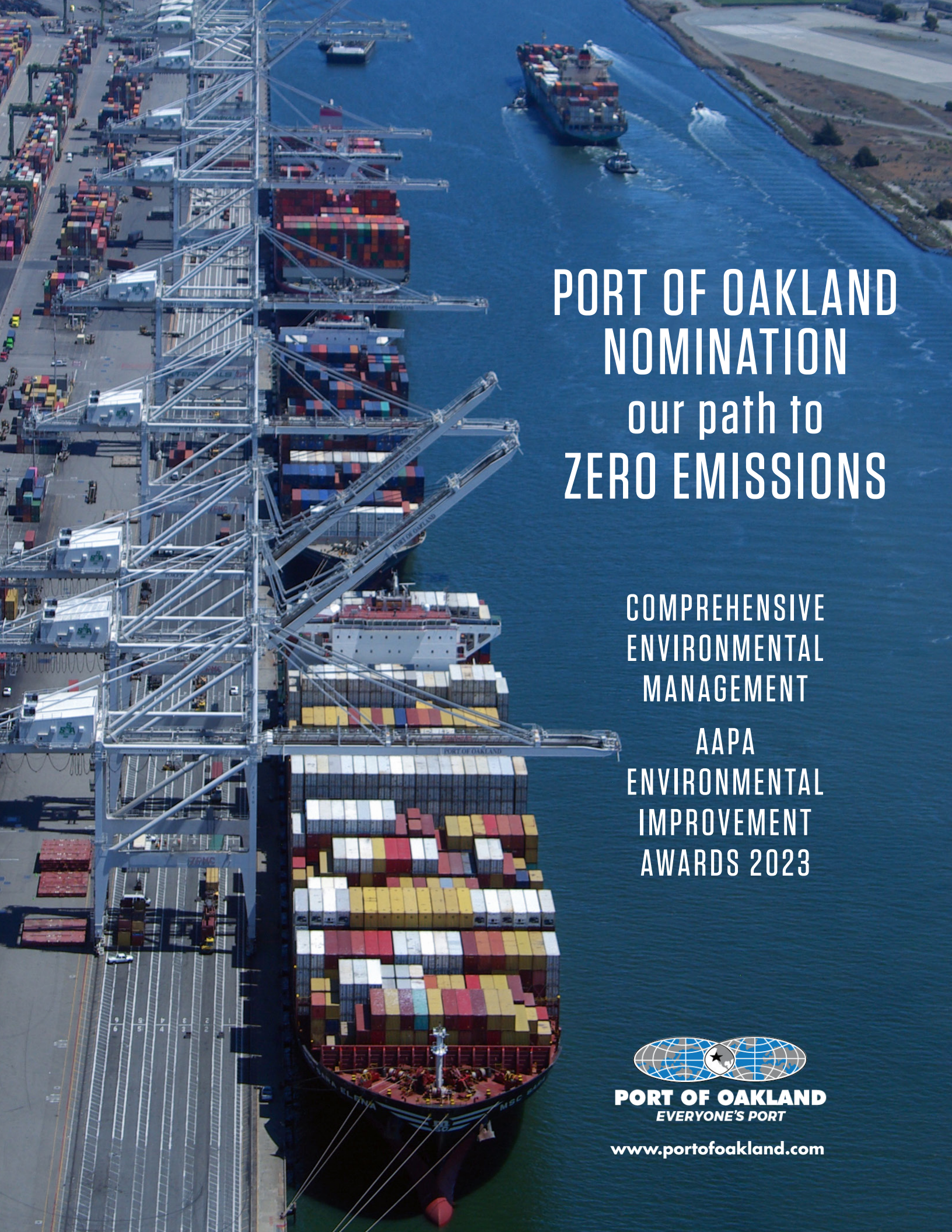

PORT OF OAKLAND NOMINATION

our path to ZERO EMISSIONS

COMPREHENSIVE ENVIRONMENTAL MANAGEMENT

AAPA ENVIRONMENTAL IMPROVEMENT AWARDS 2023

PORT OF OAKLAND
EVERYONE'S PORT

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1. SUMMARY

The Port of Oakland, California, USA (Port), is committed to managing its operations in the public interest for the public good. To achieve this commitment the Port must be environmentally sustainable. The Oakland Seaport is improving the environment through its plan to reach zero emissions operations. This is being done through planning and building infrastructure and implementing innovative technology that supports a pragmatic transition of the Port to zero emission operations over time. Noteworthy progress has already been achieved on our path to zero emissions.

This nomination summarizes the Port of Oakland's new Zero Emissions Program. This program is the natural outcome of the Port's ***Seaport Air Quality 2020 and Beyond Plan – The Pathway to Zero Emissions***, which provides the framework for the Port to continually improve the environment by reducing and eventually eliminating harmful emissions from seaport operations. Through its Zero Emissions Program, the Port will implement environmental compliance activities alongside voluntary initiatives to improve air quality for a better environment, Port workers, and those who live in surrounding communities.

The Oakland Seaport, on the eastern shore of the San Francisco Bay, is the principal gateway for international cargo in Northern California. The Port of Oakland oversees 1,300 acres of maritime facilities serving a local market of 14.5 million consumers and reaching 50% of the US population by rail. The Port pairs the success of its business with community benefits, envisioning more jobs and economic stimulus as the Port grows responsibly and strives to reach its zero emissions goal.

The Port is hopeful that sharing our program through this award nomination will provide useful information and inspiration for other ports to improve the environment.

Seaport Air Quality 2020 and Beyond Plan

2. GOAL AND OBJECTIVES

The goal of the Zero Emissions Program is to achieve fully zero emissions operations, while remaining a catalyst for jobs and economic development for the Northern California region. This is a tremendous undertaking and requires the participation of every Port stakeholder including tenants, industry, neighbors, regulatory agencies, grant funding agencies, and state and federal support.

The Port has assembled an interdisciplinary Zero Emissions Team, consisting of Port staff and consultants, to manage the Zero Emissions Program and advance the following objectives. The methodology for achieving each objective is provided in the next section.

OBJECTIVE/DESCRIPTION

PLANNING

Transition Port equipment to zero emission and assess existing infrastructure to support the zero emission goals. Also, understand Port tenants' zero emissions plans, and identify ways the Port can help facilitate and accelerate their transition

INFRASTRUCTURE

Plan and prepare for increased electrical demand and alternative fuel infrastructure

FUNDING

Leverage state and federal dollars with public/private partnership investments to maximize funding for zero emissions project

PARTNERSHIPS

Foster partnerships to facilitate clean air grants and projects

EDUCATION & AWARENESS

Increase Port-wide and adjacent community awareness of zero emissions technology, future developments, and implications of each technology

IMPLEMENTATION

Ensure every Port project and Port purchase are implementing the cleanest, most forward-looking technology possible

TRACKING

Track the progress towards zero emissions and report publicly, to promote transparency and accountability

In summary, the Port is taking an aggressive stance to accelerate the transition to zero emissions operations.

3. DISCUSSION

This section provides a short background on the Port's clean air efforts to date, followed by a description of the methodology the Port is using to meet the objectives listed above.

3.1. BACKGROUND

The Port has been steadily working on improving air quality for a long time. In 2008, the Port adopted its Maritime Air Quality Policy Statement and in 2009, the resultant Maritime Air Quality Improvement Plan (MAQIP), which established a goal to reduce the health risk related to diesel particulate matter (DPM) at the Seaport by 85% by 2020 compared to a 2005 baseline. The Port surpassed this goal by achieving an 86% reduction in DPM from 2005 levels, which includes reductions from ocean-going vessels, drayage trucks, tugs, locomotives, and cargo handling equipment.

In 2019, the Port approved an updated maritime air quality plan – the ***Seaport Air Quality 2020 and Beyond Plan – The Pathway to Zero Emissions*** (Plan). The Plan adds greenhouse gas reductions, local exposure reduction and the transition of diesel equipment to zero and near-zero emissions equipment. The Port has collaborated with its tenants to increase shore power usage, converted cargo handling equipment (CHE) to hybrid power (diesel-electric), met with community stakeholders on zero emissions initiatives, and applied for grants for other zero emissions projects.

The Port is committed to zero emissions operations and has formed numerous partnerships, applied for (and been awarded) multiple grants, and has many demonstration projects underway or planned. For example, there are currently 10 battery-electric drayage trucks operating at Shippers Transport Express and a demonstration project consisting of 30 hydrogen fuel cell trucks that is anticipated to begin operations in June 2023. Port tenants are also currently demonstrating two battery electric top-picks and deploying charging stations for five battery electric yard tractors. Each piece of battery-electric equipment has associated charging equipment and a new hydrogen fueling station is being built next to the Seaport. The Port will also be building two new and innovative mobile shore power outlets at Berths 55 and 59, which will help solve the problem of ships not being able to align correctly with the fixed-location shore power vaults.

*Port of Oakland Wharfinger **Ralph Reynoso** stands on one of the world's first all-electric top-picks. This zero-emissions equipment at the Oakland Seaport can stack big shipping containers.*

3.2. OBJECTIVES AND METHODOLOGY

3.2.1. PLANNING

Meetings with Tenants

The Port of Oakland functions as a landlord Port and as such does not operate any terminals or own cargo handling equipment (CHE). The Port's tenants own and operate all the equipment, so their partnership is critical for this endeavor. The Port has been meeting with its tenants to discuss their plans for the transition to zero emissions equipment. The Port also provides grant-writing support and partners as the grant applicant for tenant projects when the grant requires a public agency lead.

Environmental Ordinance

The Oakland Board of Port Commissioners approved an environmental ordinance that includes a requirement for tenants that operate CHE, to submit a plan for converting diesel-powered CHE to zero emissions to the Port by December 31, 2023. These plans will allow the Port sufficient planning time to support an efficient and timely transition to zero emissions.

Supporting Studies

The Port conducts studies as needed for its zero emissions efforts. For example, the Port is conducting a Public Truck Charging/Alternative Fuel Study to understand the infrastructure that may be required on Port property to support the conversion of the drayage truck fleet to fully zero emissions by 2035. The study is well underway, with a preliminary needs assessment forecast completed for both hydrogen fueling and truck charging stations. The study team is identifying sites located on or near the Port which could be promising locations for locating truck charging stations in the future. Port stakeholders are being engaged at every step to make sure their feedback is incorporated into the study.

Electric Trucks

Hybrid Transtainers

Electric Yard Tractor

Zero-Emissions Top-Picker

Shore Power Plugs on a Container Ship

Hyundai Fuel Cell Electric Truck

3.2. OBJECTIVES AND METHODOLOGY CONTINUED

3.2.2. INFRASTRUCTURE

The Port is a publicly owned utility and is preparing for its zero emissions future by replacing and upgrading three major substations and increasing capacity. The Port is also exploring microgrids as a possible mechanism for expanding its electrical capacity in case demand outpaces supply and making its grid more resilient during shutdowns and unplanned outages.

Substation Replacements

The Port is designing replacements for its two main substations, "Davis" and "Cuthbertson." These two main substations are the where the Port receives its feed from Pacific Gas & Electric (PG&E) transmission lines. These main substations were originally built in the early and mid-1990s and are now approaching the end of their useful life. Benefits of replacing these existing main substations include:

- **Expanding the electrical capacity of the Port's power grid;**
- **Providing added redundancy/resiliency;**
- **Incorporating the modern controls needed to handle the move towards renewable energy resources; and**
- **Replacing existing equipment that currently uses greenhouse gas sulfur hexafluoride, or SF6.**

It is anticipated that replacement of Davis and Cuthbertson will cost more than $50 million and be completed in the late 2020s/early 2030s, depending on the timeline for coordination with outside agencies.

Additionally, the Port of Oakland won a FY21 Port Infrastructure Development Program (PIDP) grant to supplement substation SS-R-14 replacement and upgrades with more localized power generation and resiliency features. The project will replace a circa 1950s substation that is at the end of its useful life and integrate renewable power generations to support the Port's shift to zero emissions. The new substation will provide increased power and improve the Port's electrical grid resiliency through the integration of a 2.7 MW (megawatt) solar array and battery energy storage system. The total capital cost of this project is expected to be $46.2 million with anticipated completion by the end of 2028.

Capacity Increase

Although the Port itself is a publicly owned utility, the electricity that the Port purchases must be transmitted via PG&E lines before it arrives at the Port for distribution. The Port has started the lengthy, multi-step process of requesting more capacity from PG&E.

Microgrids

The Port is considering adding microgrids to its electrical infrastructure, to supplement grid power that is delivered to the Port over PG&E transmission lines, to improve resilience in case of grid outages, and to reduce peaks in demand.

3.2. OBJECTIVES AND METHODOLOGY CONTINUED

3.2.3. FUNDING

The Port will achieve its objective of maximizing funding for zero emissions projects by aggressively pursuing grant opportunities and spending Low Carbon Fuel Standard (LCFS) money on projects that decrease the carbon intensity of fuels.

Grants

The Port has created a Grant Opportunities Program within its Environmental Programs & Planning Division and is augmenting its staff and building a team of consultants who specialize in writing grant applications. This allows the Port to track the multitude of current and future grant opportunities to match with prospective projects for the Port and its industry partners/tenants. This staffing structure has allowed the Port to be nimble and successfully submit applications on short timelines.

Further, the Port facilitates grant discussions between tenants and funding agencies and takes the lead on grant applications in situations where only a public agency can be the applicant for a particular grant.

The Port has received the following recent grant awards related to air quality projects:

GRANT PROGRAM	GRANT AMT	PROJECT DESCRIPTION	STATUS
Zero And Near-Zero Freight Facilities (ZANZEFF)	$2.1M	Stevedoring Services of America (SSA Marine) Electric Cargo Handling Equipment (CHE) & Chargers (10 Trucks, 2 Top Picks, Yard Tractors & Chargers) & STE (Shippers Transport Express) Substation Upgrade	Testing Equipment
Bay Area Air Quality Management District (BAAQMD) Carl Moyer Program	$5M	13 Hybrid RTGs (Rubber Tire Gantry Cranes) at OICT (Oakland International Container Terminal)	Completed June 2020
BAAQMD Carl Moyer Program	$850k	3 Hybrid RTGs at TraPac	Awarded
2021 MARAD Port Infrastructure Development Program (PIDP)	$5.1M	Electrical Infrastructure, Renewable Power and Battery Storage	Awarded
2022 MARAD Port Infrastructure Development Program (PIDP)	$37M	Outer Harbor Terminal Redevelopment and Green Infrastructure Improvements	Awarded

3.2. OBJECTIVES AND METHODOLOGY CONTINUED

3.2.3. FUNDING continued

The Port has submitted the following applications and awaits notification of award:

GRANT PROGRAM	GRANT AMT	PROJECT DESCRIPTION	DATE SUBMITTED
2022 Trade Corridor Enhancement Program (TCEP) California Transportation Commission	$42M	Electrical Infrastructure, Battery Storage and EV (Electric Vehicles) Charging	Nov 2022
2022 CalSTA (California State Transportation Agency) Port and Freight Infrastructure Program	$289M	Roadway Access and Marine Terminal Modernization; Zero-Emissions Cargo Handling	Jan 2023
EPA (Environmental Protection Agency) Environmental Justice Government-to-Government Programrm (EJG2G)	$1M	Rising Seas and Oakland's Frontline Communities: Adaptation Planning for Neighborhood-Led Resiliency	Apr 2023
2023 DOT/MARAD Port Infrastructure Development Program Grant (PIDP)	$46M	Partnering on a Resiliency Solution For Seaport Emissions; Implementing Actions in the Seaport's Pathway to Zero Emissions Plan	Apr 2023

The Port has two more grant applications currently underway:

GRANT INCENTIVE PROGRAM	GRANT AMT	PROJECT CONCEPT	DEADLINE
Reduction of Truck Emissions at Port Facilities Grant Program (RTEPF - Reduction of Truck Emissions at Port Facilities)	$160M Match 20%	Grant Lead: Port Tenant electric trucks	Jun 26, 2023
California (CA) Strategic Growth Council Community Resilience Center Program (CRC)	Up to $10M	Grant Lead: City of Oakland City of Oakland staff leading preparation of application for Community Resiliency Hub	Jun 2023 Concept Sep 2023 Final

Also, the Port is maintaining a running list of over 60 potential grant opportunities, with a short list of 12. In parallel, the Port keeps a list of project ideas and meets internally every week to identify any matches that could be pursued.

LCFS

The Port of Oakland opted into California's Low Carbon Fuel Standard program (LCFS) in January 2019 and has been generating credits ever since. The Port generates credits primarily by supplying electricity to ships at berth when they are plugged in to the Port's shore power system. The Port also generates credits from battery-electric Class 8 tractors, top-picks, as well as medium- and light-duty electric vehicles. Funds generated from LCFS credits are used to further the transition to zero-carbon transportation fuels.

3.2. OBJECTIVES AND METHODOLOGY CONTINUED

3.2.4. PARTNERSHIPS

Converting the Port to zero emissions is a massive endeavor, and the Port can't do it alone. The Port has been fostering partnerships with tenants, industry, community, and agencies to help transition to zero emissions. These partnerships have already proven themselves effective, as the Port can reach out to tenants on projects, get valuable feedback on draft applications for grants, followed by letters of support for grants highlighting a united front in Oakland.

West Oakland Sustainable Port Collaborative & Port of Oakland Partnership Agreement

The Port has been working closely with a host of partners who care deeply about helping the Port achieve its goal of going to zero emissions. The Port's Executive Director and senior management have monthly meetings with members of the West Oakland Sustainable Port Collaborative (WOSPC, shown below), a group formed as an outcome of the State of California Assembly Bill 617. The members include West Oakland Environmental Indicators Project, Earthjustice, the Union of Concerned Scientists, the Environmental Defense Fund, the East Bay Community Energy Authority, and UC Berkeley Goldman School of Public Policy. The Port and WOSPC signed a Memorandum of Partnership on May 19, 2023, formalizing the goals, principles, and communication protocol for the group.

Green Shipping Corridor

The Port is aligning with the Green Shipping Corridor initiatives. The Port supports the advancement of de-carbonization by improving environmental performance in the maritime shipping industry and improving supply chain efficiencies through information digitalization. The Port of Oakland collaborates with other Ports and entities to facilitate the supply and adoption of a range of fuels that are demonstrated to achieve the transition to carbon neutral emissions, identify pilot and demonstration projects, along with initiatives to advance the development and transition to low and/or zero emission fuels and technologies to support decarbonization and emissions reductions in the maritime shipping industry.

Teaming up with the City of Oakland

The Port and City have been working together on many initiatives, such as the West Oakland Truck Management Plan, locating public truck charging stations, the City's Climate Action Plan and the City's Industrial Plan.

Stakeholder Engagement

The Port has many stakeholder engagement programs. For air quality, the Port holds a monthly Technical Working Group meeting based on the ***Seaport Air Quality 2020 and Beyond*** Plan. These meetings are open to the public and well attended. We discuss topics of interest, as prioritized by the West Oakland Environmental Indicators Project, and as listed in the West Oakland Community Action Plan.

3.2. OBJECTIVES AND METHODOLOGY CONTINUED

3.2.4. PARTNERSHIPS continued

(ARCHES) Alliance for Renewable Clean Hydrogen Energy Systems

The Port is a member of the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) which is California's public-private hydrogen hub consortium to accelerate the development and deployment of clean, renewable hydrogen projects and infrastructure. ARCHES submitted an application to the U.S. Department of Energy for a grant to deploy a regional hydrogen hub in California. The Port has a project in the Tier 1 category, where a Port tenant would be an end-user of clean hydrogen supplied by a local hydrogen producer.

3.2.5. EDUCATION & AWARENESS

The Port educates its staff and stakeholders and increases awareness about all the advancements in zero emissions technology. Improvements are coming so fast that the Port must actively and purposefully invest in education to know what is becoming commercially available and how it might be applied at the Port.

Conferences

The Port staff from every department have been attending various conferences focused on zero emissions technology to increase awareness of the types of projects happening at other ports, become more educated on all the different technologies, and stay up to date on latest trends and developments. Recently, Port staff have attended conferences on microgrids, zero emissions marine engines, and zero emissions land-side fleets. After each conference, staff hold a debrief within the Port to describe what they learned and how it could apply at the Port.

Tours

Like conferences, the Port encourages staff to tour clean-air projects at other sites when possible. There is nothing like seeing a project in person, and meeting those responsible for delivering and operating/maintaining the project to better understand how it works and best practices that might apply to delivery/operation of similar Port projects. Most recently, Port staff have toured an emissions capture and control barge under construction, and a demonstration hydrogen electrolyzer plant that may support Port tenants' needs for hydrogen fuel for their fleets.

Knowledge Sharing

On the reciprocal side, the Port welcomes delegations and tours from Ports around the country and around the world. We proudly show them the Port's shore power system and take them to see demonstration project deployments within the Port. The Port also shares data and lessons learned from implementing pilot projects.

3.2.6. IMPLEMENTATION

Procurements

The Port implements its Zero Emissions Program (ZE Program) by reviewing every project and every equipment purchase, to ensure they implement the cleanest, most forward-looking technology possible. Before the Port buys any piece of equipment such as a water truck or street sweeper, or replaces a back-up generator, it is now standard practice to contact the Zero Emissions Team to find out whether there are any zero emissions options that meet the duty cycles required. And if not, then the Port will go with the next cleanest option available.

The Port is converting its own fleet of cars, pickups, and work trucks to electric earlier than required by the Advanced Clean Fleet Regulation. To date, the Port has purchased an all-electric passenger van, two electric work trucks, twenty hybrid and electric passenger cars and two electric heavy-duty pickups.

3.2. OBJECTIVES AND METHODOLOGY CONTINUED

3.2.7. TRACKING

The Port achieves its objective of promoting transparency and accountability towards reaching its goal of zero emissions through tracking, reporting, and joining the Green Marine Program.

Emissions Inventories

The Port conducts emissions inventories every few years. These are comprehensive emissions estimates from all mobile sources operating at the seaport. They rely on emission factors and load factors published by the California Air Resources Board, as well as ship call data, tug reports, dredging information, truck trips, and equipment information provided by each tenant that operates cargo handling equipment (engine size, operating hours, fuel consumption, etc.). The Port's most recent emissions inventory was for 2020, when it was found that the Port surpassed all the emission reduction goals in the MAQIP. All the Port's emissions inventories are published on its website. The Port's next emissions inventory will be in 2023.

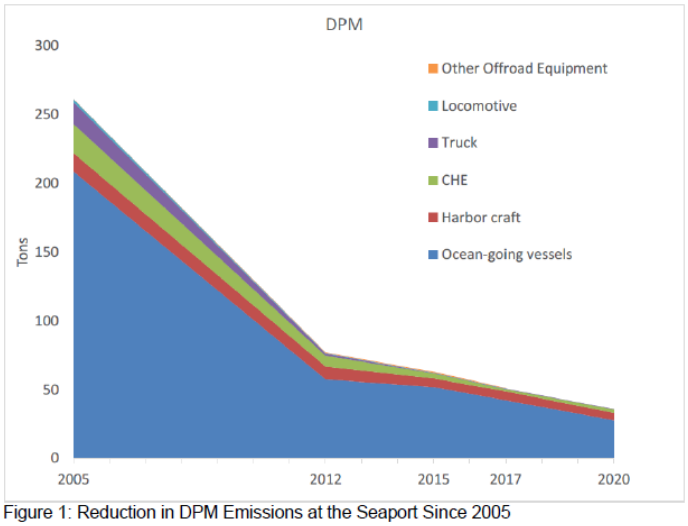


Figure 1: Reduction in DPM Emissions at the Seaport Since 2005

Shore Power Tracking

Shore power – ships plugging in to the Port's clean energy grid at berth – has nearly eliminated emissions from a plugged-in ship. The Port tracks its shore power program carefully. The Port's shore power system was initially installed in 2012-2013. Since then, the Port has diligently tracked the usage of its system, posting monthly snap shots on its website. This allows the Port to monitor usage and look for any issues and ways to improve. For example, one of the challenges for plugging in ships is lining vessels up with the concrete shore power vaults at each berth. Having detailed usage data helped the Port determine which berths needed more flexibility for shore power. Consequently, the Port will be installing two mobile shore power outlets at Berths 55 and 59. These are innovative and will be the first of their kind in North America.

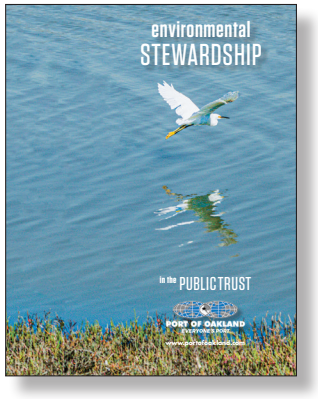
Green Marine Certification

The Port is participating in the Green Marine Program, a leading certification program for the maritime industry. This voluntary program supports the Port's initiatives to continue to improve the environment such as air quality, soil/groundwater, and surface waters. Green Marine provides verifiable metrics that can be used to track progress towards the Port's environmental goals. It also allows the Port to be more transparent and share its progress with the public.

3.3. HOW THE PORT'S ZE PROGRAM FULFILLS THE AWARD CRITERIA

The Port's Zero Emissions Program qualifies for the American Association of Port Authorities' Environmental Improvement Award 2022 in the Comprehensive Environmental Management category and exceeds the six award criteria:

1) **Improved the environment through major emissions reduction and continues to provide benefits and protection to the community with the implementation of initiatives toward zero emissions operations;**
2) **Establishes the Port as the lead for voluntary programs, including grant opportunities, to exceed regulatory requirements and collaborates with the community to address their concerns;**
3) **Creates innovative and new initiatives that the Port embarks on to reduce emissions;**
4) **Significantly reduces emissions from diesel equipment and trucks at waterfront properties and adjacent communities;**
5) **Provides efficiency and cost effectiveness by using Port funds, LCFS funds, and seeking grant opportunities to support the Port's initiatives; and**
6) **Seeks technology that complements and supports the Port industry including zero emissions equipment, improvements to electrical infrastructure, and supporting alternative fuels to meet the Port's goals.**



Environmental Stewardship
Brochure

The Port of Oakland's Zero Emissions Program exists because Port leadership, the Board of Port Commissioners and the Executive Director, are in full support of this program. The commitment has been made to add resources, devote staff time (also increase staffing), and invest in achieving this important goal. The Port has made noteworthy progress over the years and is well positioned to continue to collaborate with our tenants, stakeholders, and community on our path to zero emissions.