on this effort, POLB released a Request for Information (RFI) in February 2022 to obtain information regarding the near-term development of publicly accessible electric-charging facilities for drayage trucks at four sites on POLB property. The RFI closed on March 29, 2022. In September, POLB released a [summary document](#) describing the findings of the RFI. The Port released an RFP for public truck charging at the Clean Truck Center on July 6, 2023. This RFP will include the first of two POLB sites identified in the RFI for which the Port has public charging plans. The RFP for the second site identified in the RFI is expected to be released in Q2 2024.

In August 2022, as part of POLA's contribution to the Volvo Low Impact Green Heavy Transport Solutions (LIGHTS) project, POLA completed and submitted to CARB a [report](#) assessing the potential of deploying battery electric trucks at or near the Ports, including a look into the operational capabilities and charging infrastructure needed for battery electric truck deployment. The report identified potential opportunity charging locations for battery electric truck that could operate at or near the Ports in order to help transition the drayage fleet to zero emissions by 2035.

Following the LIGHTS report, POLA released an RFP for public charging at a site in Wilmington in the July 2023. The RFP closed in October 2023, but did not receive any responsive proposals. A revision of the RFP is scheduled for release in January 2024. The site is part of a larger grant funded project through the Los Angeles Cleantech Incubator.

TERMINAL EQUIPMENT

Early Deployment and Demonstrations. The Ports continue to manage several grant funded demonstration projects, including electric yard tractors, electric top handlers, and electric rubber-tired gantry cranes, as well as innovative approaches to charging infrastructure including micro-grid controls with distributed generation and battery storage.

At POLA's Everport terminal, three second generation BYD battery electric yard tractors, charged with Cavotec's Smart Plug-In System, continue to operate in demonstration service throughout 2023. Everport continues to operate two Taylor battery electric top handlers and 22 Capacity ultra-low NOx renewable natural gas yard tractors in revenue service. The Advanced Infrastructure Demonstration (AID) Project will demonstrate 12 WAVE wireless inductive charging stations to energize 10 BYD battery electric yard tractors at West Basin Container terminal. Phase 1 construction was completed in Q3 2022 and two yard tractors were tested in operations. Phase 2 is scheduled for completion in Q2 2024.

At Pier C, SSA took delivery of the 33 electric yard tractors and completed construction of the infrastructure installation to support the yard tractor deployment. Commissioning of the infrastructure and vehicles continued through the end of 2023 and will be completed in Q3 2024. Commissioning was slowed due to interoperability issues with the vehicles and charging stations, mechanical and software issues identified on some of the first yard tractors deployed, and reliability issues with some of the charging stations.

The Port of Long Beach Zero-Emission Terminal Equipment Transition Project was officially closed out in December 2023. The project was funded under a \$8,610,000 grant received from the California Energy Commission (CEC). The project designed, built, and delivered into service battery-electric yard tractors with BYD, LNG PHETs with US Hybrid, grid-tied electric rubber-tired gantry cranes with SSA and Cavotec, and electric infrastructure upgrades performed by SCE.

The CHEs were demonstrated at three container terminals and the LNG PHETs were put into service at TTSI (as mentioned above).

POLB continued to make progress on the project to replace 60 diesel yard tractors with battery-electric technology and supporting infrastructure at LBCT, which was awarded \$30.1 million from the U.S. Maritime Administration's (MARAD) Port Infrastructure Development Program (PIDP) grant program in October 2022. In 2023, the project was Categorically Excluded under the National Environmental Policy Act (NEPA) and contracting commenced between POLB and MARAD. A final master contract with MARAD and an executed subgrant agreement passing through all terms and conditions of the grant to LBCT is expected in 2024.

Infrastructure Master Planning for Terminal Equipment

In May 2022, POLB executed a \$2.5 million grant agreement with the CEC for the EV Blueprint Phase II Project, which includes development of a zero-emission infrastructure master plan (ZEIMP) for terminal operations at Pier J. POLB staff have selected a consultant to support development of the Pier J ZEIMP in early 2023. Since then, weekly meetings have been held to discuss data gathering, schedule, and basis of design. Initial areas have been identified for charging infrastructure, and alternatives are being analyzed for locations and methods of charging (electric utility versus hydrogen fuel) as well as parking layouts for new ZE equipment. These items have been closely coordinated with the tenant at Pier J to ensure operations will be minimally affected. Separately, POLB selected a consultant for professional engineering services to develop the SSA Marine Pier A ZEIMP under a request for proposal (RFP) from POLB's Engineering Division's bench of on-call consultants zero-emission programs. LBCT, TTI, and ITS are actively designing for their transition to zero emission operations at their respective terminals.

The POLA Engineering Division worked with the Los Angeles Department of Water and Power (LADWP) and the Electric Power Research Institute (EPRI) and a grid-demand assessment to evaluate the impacts from terminal electrification on LADWP's grid. The report also recommends projects for POLA and LADWP to pursue in support of terminal electrification to achieve the CAAP CHE ZE goal. The report was published on July 29, 2023. Following this report, POLA staff will work with each terminal partner to develop a public ZE Terminal Transition Plan for publication in 2024. This Plan will build on the published study with EPRI and LADWP and work with each terminal to refine the overall planned projects to deploy ZE Terminal Equipment at POLA.

Feasibility Assessment for Terminal Equipment. As part of the 2017 CAAP update, the Ports committed to developing assessments for terminal equipment every three years. The Feasibility Assessments evaluate the current status of clean terminal equipment technologies and infrastructure. The first report, [2018 Feasibility Assessment for CHE](#), was released in September 2019. The Ports commenced the second Feasibility Assessment for Terminal Equipment in Q1 2021. The [Final 2021 Feasibility Assessment for CHE](#) was released on August 25, 2022.

SHIPS

Vessel Speed Reduction. 95% of vessels visiting the Ports in 2023 slowed down to 12 knots within 20 nautical miles of Point Fermin, and 90% of vessels slowed within 40 nautical miles.

Ship Incentive Programs. POLB continued to implement the revised Green Ship Incentive Program, which incentivizes vessel calls from ships utilizing the Environmental Ship Index (ESI) and those that meet the International Maritime Organization (IMO) Tier III engine standards. POLA continues to incentivize ships for complying with the ESI program, meeting IMO Tier III Engine Standards, and/or participating in the Technology Advancement Program.

Green Shipping Corridors. In Q1 2022, the POLA and Port of Shanghai, with support from C40 Cities, announced a partnership including the City of Los Angeles, City of Shanghai, shipping companies, and a network of cargo owners, to create the world's first transpacific green shipping corridor to decarbonize goods movement between ports in the United States and China. In Q2 2022, POLB and Ocean Network Express joined the Green Shipping Corridor partnership. A Green Shipping Corridor implementation plan was developed during Q1-Q3 2023 and was released publicly on September 22, 2023.

On April 24, 2023, the POLA, POLB, and the Maritime and Port Authority of Singapore signed a Memorandum of Understanding (MOU) to establish a green and digital shipping corridor between Singapore and the San Pedro Bay port complex. This corridor will focus on low- and zero-carbon fuels for bunkering, as well as digital tools to support the deployment of clean technology. Corridor partners met regularly during Q2-Q4 2023, developing a Partnership Strategy for the green and digital shipping corridor, which was ultimately unveiled at the 2023 United Nations Climate Change Conference (COP28) on December 6, 2023.

In March 2023, POLA entered into separate MOUs with the Port of Tokyo and the Port of Yokohama to formally collaborate on sustainability and environmental issues and establish Green Shipping Corridors. In June 2023, POLA also signed an MOU with Port of Nagoya to broaden cooperation on key sustainability and operational efficiency initiatives including Green Shipping Corridor.

At Berth Regulation. CARB's Board approved the latest update to the At Berth Regulation at their Board meeting on August 27, 2020. POLA and POLB completed, signed and submitted Port and Terminal Plans to CARB by their due date, December 1, 2021. During Q1-Q4 2023, Port staff continued to meet with terminal operators regarding implementation of their terminal plans. Specifically, Port staff worked with tanker and auto terminal operators for the upcoming mandatory February 1, 2024 update of their terminal plans.

HARBOR CRAFT

Commercial Harbor Craft Regulation. Implementation of the amendments to the Commercial Harbor Craft (CHC) Regulation approved by CARB in 2022 began on January 1, 2023. CHC operators reported on their CHC fleets by March 31, 2023. Facility operators/owners were required to report on CHC fleet operators beginning July 1, 2023. Both Ports submitted the required reporting in compliance with the July 1, 2023 deadline. Ports also submitted the CHC infrastructure report in compliance with the December 31, 2023.

OTHER

2022 Emissions Inventories. Both Ports released their respective 2022 Emissions Inventory in Q3 2023: <https://cleanairactionplan.org/results/emission-reductions/>.

Air Quality Monitoring Program. POLB released its 2022 Air Quality Monitoring Report in September 2023. POLA released their respective 2022/2023 Air Quality Monitoring Report in September 2023. The Ports' annual reports can be viewed at: <https://monitoring.cleanairactionplan.org/reports/>.

POLA started the process of upgrading the air monitoring equipment at their four air monitoring stations in 2022 with all new equipment. POLA held three public meetings (January 11, 2023, May 16, 2023, and October 24, 2023) to inform the public about the status of the equipment upgrades and to answer questions on the air monitoring program. The air monitoring equipment

upgrade project was completed on October 12, 2023. A field trip is planned at one of the air monitoring stations for the public to view the new equipment and ask questions in Q1 2024.

Technology Advancement Program (TAP). In April 2023, the Ports updated the TAP Program Guidelines, which can be found on the [TAP website](#). The Program Guidelines provides TAP background, eligibility requirements, and information regarding the application and selection process. It was revised to reflect advances in zero-emission technologies for Port source categories and therefore changes in funding eligibility. The TAP supports technology development in anticipation of new State or federal regulations for off-road, maritime-related source categories. For this reason, TAP funding priorities have been given to zero-emission cargo-handling equipment, zero-emission locomotives, zero-emission harbor craft (or technologies that enable the repower of a harbor craft to Tier 4 or cleaner if zero emissions technology is not feasible). Other priority areas include technologies that reduce main-engine emissions from ships during transit to IMO Tier III levels or cleaner and innovative charging or fueling infrastructure (beyond the standard fueling/charging) for any port source. It is important to note that heavy-duty trucks are no longer eligible for TAP funding. Heavy-duty trucks are required to have increasing commercial sales starting in 2024 under the State's Advanced Clean Trucks Regulation and major OEMs have already released commercialized models. However, innovative charging for heavy-duty trucks will be considered. More information may be found: <https://cleanairactionplan.org/technology-advancement-program/tap-guidelines-and-funding-opportunities/>.

The TAP website was also updated to include a streamlined process by which interested applicants may submit their project concept information on the TAP website. Applicants are now able to use one web form to submit their project concept and they may save their information and return to it at a future date, if desired. The updated website also provides contact information for additional support and guidance, if needed.

2022 TAP Annual Report was released in May 2023 and may be accessed here: <https://cleanairactionplan.org/technology-advancement-program/reports/>. The 2023 TAP Annual Report is currently in development with an anticipated release for Q2 2024.

Project Concepts Received in 2023

The Ports received two project concepts in 2023. The first submission focused on a battery swap charging solution for drayage trucks. Since this technology falls under the criteria for funding eligibility and innovative charging, the applicant was invited to submit a full proposal for funding consideration. However, a full proposal was not received by the close of the year. The second submission proposed an electric vehicle charging depot for Class 6 – 8 trucks using solar power and battery storage solutions to help offset impacts to the grid. Since this project concept focused on deployment of commercialized technologies, the project was not eligible for funding under the TAP. Hence, the applicant was not invited to submit a full proposal.

TAP and Grant Projects. Below is an overview of Port grant-funded projects and TAP project demonstrations active in 2023. Entries in bold font were initiated in 2023.

Project Title	Project Description	2023 Status
Advanced Infrastructure Demonstration Project (Port of Los Angeles)	Design and demonstrate inductive charging infrastructure to support opportunity charging for 10 battery-electric yard tractors.	The charging infrastructure passed UL inspection and is fully operational. Six of the 10 yard tractors are in service, with the remaining four pending receipt of retrofit components.
Crowley Electric Tug	Design and build a battery-plug-in hybrid tugboat capable of 90 tons bollard pull for ship assist and harbor work. A key deliverable of this project is for this tug to be approved by CARB as a Zero-Emission Advanced Technology (ZEAT) tug under the recently amended Commercial Harbor Craft (CHC) regulation.	Crowley worked towards completion of the bid package and building funding support for the project. The contract agreement between the Port of Long Beach and Crowley was finalized on October 18, 2023. After receiving bids from shipyards, Crowley selected their shipyard for construction of the vessel and entered into negotiations with the shipyard to solidify contract terms.
Electric Vehicle Blueprint Phase II Project (Port of Long Beach)	Develop zero-emission infrastructure master plan for SSA Marine's Pier J facility to convert to zero-emissions operations. Develop a similar infrastructure master plan for the Port of Long Beach to support a fully zero-emissions Port-owned fleet. Install EV chargers at the Port's Maintenance Facility as well as the infrastructure needed to power future chargers at the Port's Joint Command and Control Center. Develop a workforce assessment report with Long Beach City College to identify workforce skills needed to maintain zero-emissions trucks and infrastructure.	Development of the Port's Zero-Emission Infrastructure Master Plans (ZEIMPs) for Pier J is well underway and the Harbor Department fleet ZEIMP is complete. The 2021 update to the Feasibility Assessment for Drayage Trucks was published in 2023. Charging infrastructure at the Port's Joint Command and Control Center is complete.
Everport Advanced Cargo Handling Equipment Demonstration Project (Port of Los Angeles)	Develop and demonstrate three battery-electric yard tractors powered by a smart charging system and two battery-electric top handlers.	<p>The top handlers successfully completed 12-months of in-service demonstration in 2021 and provided valuable lessons learned for future models. The top handlers continued to be utilized in daily operations during 2023.</p> <p>Three BYD battery-electric yard tractors integrated with the smart charging system began demonstration in May 2022, though several modifications were needed to address</p>

		<p>challenges encountered before the yard tractors could be effectively deployed. The most important project outcome was continued product improvement towards developing battery-electric yard tractors capable of meeting the rigorous demands of marine terminal operations.</p> <p>The project Final Report was submitted to CEC in November 2023 and this project is now complete.</p>
Pacific Harbor Line Zero-Emission Switcher Locomotive Demonstration Project	Design and demonstrate a zero-emission switcher locomotive and associated charging infrastructure.	The battery charging system was commissioned in November 2023. Both the battery charging system and locomotive were placed in service December 2023 and the unit is currently performing rail services for this 12-month demonstration.
Pasha Green Omni Terminal Demonstration Project (Port of Los Angeles)	Develop and demonstrate two battery-electric yard tractors and two battery-electric on-road trucks; three 21-ton electric repowered forklifts; a microgrid with battery storage capability tied to a rooftop solar array; and a land-based ship emissions capture and treatment system.	This project provided valuable lessons learned for the deployment of zero emission and near-zero emission technologies, including EVs, electric CHE, and the ShoreKat land-based ship emissions capture and control system at a multi-modal facility. The project Final Report was submitted to CARB in November 2023 and this project is now complete.
Pasha Hawaii Ohana Class LNG-Powered Container Ships Project (Two New Vessels)	Design and build two Ohana class vessels powered with internal combustion dual-fuel (LNG & diesel) propulsion technology to facilitate the primary use of cleaner burning LNG. AMP capability included. These propulsion engines will meet Tier III standards.	The LNG vessels call on a ~weekly basis since August 2022. The ships bunker approximately 320,000 gal of LNG per fueling event, with the goal of operating entirely on LNG. Emissions testing is planned for 2024.
Pasha Horizon C9 Vessel LNG Engine Repower Demonstration Project	Repower one C9 class vessel from steam turbine power to internal combustion dual-fuel (LNG & diesel) technology to facilitate the primary use of cleaner burning LNG and provide a significant engine efficiency increase. AMP capability will also be included in this repower. These propulsion engines will meet Tier III standards.	The repower process has been slow, due to shipyard closures for health concerns (COVID; Heat), and test failures for the new engine block. Modifications have been made throughout 2022, and initial MGO trials were completed in December 2023. Despite the setbacks the vessel is on schedule to be deployed in January 2024. Emissions testing is planned for 2024.

<p>SSA Marine H2 Fuel Cell Top Handler Development and Demonstration Project</p>	<p>Design, manufacture, and demonstrate two hybrid hydrogen fuel cell top handlers.</p>	<p>Project agreement was executed and project activities have begun. The equipment is scheduled for 2025 delivery.</p>
<p>South Coast AQMD Zero-Emission Cargo Transport (ZECT) II Demonstration</p>	<p>ZECT II encompasses the development of seven drayage trucks by five different contractors and includes PHEV, BEV and fuel cell technology.</p>	<p>Six demonstration trucks continued their in-service demonstration, achieving a range of 150-200 miles, with an average fuel consumption rate of 6-8 mi/kilogram of hydrogen (fuel consumption varies by duty cycle, load, etc.). Operator feedback has been positive. The final truck experienced management and design delays, but this truck will begin its demonstration service in Q2 2024.</p>
<p>South Coast AQMD Ocean-Going Vessel Low-Pressure Exhaust Gas Recirculation Retrofit (LP-EGR), Polar Bear Pilot Vessel Conversion</p>	<p>Retrofit two OGVs with emissions reduction technology including (1) Low-Pressure Exhaust Gas Recirculation, and (2) multiple fuel flexible injection platform with a gas supply system.</p>	<p>POLB approved funding agreement and POLA will seek approval in January 2024. Engineering design work is well underway, with classification approvals and field testing anticipated in 2024.</p>
<p>Shore-to-Store Project (Port of Los Angeles)</p>	<p>Develop and demonstrate 10 hydrogen-fuel-cell Class 8 trucks, build two heavy-duty hydrogen fueling stations, and demonstrate two electric yard tractors at the Port of Hueneme and electric forklifts at Toyota warehouses.</p>	<p>This project was completed in 2023, with the accumulation of 21,650 miles of zero-emission truck operation in drayage service. The yard tractors utilized opportunity charging to operate two shifts per day and significant efficiency benefits were demonstrated. The ZE forklift demonstrated equivalent operation to the conventional technology (propane). The project Final Report was submitted to CARB in November 2023 and this project is now complete.</p>
<p>Sustainable Terminals Accelerating Regional Transformation (START) Project (Port of Long Beach)</p>	<p>Demonstrate more than 100 pieces of zero-emission terminal equipment and trucks at three California seaports, develop a battery-hybrid electric tugboat, deploy two ships with some of the cleanest available engines, and advance workforce development programs to support sustainable goods movement.</p>	<p>The charging infrastructure for the electric yard tractors is complete at POLB and is projected to be complete in Q2 2024 at the Port of Oakland. Commissioning of the yard tractors at POLB began in 2023, but numerous issues with the vehicles as well as the charging stations, prevented official commencement of the demonstration.</p> <p>Nine of the ten drayage trucks at the Port of Oakland completed their demonstration; the tenth</p>

		<p>vehicle entered service just prior to Shippers Transport Express terminating drayage service at that location. The POLB drayage truck demonstration is expected to begin in Q2 2024.</p> <p>The electric top handlers operating at Shippers Transport Express in Oakland completed their demonstration and will continue in service under the facility’s new operations.</p> <p>Both Tier III container ships continued operations and emissions testing of the auxiliary engines was completed on each vessel. Emissions testing of the baseline vessel was also completed.</p> <p>A shipyard to construct the Crowley zero-emission capable plug-in hybrid tugboat was identified and POLB staff worked with Crowley and funding agencies to secure additional funding for the project, in addition to approving a TAP award. (See above)</p>
<p>Toyota Tsusho Hydrogen Top Handler and Mobile Hydrogen Refueler Project</p>	<p>Demonstrate the repower of a diesel top handler and develop and deploy a “mobile” hydrogen refueler to support the demonstration.</p>	<p>Completion of the top handler assembly and mobile refueler components occurred in November 2023. Operational testing and demonstration of the delivered top handler commenced in December 2023.</p>
<p>Zero-Emission Terminal Equipment Transition Project (Port of Long Beach)</p>	<p>Repower nine RTG cranes for full-electric power, demonstrate 12 zero-emission yard tractors and two smart charging systems, and convert four LNG trucks to plug-in hybrid electric trucks with LNG range extender.</p>	<p>-Completed the conversion of nine conventional rubber-tired gantry (RTG) cranes into grid-powered electric RTG cranes, which remain in service.</p> <p>-Converted four LNG-fueled drayage trucks with plug-in hybrid technology. These units faced challenges with proprietary charging station interfaces and relocation to a site without sufficient infrastructure to demonstrate charging capability and zero-emission mode.</p> <p>-This project planned to demonstrate 12 electric yard tractors at two Port terminals. This number was later reduced to eight units at two terminals (The</p>

		<p>remaining four units were dropped due to complications with the engineering design and build.</p> <p>- The project Final Report was submitted to CEC in December 2023 and this project is now complete.</p>
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Electric Vehicle Infrastructure Training Program (EVITP) Policy. POLB staff developed an Electric Vehicle Infrastructure Training Program (EVITP) Policy that requires contractors bidding on Port-owned and led charging infrastructure projects for Port-owned electric vehicles to be EVITP approved, and their electricians EVITP certified. The policy also applies to any vehicle charging infrastructure work funded by the Port, including projects that receive incentives from the CTF Rate or the TAP. The finalization and execution of this ordinance was completed at the POLB Board meeting on July 24, 2023. POLA requires contractors that provide construction services for electric vehicle charging infrastructure or equipment, funded or authorized in whole or in part by the California Public Utilities Commission or the CEC, to hold EVITP certification.

Rule 2304 –Indirect Source Rule for Commercial Marine Ports. Port staff continues to monitor the progress of the regulation and participates in all workshops/meetings.

U.S. Department of Energy Hydrogen Hubs. The Ports are working together with many other public and private California stakeholders through the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) to support the development of an application to the Department of Energy’s (DOE) Regional Clean Hydrogen Hubs grant solicitation. The program will be awarding grants up to \$1.25 Billion, and the Ports are coordinating with state leaders and ARCHES to secure projects under this opportunity. The full DOE grant solicitation was released on September 22, 2022 and applications were due on April 7, 2023. The Ports submitted proposed projects for the deployment of zero-emission hydrogen fuel cell terminal equipment and supporting hydrogen fueling equipment to ARCHES for inclusion into the statewide application. In October 2023, it was announced that the ARCHES application was awarded up to \$1.2 billion in federal funding. ARCHES is currently working through award contracting with the federal government and the various project partners, including the Ports.

California State Transportation Agency (CalSTA) Award to POLB

On July 7, 2023, POLB was awarded \$383.35 million under the CalSTA Port and Freight Infrastructure Program for the Pier B On-Dock Rail Support Facility Program and clean air technology projects aimed at accelerating the transition to zero-emission operations. The overall program is known as the System-Wide Investment in Freight Transport (SWIFT) Program. \$224.9 million will fund zero-emissions cargo handling equipment at SSA Marine terminals (Piers C & F) and LBCT (Pier E), ship-to-shore power at all three Tesoro terminals, the Crowley ZEAT tugboat demonstration, and development of new incentive programs to further reduce emissions from cargo handling equipment, rail, and harbor craft. POLB worked with Caltrans, who will be implementing the grant on behalf of CalSTA, on early required deliverables for the grant, including Project Programming Requests (PPRs) and initial outreach and engagement plans during Q3-Q4 of 2023. More details on the individual air quality focused projects and programs will be provided in the appropriate sections of the 2024 Annual CAAP Progress Report.

PLANNED ACTIONS FOR 2024

- Jointly hold CAAP Implementation Stakeholder Meetings in 2024
- Continue to monitor the Ports' supplemental Voucher Incentive Program to determine if modifications to the program are needed.
- Continue to monitor CTF Rate collection and effects on drivers.
- Continue coordination with AQMD on a Large-Scale ZE Truck Deployment project.
- Both Ports to release their respective final 2023 Emissions Inventories.
- Both Ports to commence their respective 2024 Emissions Inventories.
- Both Ports plan to release their respective 2023 Air Monitoring Reports.
- Continue to evaluate TAP proposals and recommend projects selected by the TAP AC for funding.
- Commence development of 2024 TAP Annual Report
- Continue to deploy additional grant-funded ZE equipment and vehicles.
- POLB to execute a master agreement with MARAD for the PIDP grant award and a subgrant agreement with LBCT.
- POLB will finalize the PPRs with Caltrans for the SWIFT Program, execute project supplement agreements for the individual projects with Caltrans, and will pass through all grant requirements to sub-recipients through subgrant agreements. It is also anticipated that POLB will begin to develop the new incentive programs for ZE locomotives, ZE cargo handling equipment, and clean harbor craft.
- Begin implementation of the Los Angeles/Long Beach-Shanghai Implementation Plan Outline for the Green Shipping Corridor Project, including establishment of working groups and increased communication with corridor partners.
- The Ports will participate in partnership meetings to advance the green and digital shipping corridor initiative with the Maritime and Port of Singapore.
- Both Ports will continue engaging with ARCHES in regard to the Department of Energy's large grant funding opportunity to develop a Hydrogen Hub in Southern California.
- POLA plans to hold a field trip in Q1 2024 with the community at one of the air monitoring stations to show the newly installed equipment and answer questions.
- POLA to approve South Coast AQMD/Wartsila OGVs TAP Demonstration.
- POLA to approve PHL Battery Charging System TAP Demonstration.
- Commence development of the 2024 Feasibility Assessments for Cargo Handling Equipment and Drayage Trucks

Send any questions or comments to the CAAP email at: caap@cleanairactionplan.org