City of Homer
www.cityofhomer-ak.gov

Office of the City Clerk
491 East Pioneer Avenue
Homer, Alaska 99603
clerk@cityofhomer-ak.gov
(p) 907-235-3130
(f) 907-235-3143

Memorandum
Agenda Changes/Supplemental Packet

TO: PORT & HARBOR ADVISORY COMMISSION
FROM: ZACH PETTIT, DEPUTY CITY CLERK I
DATE: APRIL 24, 2024
SUBJECT: SUPPLEMENTAL

INFORMATIONAL MATERIALS

From: Bob Shavelson
To: Zach Pettit
Cc: Bryan Hawkins
Subject: Re: Port & Harbor Advisory Commission Regular Meeting on April 24, 2024
Date: Friday, April 19, 2024 10:15:50 PM
Attachments: Catalytic Cities Decarbonization Fund - Final Report (1).pdf

---

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Hi Zach -

I regret I'll be unavailable for the upcoming PHC meeting April 24 - I'll be across the bay at Kasitsna Bay Lab with my daughter's 6th grade field trip.

I'm disappointed because I wanted to hear HDR's discussion on electrification; please share with HDR and the PHC the attached paper which discusses that topic.

Thanks -

Bob

On Thu, Apr 18, 2024 at 2:23 PM Zach Pettit <zpettit@ci.homer.ak.us> wrote:

> Good afternoon,
>
> The agenda and packet for next week's regular meeting can be accessed virtually by using the hyperlink provided below:
>
> PHC Regular Meeting Packet and Agenda
>
> I will have paper copies of the packet ready to be picked up in the public kiosk outside the Clerk's Office **around 4 p.m. later today**. As always, please notify me as early as possible if you aren't planning on attending the meeting next Wednesday. Please let me know if you have any questions/concerns regarding anything.
>
> Thanks and have a great weekend,
>
> Zach Pettit
>
> Deputy City Clerk

Catalytic
FINANCE FOUNDATION

October, 2023

PORT DECARBONIZATION FUND WITH THE BLOOMBERG PHILANTHROPIES:

ANALYSIS & RECOMMENDATIONS

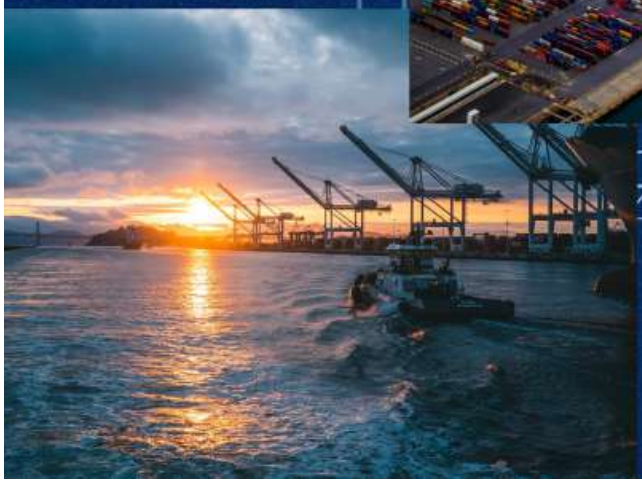


Table of Contents

Introduction

The global maritime industry is at a juncture, facing the need to decarbonize in order to mitigate the detrimental environmental impacts of shipping, with ports playing a crucial role in this effort. Being central hubs of global trade and transportation, ports are significant contributors to carbon emissions, primarily through the use of fossil fuels for ships and port operations.

As part of the endeavor to assess and advance port decarbonization worldwide, this report started with a targeted survey and analysis of the current landscape of port infrastructure and initiatives in place. To contextualize our findings, surveys have been completed by ports spanning across the continents of Europe, South America, North America, Asia/Asia Pacific, and Australia. These surveys, along with research reports done by third party organizations, shed light on dynamics shaping the present state of port sustainability efforts, as well as the barriers and opportunities of implementation more widely. Case studies of implemented demonstration projects are also presented. Finally, the report describes strategic initiative recommendations within policy, technology and finance to accelerate port decarbonization.

Key aspects of port decarbonization initiatives include integrating renewable energy sources into port operations, promoting electrification or low-carbon fuels for port equipment and vessels, adopting energy-efficient technologies for lighting and operational equipment, optimizing supply chains, and implementing policy and regulatory frameworks to incentivize sustainable practices. The degree of decarbonization efforts in ports worldwide varies significantly, so collaboration among port authorities, shipping companies, governments, technology providers, and environmental organizations is crucial to achieving meaningful progress.

In our pursuit of unraveling the complexities surrounding port decarbonization worldwide, we have created a comprehensive directory encompassing over 800 contacts within the global port network. Some recurring themes regarding obstacles to decarbonization include lack of support from local governments, lack of mandatory regulations and requirements, poor management, social awareness, and outdated shipping technologies.

On the positive side, collaborative climate action initiatives, such as the World Ports Climate Action Program (WPCAP) and the World Ports Sustainability Program (WPSP) are making some progress in the fight to decarbonize ports by collecting data on demonstration projects. Based in the global "north", participating ports include Port of Rotterdam, Port of Los Angeles, Port of Long Beach, Vancouver Fraser Port Authority, Port of Hamburg, Port of Antwerp, Port of Barcelona, Port of Gothenburg, Port Authority of New York & New Jersey, Port of Amsterdam and HAROPA Port of Le Havre. WPCAP focuses on five main areas that have informed this report, including efficiency of supply chains; common and ambitious policy; power-to-ship solutions; low carbon fuels; and decarbonization of cargo handling equipment.

The survey outreach has been very fruitful, not only because connecting with the ports directly is an invaluable resource for continuing to advance decarbonization strategies, but because the data collected and analyzed showed that:

- 40% of respondents expressed uncertainty regarding their port's interest in financial support to expedite decarbonization and sustainability initiatives, because these measures are not yet a priority.
- The vast majority of port container handling equipment (CHE) are not electrified or are not yet using sustainable fuels (primarily using diesel) and have not electrified terminals for vessel shorepower ("cold ironing").
- A majority of ports do not have sustainability plans or reports, however community outreach and port-city dialogues are on the top of ports' agendas worldwide.
    - Local air quality is a top environmental priority for ports worldwide, not reducing greenhouse gas emissions.
    - Many have begun implementing lighting retrofits, as these measures pay for themselves in energy savings.
- Most ports (with the notable exception of California and the European Union) are not operating under regulations/deadlines to decarbonize, so are not highly motivated to explore options, while other perceived barriers include:
    - Lack of incentives or attractive financing
    - High initial cost
    - Low/no financial return on investments in new technology
    - Technical feasibility or lack of equipment/fuel availability and standards
    - A lack of adequate grid power

Despite the obvious barriers and lack of progress to date, there are a few "leaders" of decarbonizing strategies. Although these leaders have developed plans for decarbonizing or optimizing operations and fuels, they have not yet transitioned more than a small fraction of their total infrastructure to low carbon technologies (even the largest port in the USA in Los Angeles has so far only implemented a few demonstration projects, which they and their terminal operators are still evaluating). The leaders include the ports of Amsterdam, Hamburg and Rotterdam.[i] Only one large-scale, commercial port terminal (LBCT in Long Beach CA) is completely automated and electrified, but even this one is powered by a utility grid dominated by natural gas.[ii]

Equally noteworthy is the revelation that a significant portion of survey respondents could not provide comprehensive answers, indicating potential gaps in information dissemination or comprehension of sustainability concepts.

These are just a few of the barriers that face broader port decarbonization efforts. However, our data does also show that out of the hundreds of ports worldwide, proof-of-concept demonstration projects are being conducted - - in both the global "north" and "south" and from the smallest island ports to the world's largest - - so there are varying degrees of efforts being made to cut carbon emissions.

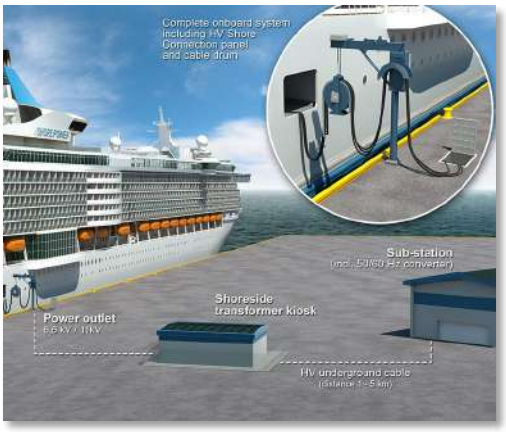
The goal of this report is therefore to identify how a decarbonization technical assistance and investment fund ("the Fund") could accelerate adoption globally.

Executive Summary

This report builds on the strategies and opportunities outlined in the "Bloomberg Ports Decarbonization Fund Concept Note (Catalytic Finance, DRAFT: May 28, 2023)", focusing attention towards four strategic approaches through the establishment of a new Technical Assistance Fund and/or Investment Fund that can yield optimal progress and significant impact in a condensed timeframe for port decarbonization.

Cold Ironing

Cold ironing, also known as shore power, reduces vessel emissions by connecting them to dockside electricity, so fossil-fueled engines and generators can be turned off. The Port of Vancouver (Canada) serves as a successful case study, reducing substantial emissions through shore power. Policy incentives and subsidies play a crucial role in encouraging its adoption. However, challenges exist, including equipment compatibility, infrastructure capacity, and policy framework (analysis of case studies illustrates that economic and policy factors significantly influence their success).



Investment opportunities in expanding shore power are focused on major ports along key transit routes, particularly in North America and Europe. Priority should be given to ports with established regulatory regimes and incentive programs. Technical assistance is vital in standardizing shorepower, assessing utilization opportunities, evaluating electrical capacity to support reliable operations, and expanding the technology to the global "south". The strategy should also include developing renewable energy projects near ports to deliver cost-effective clean electricity to power the cold ironing systems.

Cargo Handling Equipment (CHE) Electrification

The mix of cargo handling equipment (CHE) at ports historically relies on diesel fuel, but a shift towards low and zero-emission battery and hydrogen electric technologies is gaining momentum. Electrifying equipment like cranes and forklifts can significantly reduce carbon footprint and improve air quality. The Port of Long Beach (USA) is a leader in electrifying CHE, with 17% of its fleet already electrified. Other ports globally are also adopting electric CHE, though challenges persist, such as grid capacity constraints, limited availability of products in this category, and high initial cost.

To advance decarbonization of cargo handling equipment, the focus should be on regions with favorable economics or government incentives ("carrots") or established reduction mandates

with penalties for air pollutant or greenhouse gas emissions ("sticks"). Three pathways can be considered in these regions that can significantly contribute to reducing emissions and promoting sustainable cargo handling at ports:

1. Focusing efforts on retrofitting CHE
2. Utilizing hydrogen-electric options
3. Integrating digitalization and automation technologies

Other investment opportunities include infrastructure development to support electrification, such as grid upgrades and renewable energy projects. Direct investments in electric CHE are challenging without subsidies, but establishing a leasing company (similar to aircraft leasing) for electric cargo handling equipment could be a viable approach. Technical assistance is crucial for identifying ports requiring capacity upgrades, offering case studies, and aiding the adoption and scalability of electrified CHE. The goal is commercialization in key ports to achieve economies of scale, paving the way for broader adoption and reduced equipment costs globally.

Renewable Energy & Microgrids

Microgrids, consisting of localized power generation, storage, and distribution systems, offer climate benefits by enhancing energy efficiency and resilience. They integrate renewable energy sources, such as solar and wind, to reduce greenhouse gas and criteria air pollutant emissions. Within ports, microgrids ensure continuous electricity supply independently, crucial for achieving self-sufficiency and overcoming challenges related to local grid capacity and reliability.

One case study shows that the Port of Long Beach (USA) implemented a $12.2 million microgrid project with a 300-kilowatt solar panel array to enhance energy resilience, reduce diesel generator dependence, and align with sustainability goals. Other studies show that in developing regions, microgrids can support ports by reducing grid dependence and enhancing sustainability, especially as ports electrify operations and energy demand grows. Challenges to implementation arise from high initial cost, regulatory intricacies, and a scarcity of comprehensive performance data. Overcoming these hurdles is pivotal for widespread adoption and integration of microgrids within port infrastructures.

Investing in appropriate microgrid installations at ports is a promising investment strategy, particularly in areas facing grid reliability issues. Government mandates aimed at reducing air pollution and transitioning to zero-emission equipment support the urgency to bolster local power generation. This presents significant investment opportunities in microgrid projects tailored to support the electrification and sustainable development goals of ports. Such investments align economic growth with environmental sustainability objectives, making them not only financially sound but also environmentally responsible choices.

Technical assistance provides essential support to ongoing projects and pilot initiatives, facilitating the sharing of valuable insights and knowledge publicly. By doing so, it enables other ports to learn from these experiences and make informed decisions regarding microgrid implementation. Additionally, TA acts as a crucial enabler in identifying ports that may lack the necessary expertise to assess and effectively implement microgrids. By bridging this knowledge gap, TA facilitates engagement with microgrid developers paves the way for collaborative efforts and the successful execution of future microgrid projects in identified ports. This collaborative approach ensures a wider dissemination of expertise and best practices, promoting the global adoption of resilient and sustainable energy solutions across various port facilities.

Operational Efficiency in Ports

Improving operational efficiency in ports is crucial for sustainable global trade and reducing the environmental impact of maritime transportation. Cost-effective measures like energy-efficient systems, LED retrofitting, and smart technologies can significantly reduce air pollution and carbon footprint.

The Port of Hamburg (Germany) showcases this by employing diverse technologies to enhance cargo flow and achieve efficiency improvements, resulting in reduced carbon emissions. The Port of Seattle (USA) is aiming for a complete transition to LED lighting by 2030.

Such efficiency enhancements hold potential for swift carbon emission reductions across ports globally and can be repaid in 3-7 years from energy and maintenance savings, making them attractive investment opportunities. This is especially true in ports facing high electricity costs, such as island nations reliant on expensive imported diesel. Sharing insights and experiences from leading ports with those in developing regions is essential for fostering sustainable improvements, aided by sustainable funding sources.

Strategic Initiatives and Recommendations to Accelerate Port Decarbonization

Strategic policy initiatives and recommendations are essential for accelerating port decarbonization, providing a framework and incentives for sustainability. The lack of government mandates for greenhouse gas reductions is a significant barrier to cleaner energy adoption in ports. A multifaceted approach involving strategic policy initiatives at international, national, regional, and local levels is essential for achieving rapid decarbonization of ports.

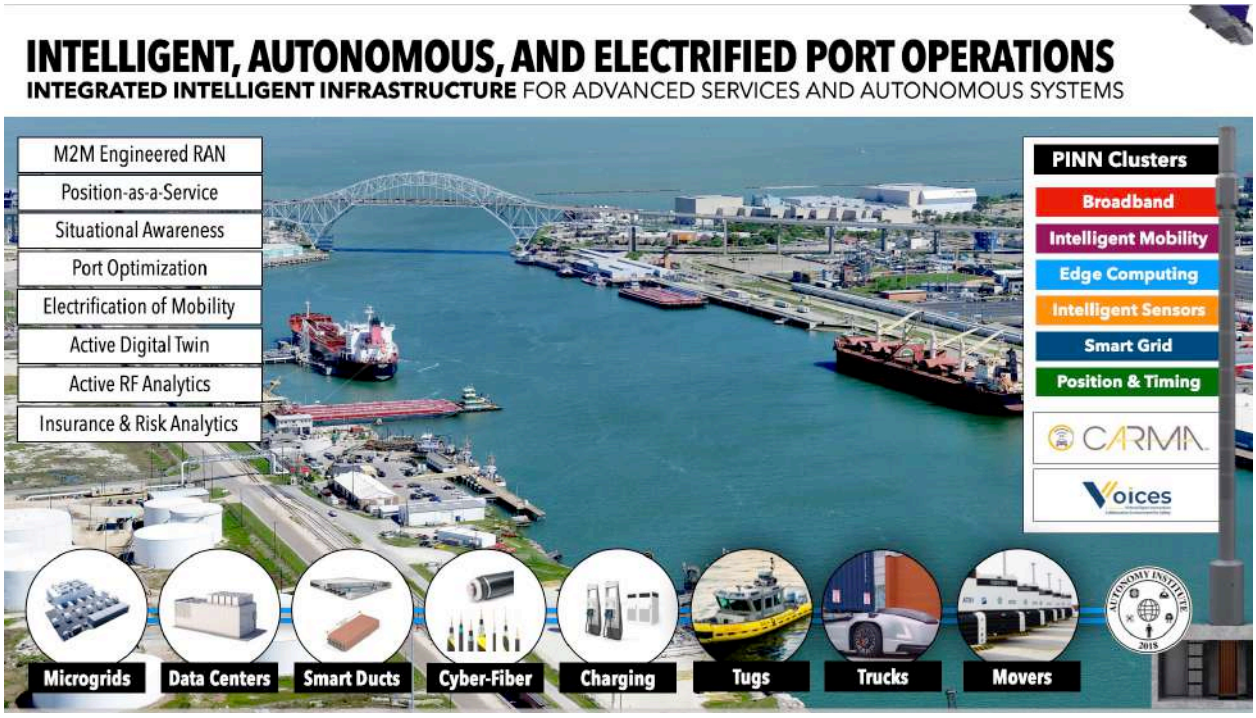
Recommendations include setting specific and ambitious targets for GHG reductions, encouraging international collaboration, investing in shore power infrastructure and green technologies, implementing financial incentives, fostering public-private partnerships, providing training programs for stakeholders, and ensuring mandatory reporting of emissions and progress. Governments addressing decarbonization in ports can lead to a cleaner maritime sector, fostering innovation, economic growth, and a healthier planet.

Additionally, effective deployment of Technical Assistance (TA) for port projects is an essential accelerator, focusing on feasibility studies, roadmaps, and collaborative efforts with maritime industry stakeholders. Partnering with strategic entities and forming collaborations can significantly enhance the impact of decarbonization efforts, while private equity firms, logistics companies, banks, energy companies, shipping companies, and OEMs have expressed interest in participating and funding decarbonization investment initiatives in ports.

Additional Resources

Resources developed during the research and development period for this report, which will inform development of the Fund(s), include:

- Over 800 port and stakeholder entries in the Contact List of Contributors
- An Illustrative Pipeline of Potential TA and Investment Capital Opportunities



Autonomy Institute, Washington DC

Priority Strategies for Rapid Port Decarbonization

In the *"Bloomberg Ports Decarbonization Fund Concept Note (Catalytic Finance, DRAFT: May 28, 2023)"* a wide variety of potential strategies were evaluated, including:

a. Cold Ironing (Shore Power)
b. Cargo Handling Equipment Electrification
c. Fuel Switching
d. Operational Efficiency in Ports
e. Port & Shipping Automation
    i. Automation
    ii. Port Digitalization
    iii. 5G
    iv. Blockchain
f. Renewable Energy & Microgrids
    i. Renewables
    ii. Microgrids
g. Dry Ports & Cold Chain Infrastructure
    i. Dry Ports
    ii. Cold Chain
h. Green Shipping Corridors & Maritime Route Optimization

However, considering the barriers to implementation described in that report and further explained in this one, the focus of a new Technical Assistance Fund and/or Investment Fund will make the most progress, with the greatest impact, in the shortest timeframe for port decarbonization by focusing on four key strategies.

A. COLD IRONING (Shore Power)

Introduction

Cold ironing, also known as shore power, is a critical environmental initiative adopted by many ports worldwide to reduce emissions from docked vessels. Otherwise, ships in port must rely on onboard power generation, such as auxiliary engines that run on heavy fuel oils which release criteria air pollutants such as SOx, NOx, and particulate matter, as well as CO2 and other greenhouse gases, along with noise and vibration. While shore power is a technologically viable means to reduce the environmental impact of ships at berth it is often policy drivers and subsidies that are necessary to ensure implementation, and further investment is needed to increase development and utilization more broadly.[iii]

Case Studies

In 2009 the Port of Vancouver (Canada) cruise ship terminal was the third port in the world to install shorepower facilities and, due to the successful rollout, expanded them to the Centerm and Deltaport container terminals in 2018 at a cost of 14 million CAD. Since 2009 shorepower installations at the Port of Vancouver have reduced an estimated 32 thousand tonnes of greenhouse gas emissions and 850 tonnes of criteria air pollutants.

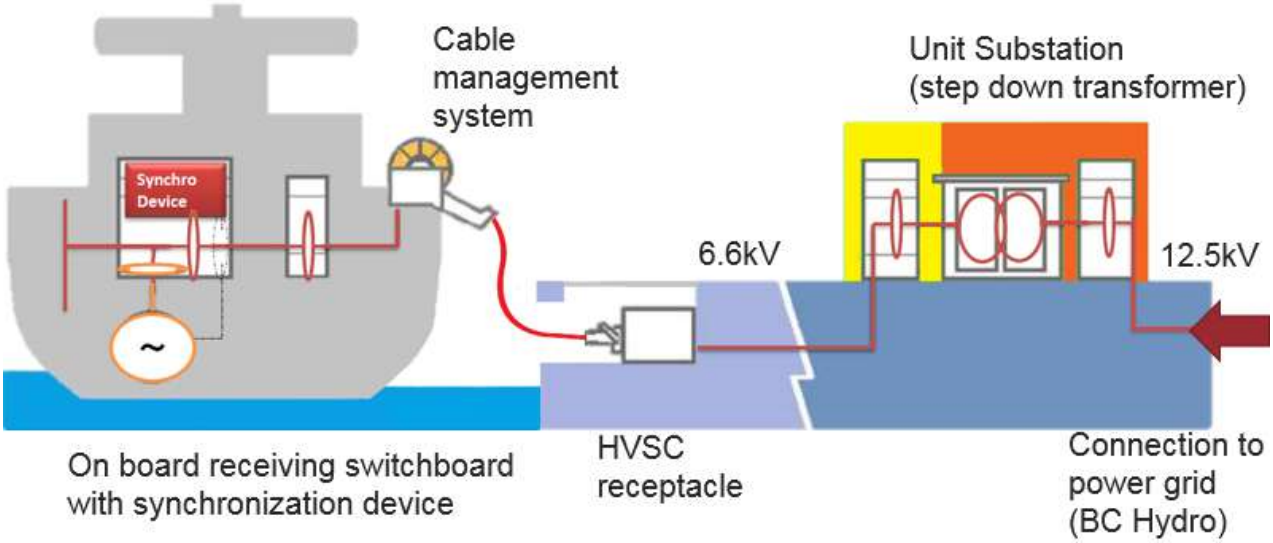


Image provided by Cavotec

Example of cold ironing or shore power[iv]

Specifically, it is estimated that average per-call reductions in air pollutants and greenhouse gas emissions (CO2e) for cruise ships is 1.1 and 50.6 tonnes respectively, while for containerships those numbers rise to 1.4 and 94.6 tonnes. The success for this program has been aided by both policy divers and incentives.

In British Columbia (Canada), ships are required to use low-sulfur marine diesel fuel within 200 nautical miles of the coast. This fuel is more costly than the locally available electricity. Consequently, when ships are docked at a berth, there is a financial incentive to switch to shorepower instead of continuing to consume low-sulfur fuel to run their generators. Additionally, the Port has helped incentivize adoption through its EcoAction Program which provides up a 75% discount on harbor fees for using shorepower.

While the program has been successful, only 34% of the ships that berth at the port are shorepower compatible and, of those, not all are compatible with existing infrastructure. The Port's decision to expand its shore power facilities will be contingent upon increased adoption by shipping lines, the results of feasibility studies assessing infrastructure conditions and electrical capacity, and the availability of funding for equipment.[v,vi]

Considering the slow adoption of shoreside and shipside cold ironing technologies, the Fund could also invest in deployment of portable scrubbers in ports that remove pollutants from ship emissions while berthed. This solution would initially be applicable in ports under clean air or GHG emissions limits but could also be deployed in unregulated ports for specific leading shipping companies (Maersk, for example) and shippers (members of the Zero Emissions Maritime Buyers Alliance, for example) that have pledged emissions reductions by dates certain, but which have not yet converted ships or other maritime equipment from fossil fuels.

Store Loading & Cold Ironing at the Port of Vancouver
MS Zuiderdam of Holland America Line

Key Findings

Although the feasibility of shorepower installations vary on a case-by-case basis, a market analysis and the case study mentioned above illustrate that economic and policy factors significantly influence their viability.

- First, ships must be equipped with standardized shorepower compatible equipment.
- Second the port must have the load capacity to support shorepower and the cost of electricity must be comparable or cheaper than maritime bunker fuels.
- Third policies related to emissions criteria at ports, as well as financial incentives to reduce emissions, must be in place.

Investment Opportunities

Expanding shorepower globally will likely need to be focused on first prioritizing the development of the technology at major ports along key transit routes in North America and Europe with traditionally stricter regulatory regimes and incentive programs. Opportunities, such as supporting the Port of Vancouver in expanding their shorepower initiatives, offer a practical way to contribute to the global deployment of shorepower infrastructure.

According to a 2020 report from the British Port Association, of the estimated 150 berths offering shorepower, the Princess Cruise terminal in Juneau AK was the only one identified as having been funded entirely by private sources. This report highlights that while shorepower has the ability to rapidly mitigate carbon emissions and improve local air quality, public support (whether in the form of policy or funding) is necessary for shorepower to be economically viable. Therefore, it is probable that there will be limited investment-grade shorepower prospects beyond regulated markets supported by substantial subsidies.[vii]

To promote the growth of shorepower on a global scale however, an effective strategy would involve establishing compatible facilities along high trafficked routes (such be between key USA and European ports) and working to increase the number of ships compatible with shorepower along those routes to increase utilization. Furthermore, the development of renewable energy projects near ports, capable of delivering electricity at a more economical and cleaner rate compared to bunker fuels, could serve as a rationale for investment along additional shipping routes and support broader port electrification initiatives.

The Role for TA

The viability of shorepower faces certain challenges, primarily related to interoperability and utilization. One way to address these challenges is by utilizing technical assistance. This assistance can serve several purposes:

- Standardization: Technical assistance can evaluate the various global standards currently in use and identify pathways toward transitioning to a single global standard for shorepower.
- Utilization Assessment: Technical assistance can evaluate ports that have already adopted shorepower and analyze shipping routes that regularly traverse these ports. This assessment can pinpoint opportunities for further equipment usage along routs, which could justify investment in shorepower infrastructure.
- Electrical Capacity: On a broader scale, considering instances like California ports being required to shut down shorepower due to grid shortages in 2022, technical assistance can evaluate which ports would benefit from increased electrical capacity to support the reliable operation of shorepower systems.[viii]

B. CARGO HANDLING EQUIPMENT (CHE) ELECTRIFICATION

Introduction

The mix of cargo handling equipment (CHE) at ports can vary based on the nature of the goods a port manages, but historically diesel fuel has been the predominant energy source. However, the shift towards low and zero-emission power sources has gained momentum in recent years, with options like battery electric and hydrogen electric technologies coming to the forefront. By substituting traditional diesel-powered machinery with electric counterparts such as electric cranes, forklifts, and trucks, ports can markedly reduce their carbon footprint and enhance local air quality. Electrification not only eliminates direct emissions but increases the offtakes for renewable energy sources, thereby delivering both global environmental benefits and tangible advantages for local communities.

Case Studies

The Port of Long Beach (USA) is a global leader in electrification of cargo handling equipment with an estimated 17% of the fleet having been electrified.[ix] Specifically the Long Beach Container Terminal boasts the world's most extensive zero-emissions fleet of any marine container terminal, which in 2021 comprised nearly 200 pieces of cargo handling equipment, including fully electric ship-to-shore cranes, automated guided vehicles and stacking cranes.[x]

In 2022, through a $30.1 million grant, the terminal announced it would also replace its diesel yard tractors with fully electric yard tractors.[xi] As part of its electrification program, the terminal also implemented automation to increase efficiency and resulting throughput. One of the challenges this electrification was the increased power demand, which required Southern California Edison, the local utility, to construct a dedicated 112MVA substation for the terminal. Additionally due to charge times, the world's largest battery exchange had to be built for automated guided vehicles which otherwise could take up to 8 hours to charge. [xii]The success of the Long Beach Container Terminal has in part been made possible by the Port of Long Beach's active role in supporting electrification projects, which to date includes managing over $150 million in near-zero and zero emissions demonstration projects. Former projects such as the C-PORT Project entailed the port actively working with terminal operators and original equipment manufacturers (OEMs) to pilot electric cargo handling equipment, such as top handlers and yard tractors, with the hopes of aiding in future commercialization.[xiii]

Long Beach Container Terminal

It is ultimately the collaborative environment and significant funding, targeted towards promoting the adoption of zero emissions equipment, that has allowed the Port of Long Beach to emerge as a global leader in the electrification of cargo handling equipment.

Other early adopters of electric CHEs have demonstrated significant and measurable reductions of criteria air pollutants and greenhouse gases. For example, in 2020 terminal operator SSA Marine in Long Beach retrofit its rubber-tired gantry (RTG) cranes to battery-electric systems, cutting diesel emissions by 95% and reducing approximately 1,200 metric tons of greenhouse gas emissions annually from each crane.

In other examples, in 2022 Kalmar/Cargotec provided Westport AS in Norway the world's first electric reach stacker and charging system; Liebherr supplied four electric ship-to-shore (STS) and 12 RTGs to the Port of Duqm in Oman; and Kalmar provided Companhia Siderúrgica Nacional nine electric RTGs to the Sepetiba Tecon terminal in Rio de Janeiro, Brazil. These examples show how nascent and limited the deployment of zero emission CHE has been to date.[xiv]

Côte d'Ivoire Terminal new electrified equipment

While the adoption of electric cargo handling equipment has been somewhat limited in the Global South, the newly established Côte d'Ivoire Terminal at the Port of Abidjan, which opened in 2022, stands out as a regional pioneer in this regard. This state-of-the-art terminal has a fleet of 6 STS cranes, 13 RTG cranes, and 36 tractors, all of which are fully electric.[xv] This equipment deployment was a crucial component of a substantial $953 million project aimed at constructing a new terminal within the Port of Cote d'Ivoire.[xvi]

Given its strategic geographical location, this port serves as a vital gateway for neighboring landlocked countries such as Burkina Faso, Mali, and Niger. As a result, it is reported to contribute to 90% and 60% of the nation's customs revenue and overall income respectively. The introduction of this electric cargo handling equipment marks a significant milestone for the region and has the potential to serve as a model for other ports looking to expand as the continent experiences ongoing development and increased foreign trade.[xvii]

While the shift to electric cargo handling equipment offers environmental benefits as compared with diesel, it is worth noting that the port still relies on non-renewable energy sources. The port is exploring strategies to make their electricity supply more environmentally friendly.[xviii] Additionally, it is important to highlight that electrical upgrades were required, not only to

construct the port terminal but also to accommodate the increased power demand resulting from the operation of electric cargo handling equipment.[xix]

Due to the barriers identified to decarbonization of CHE in most regions, the Fund should focus on locations that have "carrots" or "sticks". Carrots include regions where economics are favorable, including government incentives or extremely high prices for diesel fuel. Sticks include regions that have established government mandated, near-term goals for reduction of criteria air pollutants or greenhouse gases (with financial penalties for failing to comply). In these regions, two pathways should be considered:

- **Retrofit CHE:** As noted in this report, there is a very limited availability of OEM zero emission CHEs. New companies in California have been established to retrofit existing diesel CHEs to battery or hydrogen electric, which extends the life of valuable legacy equipment and significantly reduces overall cost. Early retrofit targets could include some of the highest-polluting equipment first (switcher locomotives and dredges, for example), which are also among the easiest to retrofit. The Fund could consider TA funding to license expertise to companies and port projects in other regions to accelerate uptake.
- **Hydrogen-electric:** Many ports will not have adequate energy infrastructure in the foreseeable future to power CHEs and shorepower with electricity, however hydrogen-electric options can fill that gap. As noted above, retrofits of CHEs can be done with either battery or hydrogen electric systems and shorepower can be provided with hydrogen microgrids. The Fund could use TA to support development of joint ventures with fuel providers, OEMs and terminals, which would reduce risk to any of those stakeholders individually and could speed adoption of the technology by providing all parties with predictable offtake and economics.
- **Port digitalization and automation** increases productivity/unit of energy, thus reducing air pollution and greenhouse gas emissions. TA could be used for assisting ports with feasibility studies that would demonstrate cost savings that would pay for system investments, while investment capital could be deployed for project implementation to collect and analyze data, automate processes, and optimize or automate CHE operations.

Key Findings

Demonstration projects implemented at ports hold the potential to significantly accelerate the commercialization of electric cargo handling equipment. However, there are several obstacles to achieving full electrification in this sector, primarily related to commercial viability and costs. While the Long Beach Container Terminal was able to address grid supply challenges, achieving complete port electrification, including drayage trucks will be more complex due to grid capacity constraints in many regions. Ultimately this will hinder the development of similar electrification programs.

Furthermore, on a global scale, grid supply for port electrification could remain a persistent barrier even after the widespread commercialization of battery electric cargo handling equipment. Therefore, it is advisable to take a diversified approach to electric cargo handling equipment, taking into account capacity limitations and duty cycles, encompassing both battery electric and hydrogen electric equipment.

While projects like the electrification of the Long Beach Container Terminal showcase the feasibility of electrifying a terminal, achieving broader adoption at this stage is likely to be cost-prohibitive without substantial subsidies. One of the primary challenges is the lack of adequate infrastructure to support battery electric and hydrogen electric equipment. The initial costs associated with establishing this infrastructure will require time to offset through savings once the equipment becomes cost competitive.

Given the emerging nature of electric cargo handling equipment, investments in supportive infrastructure, such as upgrades to local grid generation and transmission capacity with renewable energy projects and hydrogen fueling facilities, could play a pivotal role in facilitating more widespread adoption globally. This is especially crucial before advocating for the implementation of electrified cargo handling equipment in the global south.

Investment Opportunities

Manufacturers of CHE include Taylor, Cargotec, Liebherr, SANY, Hyster-Yale, and Konecranes, however zero emission options remain very limited in volume and distribution. Considering the current state of commercialization and the associated costs of electric cargo handling equipment, making direct investments in this equipment without subsidies could pose considerable challenges. An alternative approach might involve establishing a leasing company that acts as a comprehensive provider of commercially available electric cargo handling equipment.

The greatest opportunity to promote the electrification of cargo handling equipment is likely to revolve around investments in the supportive infrastructure. This includes initiatives such as grid upgrades and renewable energy projects. These investments not only offer investors a more secure return on their investment, but also play a pivotal role in facilitating the broader electrification of ports and surrounding communities.

The Role For TA

Providing technical assistance to identify ports needing capacity upgrades and expanded renewable energy sources for successful electric cargo handling equipment implementation, along with offering additional case studies, can significantly hasten the adoption and scalability of electrified CHE. This technical assistance can play a crucial role in advancing the commercialization of electrified CHE, especially in major ports like those in Europe and the

United States. The goal is to achieve successful commercialization in these key ports, which can subsequently lead to reduced equipment costs in other ports. Globally, technical support can also be pivotal in facilitating the development of essential infrastructure required for cargo handling equipment electrification, as commercialization continues to drive down prices, making it more competitive with diesel-powered alternatives.

C. Renewable Energy & Microgrids

Introduction

Microgrids, consisting of localized power generation, storage, and distribution systems, offer significant climate benefits by enhancing energy efficiency and resilience. By integrating renewable energy sources, such as solar and wind, microgrids can further reduce greenhouse gas emissions. Within port environments, microgrids hold a distinct significance by guaranteeing continuous electricity supply independently, eliminating the need for diesel backups in the event of grid failure, and aiding ports in achieving self-sufficiency in power generation and use. This is especially crucial as numerous ports encounter challenges in electrifying their operations due to constraints regarding local grid capacity and reliability.

Case Studies

In 2022 the Port of Long Beach (USA) implemented a $12.2 million microgrid project to ensure a reliable power supply for its main security facility, the Joint Command and Control Center (JCCC), while advancing its zero-emissions goals. This initiative featured a 300-kilowatt solar panel array that provided power to both the JCCC and Jacobsen Pilot Services. It improved energy resilience, reduced dependence on diesel generators during outages, and was anticipated to yield annual electricity cost savings exceeding $60,000.

Joint Command and Control Center

The microgrid was built in alignment with the Port's sustainability policies, furthering its commitment to clean air targets and its zero-emissions goals for cargo-handling equipment by 2030 and drayage trucks by 2035. Notable features included the solar array, advanced cybersecurity measures, and the ability to deploy a truck-mounted battery system during emergency situations. Performance data collected during the initial year of operation will help inform future microgrid projects. A substantial portion of the funding came from a $5 million grant awarded by the California Energy Commission, and the project became operational in November 2022.[xx]

Overall, California ports have emerged as a prime location for microgrid experimentation due to the existing strain on the grid. This strain has resulted in occasional power failures, notably during the 2022 summer heatwave.[xxi] Additionally, challenges related to grid capacity are poised to impede port operation electrification efforts. Consequently, California ports will need local power generation and microgrid implementation to ensure a consistent, reliable supply of electricity, independent of grid conditions. The creation of these microgrids will serve as valuable case studies that can be replicated worldwide, aiding other ports facing similar needs for local and dependable power generation free from grid vulnerabilities.

In another example, in 2020 Vale announced it would install a 10 megawatt-hours BESS (Battery Energy Storage Systems) system at Ilha Guaíba terminal (TIG), in Rio de Janeiro Brazil), which is estimated to reduce electricity costs by 20% during peak hours.[xxii,xxiii] While not as extensive as microgrid systems deployed in California, it represents a first step in developing energy back-up systems that increase resiliency and can reduce dependency on diesel backup in the global south.

In developing regions generally, where the grid is often unreliable and diesel backup systems are frequently used, microgrids can play a vital role in supporting ports. By implementing dedicated microgrids and the necessary transmission infrastructure, it becomes possible to reduce dependence on the grid and reliance on diesel backups. This, in turn, enhances the sustainability of port operations, prevents shutdowns that cause delays and reduce productivity. This becomes increasingly important with the growing electrification of port equipment and the rising demand for cold chain infrastructure in developing countries. These trends are putting additional pressure on already strained grids, necessitating more affordable and dependable electricity sources.

Key Findings

In developed countries, energy resilience and sustainability are two of the key drivers for ports to implement microgrids. Specifically, microgrids insulate ports from the grid. This becomes especially critical in the face of climate change and the resultant increase in extreme weather events, which raise concerns about the reliability of traditional grid-based power supplies.

Moreover, microgrids bring about several sustainability advantages. They reduce a port's reliance on diesel backup systems and empower ports to exercise greater control over the origin of their electricity, enabling them to prioritize renewable sources. As ports increasingly transition towards electrifying their operations, they will encounter capacity limitations within their local grids. This necessitates a diversification of their electricity sources and underscores the importance of local electricity generation, further emphasizing the value of microgrids. Despite key drivers for ports to implement microgrids, the high upfront investment, regulatory complexities, and limited performance data are barriers to the implementation of microgrids in ports to date.

In developing countries, the factors driving or hindering the implementation of microgrids for ports share similarities with developed regions, but also exhibit important differences. Notably, grid reliability concerns are of chief significance for ports in developing regions, and it is likely the primary incentive for investing in microgrids, surpassing even sustainability considerations. Although sustainability remains a motivating factor, government mandates are less prevalent compared to developed regions. However, the barriers to microgrid adoption are often more pronounced in developing regions due to limited sources of funding, potential shortages of local expertise, and frequently unpredictable regulatory environments.

Investment Opportunities

Because microgrids can enhance port reliability by disconnecting them from grid-related issues, identifying suitable microgrid installations at ports could be a viable investment strategy. For example, inadequate investment and maintenance of infrastructure have played a role in the increasing inefficiencies observed in South African ports. Specifically, issues with grid reliability have resulted in power outages. The South African government is actively pursuing private investment to address these challenges and enhance both efficiency and reliability. Considering the current state of South Africa's grid, microgrid installations could contribute to ensuring a dependable power supply and improving the efficiency of the country's ports.[xxiv,xxv,xxvi]

Government mandates requiring ports to reduce local air pollution and transition to zero-emission equipment brings about the imperative to bolster local power generation. This is essential for supporting the electrification, especially considering grid capacity limitations and concerns about grid reliability. Consequently, this situation presents a compelling opportunity for investments in microgrid projects at ports in areas where regulatory conditions are conducive for such investments. For instance, in California, regulatory authorities have consistently raised emissions reduction requirements for ports.[xxvii] This necessitates the expansion of shore power facilities, which, in turn, exerts additional strain on already burdened grids. Furthermore, California's mandate to achieve zero emissions for drayage trucks by 2035 will likely further stress the grid, assuming a significant portion of the truck fleet becomes battery electric.[xxviii]

In both the global north and south, there is an abundance of developers of solar, wind, wave, biomass, hydro, and other renewable energy technologies. The Fund should identify developers in port areas where either technical assistance may be needed (for feasibility studies or other de-risking assessments) or investment capital, and work with them to implement renewable energy projects that can support port energy demand.

Many ports surveyed report inadequate transmission infrastructure to supply energy to battery-electric CHE or cold ironing equipment. Renewable energy developers in many regions are also experienced with design and deployment of micro-grids that could be dedicated to these port

energy demands, rather than reliance on local grid power. Micro-grids could be powered with renewables or low-carbon sources of hydrogen.

The Role for TA

Technical assistance could be used to assist pilot initiatives, such as sponsoring further research in ongoing projects to share valuable insights publicly for the benefit of other ports. Furthermore, technical assistance can help identify ports lacking the internal expertise to assess and implement microgrids, potentially leading to the establishment of a project portfolio that microgrid developers could subsequently engage with.

D: Operational Efficiency in Ports

Introduction

Improving port operational efficiency while simultaneously reducing carbon emissions is essential for fostering sustainable global trade and mitigating the environmental impact of maritime transportation. Enhancing operational efficiency serves as a viable means for ports to reduce their air pollution and carbon footprint, as adopting cost-effective measures like energy-efficient systems, LED retrofitting, HVAC upgrades, and smart technologies, can yield gains in energy efficiency that can potentially offset their own implementation costs in just a few years. However, without dedicated funding, comprehensive understanding of the most suitable technologies, or relevant expertise, ports may not be inclined to implement these technologies and practices.

Alameda County (California, USA) GoPort Freight Intelligence Transportation System Port

Case Studies

The Port of Hamburg (Germany) stands at the forefront of operational efficiency, harnessing diverse technologies to not only to enhance the seamless flow of cargo in and out of the port, minimizing bottlenecks, but also to achieve synergistic efficiency improvements that result in reduced carbon emissions and a more sustainable operational model.

Through enhancements in energy efficiency, the port has successfully trimmed its yearly energy consumption by 0.5% per year and has set its sights on achieving a 5% energy reduction by 2025 compared to the levels recorded in 2019. Additionally, between 2015 and 2020, the port

surpassed its original annual emissions reduction targets, progressing steadily toward its ultimate goal of reducing emissions by 50% in 2025 compared to the levels in 2012.[xxix]

Some of the measures the port has taken to achieve these goals have been the implementation of LED lighting retrofits, smart technologies aimed at decreasing congestion (road, rail, and maritime), onshore power for the port's own fleet, increased use of electric vehicles, renewable energy and heat pumps.[xxx] The port of Hamburg has also deployed innovative technologies such as solar powered mooring systems that eliminate the need for underwater cables, reducing both installation and maintenance costs.[xxxi]

Port of Seattle

Much like the Port of Hamburg, the Port of Seattle (USA) has placed a strong emphasis on operational efficiency to achieve its sustainability objectives as part of the Port's Century Agenda. A notable initiative in this regard is the ongoing "LED Lighting Accelerator" program, which was initiated in 2022. This program aims to kickstart the complete transition of the port to LED lighting by 2030, with $4.5 million allocated for this purpose over the next 4 years. Its primary goal is to retrofit all waterfront properties, which will help the port curtail both energy and maintenance expenses.[xxxii,xxxiii]

Key Findings

Due to their relatively easy accessibility in terms of both technology and costs, along with potential quicker returns on investment, enhancements in operational efficiency hold the potential to swiftly reduce carbon emissions across ports globally. Simple solutions like LED lighting and sensor technologies serve as excellent examples of minor changes that can be implemented at relatively low costs, and those costs can gradually be recouped over time.

Investment Opportunities

One potential investment opportunity lies in upgrading lighting systems to LED technology at ports that currently face high electricity costs, especially in small island nations with high reliance on diesel. For instance, conducting a survey of Caribbean ports could help identify a collection of smaller projects in the region that can be executed concurrently, resulting in more favorable returns. A revolving loan fund is an attractive option for deploying capital to retrofits.

Furthermore, the efficiency improvements demonstrated by the Port of Hamburg through its advanced management systems could be replicated at other ports. These systems are

particularly suitable for larger ports that warrant their implementation but may lack the necessary expertise. One viable investment approach might involve establishing a company specifically designed to assess ports, offer comprehensive operational efficiency enhancements, and integrate smart management software and IoT sensors as turnkey solutions.

The Role for TA

It is of utmost importance that the insights gained from leading ports like Hamburg and Seattle are shared with ports in developing regions that may lack the same financial resources and expertise to execute these operational enhancements. While the entry barriers for such improvements are lower and they offer faster returns, there are still initial costs involved. Therefore, identifying feasible projects and establishing sustainable funding mechanisms for them with TA funding could expedite efficiency improvements at ports that might otherwise struggle to implement them. TA could also be used to design a revolving loan fund for philanthropic investors that may offer capital at lower rates in "program-related investments" (PRIs).

Strategic Initiatives and Recommendations to Accelerate Port Decarbonization

A. Policy

Strategic policy initiatives, mandates, and recommendations play a crucial role in accelerating port decarbonization, arguably the most crucial, because they provide a framework, incentives, and guidelines that can force stakeholders to transition towards cleaner and more sustainable operations.

The 2018 Maritime Technology Cooperation Center (MTCC) reports repeatedly showed that lack of policies by governments mandating GHG reductions are one of the main reasons why ports are not transitioning to cleaner and more efficient sources of energy. One MTCC report on Pacific ports specifically states that "given the low level of implementation of existing laws and the time needed to adopt policies and laws, it is unlikely that mandatory requirements and policies will be given effect in the short- and medium- term." Data collection and analysis to support informed policy and decision-making at the regional and national levels, and to facilitate investment planning for port and ship operators is essential.

Accelerating port decarbonization requires a multifaceted approach involving strategic policy initiatives and recommendations at various levels—international, national, regional, and local. Working with the aforementioned maritime collaboratives and others, the Fund could support a dedicated policy advocacy team to accelerate progress. There are many ways in which to do this, but recommendations for action by this type of policy team include:

- Establishing specific and ambitious targets for reducing greenhouse gas emissions from ports, aligning with national and global climate goals is a start. These targets should be measurable, time-bound, and realistic, and encourage ports to invest in sustainable technologies and practices.
- Encourage international collaboration to learn what works and what doesn't work and to establish projects and frameworks that are realistic and effective. Organizations like the International Maritime Organization (IMO) or the World Ports Sustainability

Program (WPSP) could help to play a key role in setting global targets and guidelines if there was a plan in place.

- Encourage governments to invest in the development of shore power infrastructure as well as in the wide variety of specific technologies needed by the port to decarbonize.
- Governments can implement financial incentives, subsidies, or tax-breaks for ports that lower GHG emissions, as well as for the companies that invest in implementing the zero-emissions technologies.
- Facilitate public-private partnerships to fund and implement decarbonization projects, leveraging private sector resources, expertise, and innovation in collaboration with government policies and funding.
- Provide training programs and initiatives to educate port operators and stakeholders about sustainable practices and technologies that can aid in reducing emissions and achieving decarbonization goals.
- Implement mandatory reporting of emissions and progress toward decarbonization targets, enabling transparency and accountability in achieving set goals.

By governments addressing the pressing issue of decarbonization in ports, they can pave the way for a cleaner, greener, and more efficient maritime sector, fostering innovation, economic growth, and a healthier planet for generations to come.

B. Finance: Strategies for Technical Assistance and Investment Funds

Sector-specific sections of this report make note of relevant opportunities for effective deployment of TA or investment capital; however, this section describes overarching and unique strategies that may inform the creation of multiple Fund products and value-added collaborations.

Discussions with ports, terminal operators, and a major private equity firm that has significant investments in ports confirms the need for a company or developer for projects in ports, rather than just a financing vehicle (for example, an airline leasing style entity with turnkey pricing for equipment, warranties, energy/fuel, etc).

In addition, several conglomerates have bought ports and terminals in recent years, building substantial portfolios of global capacity.[xxxiv] Working with and through these companies could more rapidly scale decarbonization technologies, systems, and financing. Similarly, working through networks such as EcoPorts (an environmental management initiative of the European

port sector) could provide economies of scale to achieve results more rapidly. There are currently 136 ports worldwide in the EcoPorts network, 106 of which are European.[xxxv]

Geographic focus will also accelerate results. For example, in California ports alone, there are over 40,000 CHEs and over 200,000 heavy duty drayage trucks that must be zero emission by 2030 and 2035 respectively. Addressing that market could quickly create economies of scale applicable to other regions (and would be highly attractive to investors), especially because those ports are under 2030 regulatory deadlines to achieve zero emission operations.

Technical Assistance funding could be applied to conventional feasibility studies, port roadmaps, and other enabling support, however it may be more impactful to build a TA Fund around an incentive model to reduce cost barriers. Examples include California's Carl Moyer and CORE programs.[xxxvi] Globally, government and other grant funding has been poorly coordinated or strategically deployed, resulting in limited results or utility. A collaborative effort could yield better results for non-dilutive capital, R&D funding/grants, pilot projects that are leveraged into scaled projects, and other early support mechanisms.

Additionally, TA can be sourced from target-specific interests and blended into one coordinated facility, including for applications such as:

- Specific port decarbonization roadmaps/plans in Africa in collaboration with the Maritime Technology Cooperation Centre for Africa.
- A roadmap that follows EU and IMO regulatory developments, engaging with affected stakeholders in ports ahead of those deadlines.
    - Related to those interests, dedicating resources to a policy development and advocacy team that can work in regions lagging on clean air and climate solutions (as described in more detail in other sections of this report).
- Aligning with the Mission Possible Partnership, which has a program that is mostly focused on shipping decarbonization, but that has expressed interest in expanding to ports (including a nascent decarbonization program for two key ports in the USA).[xxxvii]
- Region-specific "total cost of ownership" (TCO) studies, which are essential to determining the economics of proposed projects and identifying ways to reduce overall cost to make adoption more attractive to stakeholders that are not under regulatory deadlines and mandates.

- A specialized partnership development team, as it is increasingly clear that there are many port decarbonization interests, stakeholders, and funding sources in the world today, but few are coordinated or collaborating.

As these examples highlight, forming partnerships with strategic partners from the maritime/port industry, governments, and non-profits can significantly amplify the impact of any new Fund. Adding TA or investment capital to existing mission-related fund products is another way to accomplish that goal and, at the same time, maximizing staffing expertise and deal sourcing/diligence through collaboration. For example, the Subnational Climate Fund and the Global Fund for Coral Reefs have deep expertise and collaboration with both TA and capital providers in developing countries that may also have ports and green infrastructure needs.[xxxviii]

Additionally, confidential expressions of interest for participation and funding have come from several global, industry-related sources of strategic capital and technical expertise (specifics will be provided under appropriate confidentiality agreements), including:

- Three of the world's largest private equity firms, including one that owns and operates ports and terminal operators and is planning significant investment in CHE and port operational optimization technologies and projects; and two that have partnered in the hard-to-decarbonize sectors.
- A multi-national cargo logistics company that owns over 80 terminals and free trade zones, handling approximately 10% of global container traffic in over 40 countries.
- A major global bulk materials and fuels logistics company with assets in over 70 terminals in 23 countries.
- Three global banks that are prepared to provide unique debt financing for a port sustainability fund.
- Two major energy companies with global assets and expertise directly relevant to ports and decarbonizing technologies.
- One of the world's top five shipping companies that is prepared to commit to rapid deployment of proven technologies on their vessels and in their terminal operations, along with providing their innovations centers for testing and demonstrating new technologies.
- Three major OEMs ready to expand deployment of equipment and components to joint ventures that can rapidly expand use of zero emission technologies in ports.

Appendix A provides an Illustrative Pipeline of potential TA and investment capital opportunities to further inform and refine the strategy of a new Fund.

List of Acronyms

Abbreviation	Meaning
BESS	Battery Energy Storage Systems
CHE	Container/cargo handling equipment
GHG	Greenhouse gases
HVAC	Heat, ventilation, air conditioning
IMO	International Maritime Organization
JCCC	Joint command and control center
LBCT	Long Beach Container Terminal
LED	Light-emitting diode
MTCC	Maritime Technology Cooperation Center
MVA	MegaVolt amperes (unit of measurement)
OEM	Original equipment manufactures
RTG	Rubber-tired gantry
STS	Ship-to-shore
TA	Technical Assistance
TCO	Total cost of ownership
TIG	Ilha Guaíba terminal
WPCAP	World Ports Climate Action Program
WPSP	World Ports Sustainability Program

Appendix A: Illustrative Pipeline of Potential TA and Investment Capital Opportunities

Appendix A: Port Decarbonization: Illustrative Pipeline of Technical Assistance and Investment Opportunities							
(As proposed by various partners and ports. Partners identification under NDAs)							
Project	**Geography**	**Sector**	**Technical Assistance**	**Blended Capital**	**Conventional Capital**	**PRIs; Grants**	**Partner**
CHE retrofit facility (battery & H2)	California	CHE			$5,000,000		PE #1
CHE retrofit & incentive assessments (battery & H2) where regulations drive adoption	North	CHE	$100,000				Foundation #1
CHE retrofit & incentive assessments (battery & H2) where diesel exceeds $10/gallon	South	CHE	$100,000				Foundation #1
CHE Incentives (1500 vehicles)	North	CHE				$100,000,000	Multiple
CHE Incentives (3,000 vehicles)	South	CHE				$200,000,000	Multiple
CHE & Cold Ironing Development NewCo	Global	CHE			$20,000,000		Shipping #1
Solar: utility scale microgrids (6 ports; 1gw)	USA	Renewables			$160,000,000		PE #2
Solar: utility scale microgrids (2 ports; 100mw)	S. Africa	Renewables		$40,000,000			SCF
Solar: utility scale microgrids (4 ports; 100w)	India	Renewables		$40,000,000			India strtegic; Port Partner #1
Solar: utility scale microgrids (6 ports; 1gw)	MENA	Renewables			$160,000,000		Regional Strategic
Solar: utility scale microgrid project dev	North	Renewables	$200,000				Foundation #1
Solar: utility scale microgrid project dev	South	Renewables	$200,000				Foundation #1
Cold Ironing Expansion	Vancouver	Shorepower			$10,000,000		PE #1
Cold Ironing Expansion (12 ports)	US-EU-Asia	Shorepower			$60,000,000		Port Partner #1
Cold Ironing Expansion Assessments		Shorepower	$200,000				Shipping #1; MPP
Policy advocacy team	North	Policy	$10,000,000				Donor #1
Policy advocacy team	South	Policy	$10,000,000				Donor #2
LED retrofits (24 ports)	North	EE	$100,000		$25,000,000		PE #2
LED retrofits (33 ports)	South	EE	$100,000	$50,000,000			Utility #1; Port Partner #1
IOT Systems	North	EE	$100,000		$10,000,000		PE #2
IOT Systems	South	EE	$100,000	$10,000,000			Utility #1
Port Decarbonization Roadmaps	South	Policy	$500,000				MPP
TCO Analytics (all ports; frequent updates)	Global	Policy	$5,000,000				Multiple
Dredging equiment electrification (12 ports)	USA	Emissions			$20,000,000		PE #1
Portable scrubber deployment	North	Emissions	$100,000		$25,000,000		Shipping #1; ZEMBA
Multi-strategy port upgrades	MENA	Multi		$70,000,000			Consortium #1
TOTALS			**$26,800,000**	**$210,000,000**	**$495,000,000**	**$300,000,000**	

Appendix B: Port Survey Template

Ports Decarbonization & Energy Efficiency Survey

The non-profit 7th Generation Advisors is working with a coalition of other NGOs, academics, philanthropists, technology providers, and investors to accelerate the transition of the heavy duty shipping, goods movement, and ports industry to clean, sustainable equipment and fuels. We are therefore seeking more information about the progress, or barriers, to this transition in each port around the world.

The following survey will assist us in gathering this knowledge and helping ports (and related terminals, companies, and governments) to adopt low-carbon fuels and technologies sooner and at lower cost.

1. Port Information
    a. Port Name:
    b. Location:
    c. Contact Person/Title:
        i. Email:
        ii. Phone:
    d. Port Ownership (government; private; other):
    e. Website:
2. Port Sustainability, Electrification or Decarbonization Status
    a. Shorepower:
        i. Number of berths (total):
        ii. Number of berths electrified:
    b. Container Handling Equipment "CHEs" (list information for each type of CHE, such as rubber tire gantry crane; forklifts, holster trucks; straddle carriers; front-end loaders; reach stacker or side loaders; rail-mounted gantry cranes; ship-to-shore cranes; other)
        i. Type & Number of CHEs (total):
        ii. Type & Number of CHE's electrified or using sustainable fuels:
    c. Website or link to Port Sustainability Report or other publications
3. Fuel Switching
    a. List any low-carbon fuels available at the port (such as biofuels, methanol, ammonia, low-sulfur diesel, hydrogen, gas or liquid; other)
        i. Type & Capacity:
        ii. Shipping or cargo handling companies using the fuels:
4. Port Automation & Energy Efficiency
    a. List any facilities that are automated:
    b. List any energy retrofit projects (lighting; electric generators/motorized equipment; other)
        i. List any such projects that could benefit from retrofits:
    c. Describe how waste and recycling
5. Port Energy Supply
    a. Describe the grid energy supplying the port (% renewables & % fossil fuels)
    b. Describe other energy used in the port (diesel generators; other)

6. Ancillary Port Facilities
    a. List any dry ports, distribution centers or other facilities essential to port container/cargo operations
7. Technical Assistance & Finance
    a. Would your port be interested in no-cost technical assistance to develop or implement decarbonization and/or energy efficiency strategies?
    b. Would your port be interested in financing (concessional and conventional) to facilitate more rapid decarbonization and sustainability efforts?

Please return your survey; and for more information, please contact:

Terry Tamminen, President

Catalytic Finance USA

EMAIL: terry.tamminen@catalyticfinance.org

Mobile: +1-424-259-3730

Appendix C: Contact List of Contributors

Port of Duqm Company SAOC	MENA	Nashat Al kindi	Process Implementation	nashat.alkindi@gmail.com
ABASHIRI	Asia Pacific	na	Port Section, Fisheries & Port Department, City of Abash	ZUSR-SK-KOWAN@city.abashiri.hokkaido.j
Abu Dhabi	MENA	Thanos Flampouris	general manager	aflampouris@yahoo.com
ABUDHABI terminals	Middle East	Mr. Muhammed Thafseer	Customer Service Officer	Mohamed.Thafseer@adterminals.ae
ABUDHABI terminals	Middle East	Mr. Saif Rashid AL Naqbi	A / Communication Manager	Saif.Alnaqbi@adterminals.ae
ABUDHABI terminals	Middle East	Mr. Yasir Nasim	General Manager - Customer Service	Yasir.Nasim@adterminals.ae
ABUDHABI terminals	Middle East	Ms. Ghada Al Ali	Customer Service Officer	Ghada.AlAli@adterminals.ae
ABUDHABI terminals	Middle East	Ms. Maryam Al Zaabi	A / Communication Officer.	Mariyam.Alzaabi@adterminals.ae
Adani Gangavaram Port Pvt Ltd	South East Asia	Mr. BG Gandhi	CEO	Bg.Gandhi@adani.com
Adani Gangavaram Port Pvt Ltd	South East Asia	Mr. Devendra Thakar	COO	Devendra.Thakar@adani.com
Adani Gangavaram Port Pvt Ltd	South East Asia	Mr. Rahul Nuthalapati	EA to CEO	Rahul.Nuthalapati@adani.com
Adani Gangavaram Port Pvt Ltd	South East Asia	Mr. Shahzad Athar	Business Development - Container	Shahzad@adani.com
Adani Hazira Port Ltd.	South East Asia	Mr. Anand Marathe	COO	Anand.marathe@adani.com
Adani Hazira Port Ltd.	South East Asia	Mr. Mohit Shaktawat	Dry Cargo	mohit.shaktawat@adani.com
Adani Hazira Port Ltd.	South East Asia	Mr. Niraj Bansal	CEO	niraj.bansal@adani.com
Adani Kandla Bulk Terminal Ltd.	South East Asia	Mr. Ajit Pisharody	Head Operation & Maintenance	Ajit.Pisharody@adani.com
Adani Kandla Bulk Terminal Ltd.	South East Asia	Mr. Harpalsinh Jadeja	EA to CEO	Harpalsinh.Jadeja@adani.com
Adani Kandla Bulk Terminal Ltd.	South East Asia	Mr. Sandeep Jaiswal	COO	Sandeep.Jaiswal@adani.com
Adani Kandla Bulk Terminal Ltd.	South East Asia	Mr. Sujal Shah	CEO	sujal.shah@adani.com
Adani Kattupalli Port Pvt. Ltd.	South East Asia	Mr. G J Rao	CEO	Gudena.Rao@adani.com
Adani Kattupalli Port Pvt. Ltd.	South East Asia	Mr. K E Thennavan	CFS Business	thennavan@adani.com
Adani Kattupalli Port Pvt. Ltd.	South East Asia	Mr. Milind Sangtiani	EA to CEO	milind.sangtiani@adani.com
Adani Kattupalli Port Pvt. Ltd.	South East Asia	Mr. Vivek Nair	CFS Business	vivek.nair@adani.com
Adani Kattupalli Port Pvt. Ltd.	South East Asia	Mr.Ramde Karangiya	Container Terminal Head	ramde.karangiya@adani.com
Adani Krishnapatnam Port Limited	South East Asia	Mr. G J Rao	MD & CEO	Gudena.Rao@adani.com
Adani Krishnapatnam Port Limited	South East Asia	Mr. Sandeep K V	EA to CEO	Sandeep.kv@adani.com
Adani Krishnapatnam Port Limited	South East Asia	Mr.Santosh Kumar P	Sales & Marketing - Dry Cargo	santhosh.kp@adani.com
Adani Krishnapatnam Port Limited	South East Asia		Sales & Marketing - Dry Cargo Common	Krishnapatnam_Agri@adani.com
Adani Krishnapatnam Port Limited	South East Asia		Sales & Marketing - Dry Cargo Common	Krishnapatnam_Fertilizer@adani.com
Adani Krishnapatnam Port Limited	South East Asia		Sales & Marketing - Dry Cargo Common	Krishnapatnam_Minerals@adani.com
Adani Krishnapatnam Port Limited	South East Asia		Sales & Marketing - Dry Cargo Common	Krishnapatnam_steelandprojects@adani.c
Adani Logistics Ltd., Gujarat	South East Asia	Mr. Anoop Gaur	Terminal Head - ICD Loni	anoop.gaur@adani.com
Adani Logistics Ltd., Gujarat	South East Asia	Mr. Chandrakant Patil	Terminal Head - ICD Tumb	chandrakant.patil1@adani.com
Adani Logistics Ltd., Gujarat	South East Asia	Mr. Chandrakant Patil	Terminal Head - ICD Valvada	chandrakant.patil1@adani.com
Adani Logistics Ltd., Gujarat	South East Asia	Mr. Chandrakant Patil	Terminal Head - Taloja	chandrakant.patil1@adani.com
Adani Logistics Ltd., Gujarat	South East Asia	Mr. Nivrutti Bachhav	Terminal Head - ICD Nagpur	nivrutti.bachhav@adani.com
Adani Logistics Ltd., Gujarat	South East Asia	Mr. Pramod Jain	Terminal Head - Kishangarh	Pramod.Jain@adani.com
Adani Logistics Ltd., Gujarat	South East Asia	Mr. Ravi Kumar Mylarapu	Terminal Head	ravikumar.mylarapu@adani.com
Adani Logistics Ltd., Gujarat	South East Asia	Mr. Ritesh Chopra	Terminal Head - ICD Patli	Ritesh.Chopra@adani.com
Adani Logistics Ltd., Gujarat	South East Asia	Ravinder Wazir	Terminal Head - ICD Kila Raipur	Ravinder.Wazir@adani.com
Adani Logistics Ltd., Gujarat	South East Asia	Vikram Jaisinghani	CEO – Logistics	Vikram.Jaisinghani@adani.com
Adani Petronet (Dahej) Port Ltd	South East Asia	Mr. Jagdish Patel	COO	Jagdish.patel@adani.com
Adani Petronet (Dahej) Port Ltd	South East Asia	Mr. Nilesh Chawda	EA to CEO	Nilesh.Chawda@adani.com
Adani Petronet (Dahej) Port Ltd	South East Asia	Mr. Pankaj Kumar Sinha	Marine Services	Pankaj.Sinha@adani.com
Adani Petronet (Dahej) Port Ltd	South East Asia	Mr. Vijay Pratap Singh Rathore	Dry Cargo	Vijay.Rathore@adani.com
Adani Petronet (Dahej) Port Ltd	South East Asia	Mr.Jugalkishor Joshi	Dry Cargo Marketing	Jugalkishor.Joshi@adani.com
Adani port of Dhamra Port	South East Asia	Capt. Ajit Narayan Mahapatra	Marine Services	Ajitnarayan.Mahapatra@adani.com
Adani port of Dhamra Port	South East Asia	Lalit Narayan Rath	EA to CEO	lalit.rath@adani.com
Adani port of Dhamra Port	South East Asia	Mr. Prashanta Patra	Dry Cargo	Prashanta.Patra@adani.com
Adani port of Dhamra Port	South East Asia	Mr. Sudip Dasgupta	COO	Sudip.Dasgupta@adani.com
Adani port of Dhamra Port	South East Asia	Sushant Kumar Mishra	CEO	sushantkumar.mishra@adani.com
Adani port of Dighi Port Ltd	South East Asia	Mr. G J Rao	CEO	Gudena.Rao@adani.com
Adani port of Dighi Port Ltd	South East Asia	Mr. Milind Sangtiani	EA to CEO	milind.sangtiani@adani.com
Adani port of Dighi Port Ltd	South East Asia	Mr. Ramde Karangiya	Container Terminal Head	ramde.karangiya@adani.com
Adani port of Dighi Port Ltd	South East Asia	Raghvendra Raghav	Head Marine Services	dpl.marine@adani.com
Adani port of Dighi Port Ltd	South East Asia	Saurabh Singh Bhadauriya	EA to CEO	Saurabh.bhadauriya@adani.com
Adani port of Mormugao	South East Asia	Mr. H C Hiremath	Dry Cargo	hiremath.hc@adani.com
Adani port of Mormugao	South East Asia	Mr. Jeyaraj Thamburaj	Business Head	jeyaraj.thamburai@adani.com
Adani port of Mormugao	South East Asia	Mr. Niraj Bansal	CEO	Niraj.Bansal@adani.com
Adani Ports and Special Economic Zone Ltd	South East Asia	Capt Sachin Srivastava	Head Marine Services	Sachin.srivastava@adani.com
Adani Ports and Special Economic Zone Ltd	South East Asia	Mr. Bhagwant Upadhye	Head Dry Cargo	Bhagwant.Upadhye@adani.com
Adani Ports and Special Economic Zone Ltd	South East Asia	Mr. Gaurang Chudasama	Head Liquid Cargo	Gaurang.Chudasama@adani.com
Adani Ports and Special Economic Zone Ltd	South East Asia	Mr. Harpalsinh Jadeja	EA to CEO	Harpalsinh.Jadeja@adani.com
Adani Ports and Special Economic Zone Ltd	South East Asia	Mr. Manoj Katar	COO (Non-Container)	manoj.katar@adani.com
Adani Ports and Special Economic Zone Ltd	South East Asia	Mr. Pradeep Jayaraman	COO (Container)	pradeep.jayaraman@adani.com
Adani Ports and Special Economic Zone Ltd	South East Asia	Mr. Pushparajsinh Jadeja	CFS Business	Pushparajsinh.Jadeja@adani.com
Adani Ports and Special Economic Zone Ltd	South East Asia	Mr. Sujal Shah	CEO	sujal.shah@adani.com
Adriatic container terminal _CROATIA	Europe	ENGINEERING		AGCTEngineering@ictsi.hr
Adriatic container terminal _CROATIA	Europe	HSSE		hsse@ictsi.hr
Adriatic container terminal _CROATIA	Europe	PROCUREMENT		agctprocurement@ictsi.hr
Ahmedabad	South East Asia	Santosh Rout	Logistics , Shipping & Port Operation Head	sanuman1@hotmail.com
AKITA	Asia Pacific	na	Harbor and Airport Division, Akita Prefectural	kowan-kuko@pref.akita.lg.jp
Antalaha	Africa	Mr Alain RAKOTONIRINA	Port Officer	portantalaha@gmail.com
Antalaha	Africa	Mr Eric RATSIMBA	Regional Director	ratsimbamichel@yahoo.fr
Antananarivo	Africa	Me Lea RAJOELINA	c/o Directeur de la ragulation	lea@apmf.mg
Antigua & Barbuda Port Authority		Carlson Richards	Cargo master	carlson.richards@port.gov.ag
Antigua & Barbuda Port Authority		Carolle Farquhar	CFO	carolle.farquhar@anuport.com
Antigua & Barbuda Port Authority		Curtis Dennie	COO	cdennie@port.gov.ag
Antigua & Barbuda Port Authority		Darwin Telemaque	CEO	darwin.telemaque@anuport.com
Antigua & Barbuda Port Authority		Darwin Telemaque	CEO (mail n 2)	dtelemaque@port.gov.ag
Antsiranana	Africa	Mr Jaona RAMANANSOA	Regional Director	jaona@apmf.mg
Antsiranana	Africa			cmdmdie@cmdmd.mg
Antsiranana	Africa			consalmag@orange.mg
Antsiranana	Africa			mg.compta.gasynet@sgs.com
Antsiranana	Africa			administrateur@logpetro.com
Antsohihy	Africa	Me RAISSA	Regional representative	wardahraissa@yahoo.fr
AOMORI	Asia Pacific	na	Department of Land and Infrastructure Ports, Harbors and Airport Division, Aomori Prefectural Government	kowan@pref.aomori.lg.jp
APM bahrain	Middle East	Ahmed Zainal		Ahmed.Zainal@apmterminals.com
APM Barcelona	Europe	Araceli Muñoz		araceli.munoz@apmterminals.com
APM netherland	Europe	Marko Mihajic	senior press officer	external.communications@apmterminals.
APM Terminals India	South East Asia	Nurjaha Arora	General Manager Communications	Nurjaha.Arora@apmterminals.com
ATAMI	Asia Pacific	na	Atami Public Works Office	atado-youchikanri@pref.shizuoka.lg.jp
Bahamas Maritime Authority	America	Ms. Jade Evans	Manager	jadeevans@bahamas.gov.bs
Barbados Ministry of transport	America	sophia Grimes	Manager	Sophia.Grimes@internationaltransport.go

Appendix C: Contact List of Contributors

Barranquilla	South America	Mr. Isidro Ecthan Perez	Deputy Director	mdiaz@granportuaria.com.co
Barranquilla	South America	Mr. Juan Guillermo Ochoa	General Manager	fherrera@selltda.com
Barranquilla	South America	Ms. Yenis Ram-rez	General Manager	servicioalcliente@puertodebarranquilla.co
Belize International Merchant Marine Registry	America	Ms. Darlin Tatianna Gaitan	Manager	dgaitan@portauthority.bz
Belo sur Tsiribihina	Africa	Mr Roland RATOVONDRAHONA	Regional representative	rolandrtovondrahona@gmail.com
Benoa Port	South Asia	Nengah Nariasa	Divisi Personalia & Sistem Informasi	nariasan@yahoo.com
Benoa Port	South Asia			info@nusatrans.com
Benoa Port	South Asia			info@lintasdewatacargo.com
Benoa Port	South Asia			cs@dps.kic.co.id
Benoa Port	South Asia			info@baliintercontcargo.com
Beppu	Asia Pacific	na	Harbors Management Room	shimura-naoya@pref.oita.lg.jp
Buenaventura	South America	Mr. Carlos Mira	General Manager	asistentessac@sprbun.com
Buenaventura	South America	Mr. Domingo Segundo Chinea	General Manager	buenaventura@granportuaria.com
Buenaventura	South America	Mr. Hector Luis Carreto	Director	equimac@equimacsa.com
Buenaventura	South America	Mr. John Murcia	Â General Manager	dpardo@bgp-cl.com
Buenaventura	South America	Mr. Leonardo Grillo	Operations Manager	cadegranltda@codinet.net.co
Buenaventura	South America	Mr. Álvaro Rodriguez Acosta	President	arodriguez@oppgraneles.com
Buenaventura	South America	Mr. Manuel Rubiano Vargas	General Manager	mpisciotti@coremar.com
Buenaventura	South America	Ms. Mariana Montaño		mmontano@almacol.com
Buenaventura	South America	Ms. Pilar Rosas	General Manager	hbarrera@algranel.com.co
Calang Port	South Asia	Mr.Rawat Pangihutan Gultom,	Head of UPP Calang	kplclg@gmail.com
Cartagena	LatAm	Luis Fernando Hernandez Roman	Port and Terminals Management	luiferhernandez@hotmail.com
Cartagena	LatAm	Marcel Alvarez	Port and Marine Terminal Planning	marcel.alvarez@gmail.com
Cartagena	South America	Mr. Alfonso Salas Trujillo	General Manager	atencionalcliente@sprc.com.co
Cartagena	South America	Mr. Francisco Daza	Operations Manager	servicioalcliente@sipor.com.co
Cartagena / Barranquilla	South America	Ms. Lilian Lopez	Director	info@opercar.com
Celukan Bawang Port	South Asia	Made Rusli Suniajaya	General Manager	Made.suniajaya@pelindo.co.id
Cochin Port Authority Kerala	South East Asia	Dr. M.Beena	CEO	chairman@cochinport.gov.in
Cochin Port Authority Kerala	South East Asia	Shri. Malla Srinivasa Rao	F.A.& C.A.O.	fa@cochinport.gov.in
Cochin Port Authority Kerala	South East Asia	Shri. Vikas Narwal	deputy CEO	deputychairman@cochinport.gov.in
Cochin Port Authority Kerala	South East Asia	Shri.V.Thuraipandian	Chief Mechanical Engineer	cme@cochinport.gov.in
Cochin Port Authority Kerala	South East Asia	Smt. Rema.E	Chief Engineer	ce@cochinport.gov.in
COOK ISLAND PORTS AUTHORITY	oceania	amatai (Emi) Tereapii	Operations Supervisor	ports.aitutaki@cookislands.gov.ck
COOK ISLAND PORTS AUTHORITY	oceania	Okesene Moananu	CEO	okesene.moananu@cookislands.gov.ck
COOK ISLAND PORTS AUTHORITY	oceania	Willie Miria	Asset & Operations Manager	willie.miria@cookislands.gov.ck
Cuban Maritime Safety Directorate	America	Jorge Ariel Tejeda Gonzalez	Manager	tejeda.sm@mitrans.gob.cu
Dominica Maritime Administration Department	America	Harold Guiste	Manager	guisteh@dominica.gov.dm
DP Wolrd Turkey	Middle East	Kris Adams	CEO	Kris.Adams@dpwolrd.com
DP World Americas Region	North America	Brian Enright	CEO	brian.enright@dpworld.com
DP World Antwerpen	Europe		Manager	preplanningag.antw@dpworld.com
DP World Antwerpen	Europe		Manager	yardplanningag.antw@dpworld.com
DP World Antwerpen	Europe		Manager	bargeplanningag.antw@dpworld.com
DP world Asia Pacific & Australasia	oceania	Glen Hilton	CEO	glen.hilton@dpworld.com
DP World australia	oceania	travis brooks	Manager	travis.brooksgarrett@dpworld.com.au
DP World China	Asia	Benjamin Lai	CEO	Benjamin.Lai@dpworld.com
DP World Cochin India	South East Asia	catherine rajesh	deputy CEO	catherine.rajesh@dpworld.com
DP World Cochin India	South East Asia	Praveen Joseph	CEO	praveenthomas_jo@hotmail.com
DP World Cochin India	South East Asia	Praveen Joseph	CEO	praveen.joseph@dpworld.com
DP World Dubai	Middle East	adal mirza	Manager	adal.mirza@dpworld.com
DP World Dubai	Middle East	albert kraak	Manager	albert.kraak@dpworld.com
DP World Dubai	Middle East	amin fikree	Manager	Amin.Fikree@dpworld.com
DP World Dubai	MENA	Ayla Bajwa	Vice President Sustainabilit	ayla.bajwa@dpworld.com
DP World Dubai	MENA	Chris Genin	Director Asset Management	chrisgenin@yahoo.com
DP World Dubai	Middle East	diana baltaji	Manager	diana.baltaji@dpworld.com
DP World Dubai	Middle East	elvira crasto	Manager	elvira.crasto@dpworld.com
DP World Dubai	Middle East	hakam kherallah	Manager	hakam.kherallah@dpworld.com
DP World Dubai	MENA	Jimena rodriguez	Oceans and Biodiversity Manager Group Sustainability	Jimena.R@dpworld.com
DP World Dubai	Middle East	joost kruijning	Manager	joost.kruijning@dpworld.com
DP World Dubai	Middle East	kate willoughby	Manager	kate.willoughby@dpworld.com
DP World Dubai	Middle East	noel francis	Manager	noel.francis@dpworld.com
DP World Dubai	Middle East	redwan ahmed	Manager	Redwan.Ahmed@dpworld.com
DP World Dubai	MENA	Rhona Hunter PEng	VP Carbon Reduction and Environment	rhonapeng@gmail.com
DP World Dubai	Middle East	sarah lockie	Manager	sarah.lockie@dpworld.com
DP World Dubai	Middle East	tarek kiwan	Manager	tarek.kiwan@dpworld.com
DP World Dubai	MENA		decarbonization managers	Andy.Tam@dpworld.com
DP World Dubai	MENA		decarbonization managers	Piotr.Konopka@dpworld.com
DP World Dubai	Middle East		Manager	yardplanningag.antw@dpworld.com
DP World Dubai	Middle East		Manager	bargeplanningag.antw@dpworld.com
DP World Dubai	Middle East		Manager	preplanningag.antw@dpworld.com
DP World Dubai	Middle East		Manager	advbrg.ja@dpworld.com
DP World Europe and Russia	Europe	Rashid Abdulla	CEO	rashid.abdulla@dpworld.com
DP World India	South East Asia	Vikash Mohan	CEO	vikash_mohan@hotmail.com
DP World India	South East Asia	Vikash Mohan	CEO	vikash.mohan@dpworld.com
DP World India	South East Asia			sakinajunaid@gmail.com
DP World India	South East Asia			junaid.zamir@dpworld.com
DP World Jeddah and Country Head, KSA	Middle East	Mohammad Alshaikh	CEO	Mohammad.Alshaikh@dpworld.com
DP World Logistics UAE FZE	Middle East	Albert Kraak	CEO	Albert.Kraak@dpworld.com
DP World Middle East and Africa Region	Middle East	Suhail Albanna	CEO	Suhail.Albanna@dpworld.com
DP World Mozambique	Africa	Christian Roeder	CEO	christian.roeder@dpworld.com
DP World Mumbai	South East Asia	Ranjit Ray	CEO	Ranjit.Ray@dpworld.com
DP World Nhava Sheva	South East Asia	Prashant Hadawale	HSE manager	prasapu140506@yahoo.co.in
DP World Philippines	Asia-Pacific	William Khoury	CEO	William.Khoury@dpworld.com
DP World Thailand	South East Asia	Alpesh Sharma	CEO	Alpesh.Sharma@dpworld.com
DP World UK	Europe	Ernst Schulze	CEO	Ernst.Schulze@dpworld.com
DP World Vancouver	Canada	Claudia Dudzevich	Nanaimo Duke Point Expansion	claudia.dudzevich@dpworld.com
DP World Vancouver	Canada	Dalton Steele	COF	dalton.steele@dpworld.com
DP World Vancouver	Canada	Ian Rothera	Project Manager	Ian.rothera@dpworld.com
DP World Vancouver	Canada	Karime Chamma	CEP project	karime.chamma@dpworld.com
Everport Terminal Services, Los Angeles, CA	North America	Kurt Schroeder	Maintenance Manager	kschroeder@everport-terminals.com
FUSHIKI-TOYAMA	Asia Pacific	na	Ports & Harbors Division,Toyama Prefectural government	akowan@pref.toyama.lg.jp
Gibilterra port authority	Europe	na	CEO and Captain of the Port	ceo@port.gov.gi
Gibilterra port authority	Europe	na	Deputy Captain of the Port	mo@port.gov.gi
Gibilterra port authority	Europe	na	Senior Port Officer	spo@port.gov.gi
Gibilterra port authority	Europe	na	VTS Manager	vtsm@port.gov.gi
Gibilterra port authority	Europe	na	Duty Port Officer/VTS Supervisor	gpaops@port.gov.gi
Gibilterra port authority	Europe	na	Bunkering Superintendent	gibunksupt@port.gov.gi

Appendix C: Contact List of Contributors

Gibilterra port authority	Europe	na	Environmental Health and Safety Advisor	ehsa@port.gov.gi
Gilimanuk Port	South Asia	Heru Wahyono	Business Manager	heruwahyono@indonesiaferry.co.id
Gobernacion Maritima de Antofagasta	south america	Main office		antofagasta@directemar.cl
Gobernacion Maritima de Arica	south america	Main office		arica@directemar.cl
Gobernacion Maritima de Arica	south america	Main office		puertoarica@puertoarica.cl
Gobernacion Maritima de Aysen	south america	Main office		aysen@directemar.cl
Gobernacion Maritima de Caldera	south america	Main office		caldera@directemar.cl
Gobernacion Maritima de Castro	south america	Main office		castro@directemar.cl
Gobernacion Maritima de Coquimbo	south america	Main office		coquimbo@directemar.cl
Gobernacion Maritima de Iquique	south america	Main office		iquique@directemar.cl
Gobernacion Maritima de Puerto Montt	south america	Main office		puertomontt@directemar.cl
Gobernacion Maritima de Puerto Williams	south america	Main office		puertowilliams@directemar.cl
Gobernacion Maritima de San Antonio	south america	Main office		sanantonio@directemar.cl
Gobernacion Maritima de Talcahuano	south america	Main office		talcahuano@directemar.cl
Gobernacion Maritima de Valparaiso	south america	Main office		gmvalparaiso@directemar.cl
Grenada Ports Authority	America	Ian Evans	Manager	portmanager@spiceisle.com
Guyana Maritime Administration Department	America	Romain Seurattan	Manager	romain.seurattan@gmail.com
Haiti Service Maritime et de Navigation	America	Jean Getro Aime	Manager	gttrro@gmail.com
HAKODATE	Asia Pacific	na	Port & Airport Department	kouwan@city.hakodate.hokkaido.jp
HANNAN	Asia Pacific	na	Department of Port Promotion, Port and Harbor Bureau, Osaka Prefectural Government	kowankyoku@sbox.pref.osaka.lg.jp
HIMEJI	Asia Pacific	na	Port Division,Public Works Bureau,Public Works & Development Department	kouwanka@pref.hyogo.lg.jp
HIMEJI	Asia Pacific	na	Port of Himeji Management Office	himejikoukanri@pref.hyogo.lg.jp
HIRARA	Asia Pacific	na	Port and Harbor Division,City of Miyakojima	t.satoshi@city.miyakojima.lg.jp
HIROSHIMA	Asia Pacific	na	Port and Harbor Promotion Division,Hiroshima	dokouwan@pref.hiroshima.lg.jp
Ibaraki	Asia Pacific	na	Port Management Section,Port and Harbors Division Ibaraki Prefectural Government	kowan5@pref.ibaraki.lg.jp
IMABARI	Asia Pacific	na	Imabari City Port Administration Division	kouwanka@imabari-city.jp
IQUITOS	South America	Hugo Carrillo ChÃ¡vez	Gerente General	hcarrillo@sea.com.pe
IQUITOS	South America	Jimmy VÃ¡squez	Operaciones Oficial de Proteccion Titular	jvasquez@enapu.com.pe
IQUITOS	South America	Juan Antonio Ruiz Tello	Gerente General	operaciones@transjupiter.com
ISHIGAKI	Asia Pacific	na	ISHIGAKI Harbor & Port Division	satou@city.ishigaki.okinawa.jp
ISHINOMAKI	Asia Pacific	na	Ports and Harbors Development Division,Miyagi	kousin@pref.miyagi.jp
Jakarta Port of Tanjung Priok	Asia Pacific			priok@indonesiaport.co.id
Jakarta Port of Tanjung Priok	Asia Pacific			pely_plgn@indonesiaport.co.id
Jamaica Maritime Authority of Jamaica (MAJ)	America	vanessa stuart	Manager	vstewart@jamaicaships.com
Jebel Ali Dubai	MENA	Assane DIA	Regional Manager, Health, Safety & Environment Middle East and Africa Region	assane.dia@gmail.com
Jeddah	MENA	Asrar Hussain	Port operations	hussainasrar32@gmail.com
Jeddah	MENA	Moemen Said	head of operations	moemenmsaid@gmail.com
KAFUKA	Asia Pacific	na	Rebun town office	suisan@town.rebun.hokkaido.jp
KANAZAWA	Asia Pacific	na	Kanazawa Port Promoting Association	kport@angel.ocn.ne.jp
Karanja Port India	South East Asia	Pavan Bakshi		pavan@hunchventures.com
KARATSU	Asia Pacific	na	Ports & Harbors Division,Transport Policy	kouwan@pref.saga.lg.jp
KAWASAKI	Asia Pacific	na	Development&Promotion Section Port&Harbor Bureau City of Kawasaki	58yuuti@city.kawasaki.jp
KITAKYUSHU	Asia Pacific	na	General and Management Division,Seaport and Airport	kouwan-soumu@city.kitakyushu.lg.jp
KOBE	Asia Pacific	na	Promotion Division, Port Promotion Department, Port and Urban Projects Bureau	cruise_kobeport@office.city.kobe.lg.jp
KOCHI	Asia Pacific	na	Port Promotion Division,Kochi Prefectural Government	175201@ken.pref.kochi.lg.jp
koja port	Asia Pacific	Indra Sani	general manager	corsec@tpkkoja.co.id
KPPBC Type A (Customs) Tanjung Priok	Asia Pacific			bkli_kpubcpriok@customs.go.id
KPPBC Type A (Customs) Tanjung Priok	Asia Pacific			bcpriok@customs.go.id
KURE	Asia Pacific	na	Port Promotion Section,Kure Port	kowan@city.kure.lg.jp
KUSHIRO	Asia Pacific	na	Port and Airport Promotion Division,City of Kushiro	ko-kouwankuukou@city.kushiro.lg.jp
KUTSUGATA	Asia Pacific	na	Town Rishiri Office	suisan@town.rishiri.hokkaido.jp
Long Beach Container Terminal (port of Long Beach, CA).	North America	Andrea Connolly		Andrea.Connolly@TraPac.com
Long Beach Container Terminal (port of Long Beach, CA).	North America	Bonnie Nixon	Director of sustainability	bonnie.nixon@lbct.com
Long Beach Container Terminal (port of Long Beach, CA).	North America	kevin Schroeder		kschroeder@everport-terminals.com
Long Beach Container Terminal (port of Long Beach, CA).	North America	Mark Jensen		Mark.Jensen@trapac.com
Long Beach Container Terminal (port of Long Beach, CA).	North America	Matt Dickinson		mdickinson@fmslax.com
Long Beach Container Terminal (port of Long Beach, CA).	North America	Mike Takayama		mtakayama@yti.com
Long Beach Container Terminal (port of Long Beach, CA).	North America	Ryan Lansden		ryan.c.lansden@apmterminals.com
Maersk and APM terminals	Europe	Ard Morina		ard.morina@maersk.com
Maersk and APM terminals	Europe	Erez Agmoni		erez.agmoni@maersk.com
Maersk and APM terminals	Europe	Yujie Su		yujie.su@maersk.com
Mahajanga	Africa	Mr Decle TATAZANDRINY	Head of warf	Tatazandriny1988@gmail.com
Mahajanga	Africa	Mr Maurice TIANJARA	Regional Director	maurice@apmf.mg
Mahajanga	Africa			smoi.mar@wanadoo
Mahajanga	Africa			dir@comama.mg
Mahajanga	Africa			keanissos@moov.mg
Mahajanga	Africa			mg.compta.gasynet@sgs.com
Mahajanga	Africa			administrateur@logpetro.com
Mahajanga	Africa			vitogazmada@vitogaz.mg
Mahajanga	Africa			secr.somapeche@moov.mg
Mahajanga	Africa			ro.dg@moov.mg
Mahanoro	Africa	Isabelle RATSIMBA	Regional representative	ratsimbaisabelle@gmail.com
Makkah King Abdullah port	MENA	Roeland van Beers	CFO	info@vanbeers.com
Malahayati Port	South Asia	Mr. Drs. Abdul Aziz / Mr. Azwar	Head of Office	adpelmalahayati@yahoo.com
Mananjary	Africa	Arcadius WAI	Company owner	magasincentral@gmail.com
Mananjary	Africa	Me Sylvia RAZAFIJAONA	Regional director	razafijaona@gmail.com
Manila	South East Asia	Rodel Binuya	CFO	rodel.binuya@gmail.com
Maroantsetra	Africa	Mr Arnaud ANDRIAMIALY	Regional director	arnaudzafy@yahoo.fr
MATARANI	South America	Gabriel Monge Aguirre	General Manager	gmonge@tisur.com.pe

Appendix C: Contact List of Contributors

MATSUYAMA	Asia Pacific	na	Ehime Prefecture,Public Works Department,Harbor and shore	kouwankaigan@pref.ehime.jp
MATSUYAMA	Asia Pacific	na	The urban development,Division harbor airport	kuukou@city.matsuyama.ehime.jp
Miandrivazo	Africa	Mr Ernest RAHERISON	Company owner	laicriri@yahoo.fr
MIKAWA	Asia Pacific	na	Port Promotion Section,Mikawa Port and Harbor Management Office,Aichi Prefectual Government	mikawa-komu@pref.aichi.lg.jp
MIYAZAKI(Miyazaki)	Asia Pacific	na	Port Authority Division,Miyazaki Prefectural government	kowan@pref.miyazaki.lg.jp
Morondava	Africa	Mr Franclair BOTOU	Regional director	botoufranclair@yahoo.fr
Morondava	Africa			sdi.sopemo@moov.mg
MOTOBU	Asia Pacific	na	Okinawa Prefecture Government Port Division	aa062006@pref.okinawa.lg.jp
Mundra India _Adani port	South East Asia	Chirag Mehta	deputy COO	ctmehta1995@yahoo.com
Muroran	Asia Pacific	na	Port Promotion Section,Muroran Municipal Harbor Bureau	Port@city.muroran.lg.jp
NAGASAKI	Asia Pacific	na	Office,Prefectural Planning Head Office,Saga	s08040@pref.nagasaki.lg.jp
NAHA	Asia Pacific	na	Naha Port Authority Stratagy Development Office	kumiai@nahaport.jp
NAKAGUSUKU	Asia Pacific	na	Okinawa Prefecture Government Port Division	aa062006@pref.okinawa.lg.jp
National	South America	Mr. Mario Germ|n Rodriguez	Rear Admiral	dimar@dimar.mil.co
NEOM	MENA	Eder Eliel Munoa de la Cruz	Head of Container Terminal	eliel_27@hotmail.com
NEOM	MENA	Melissa Blake	Port Director	agamemnon31@yahoo.com
NEOM	MENA	Nezar Batan	Senior Project Manager	nezar.battan@gmail.com
New Port of Phnom Penh	Asia	Hun Sokhalay	head of planning	hun_lay@yahoo.com
NHAVA SHEVA FREEPORT TERMINAL	South East Asia	Kumar Gaurav	Procurement	krgaurav093@gmail.com
NIIGATA	Asia Pacific	na	Port Promotion Division,Bureau of Transportation policy	ngt170010@pref.niigata.lg.jp
NIIGATA	Asia Pacific	na	Port and Harbor Division	kowan@city.niigata.lg.jp
NIIHAMA	Asia Pacific	na	Niihama Port Authority	kouwan@city.niihama.ehime.jp
North sea port	Europe	Maarten den Dekker	Chief Sustainability Officer (CSO)	maartendendekker@hotmail.com
Nosy Be	Africa	Mr Jean Marc	Manager	samm.exp@moov.mg
Nosy Be	Africa	Mr Pascal RATOVONJANAHARY	Regional director	rapassy2000@yahoo.fr
Nosy Be	Africa	Mr Romuald	Finance director	samm.daf@moov.mg
Nosy Be	Africa			jledereve@gmail.com
NY Atlantic Container Line a Grimaldi Group Comp	North America	Corporate Compliance, Security and Sustainability NY		hypervyper2004@yahoo.com
OGI	Asia Pacific	na	Port Promotion Division,Bureau of Transportation policy	ngt170010@pref.niigata.lg.jp
OIGAWA	Asia Pacific	na	Oigawa Port Administration Office	oigawakou_kanri@city.yaizu.lg.jp
OMAEZAKI	Asia Pacific	na	Omaezaki Port Authority	omaezaki-kikaku@pref.shizuoka.lg.jp
OSAKA	Asia Pacific	na	Port Promotion Div.,Port & Harbor Bureau	cruiseport@city.osaka.lg.jp
OTARU	Asia Pacific	na	Port Office,Industry-Port and Harbor Department Otaru	kowan@city.otaru.lg.jp
OXAGON, Duba, Tabuk	MENA	Phil Eiszele	Director of Port Development	phil@eiszele.com.au
OXAGON, Duba, Tabuk	MENA	Rene Eland	Senior QA Manager Port Automation	r.eland80@upcmail.nl
Padang Bai Port	South Asia			info@bwsbali.com
Philipines port authority	Asia Pacific	ANGELINA A. LLOSE	Corporate Planning Department	aallose@ppa.com.ph
Philipines port authority	Asia Pacific	CARLITO M. CASTILLO	Port Construction & Maintenance Department	cmcastillo@ppa.com.ph
Philipines port authority	Asia Pacific	CORDELIA C. SIDON	Port Management Systems & Organizational Development Department	ccsidon@ppa.com.ph
Philipines port authority	Asia Pacific	ELMER NONNATUS A. CADANO	assistent to the GM	enacadano@ppa.com.ph
Philipines port authority	Asia Pacific	FRANCISQUIEL O. MANCILE	assistent to the GM	fomancile@ppa.com.ph
Philipines port authority	Asia Pacific	HIYASMIN H. DE LOS SANTOS	Port Operations & Services Department	mhhdelossantos@ppa.com.ph
Philipines port authority	Asia Pacific	JAMES J. GANTALAO	assistent to the GM	jjgantalao@ppa.com.ph
Philipines port authority	Asia Pacific	JAY DANIEL R. SANTIAGO	General Manager	pgm@ppa.com.ph
Philipines port authority	Asia Pacific	MARK JON S. PALOMAR	Commercial Services Department	mjspalomar@ppa.com.ph
Philipines port authority	Asia Pacific	REYNAND C. PARAFINA	Port Planning and Design Department	rcparafina@ppa.com.ph
Philipines port authority	Asia Pacific	RIGEL L. CAABAY	Legal Services Department	rlcaabay@ppa.com.ph
Philipines port authority	Asia Pacific	ROLANDO K. PEREZ	Dredging & Survey Department	rkperez@ppa.com.ph
Philipines port authority	Asia Pacific	VENICIUS V. VILLASEÑOR	Internal Audit Department	vvvillasenor@ppa.com.ph
Phnom Penh	Asia	Hei Bavy	port director	ppapmpwt@online.com.kh
PISCO	South America	Jorge Luis Arce Almenara	Gerente General	jorge.arce@tpparacas.com.pe
PMO Agusan	Asia Pacific	MILDRED J. PADILLA	Port Manager	mjpadilla@ppa.com.ph
PMO Bataan / Aurora	Asia Pacific	JON GABRIELL M. MANANSALA	Acting Port Manager	jgmmanansala@ppa.com.ph
PMO Batangas	Asia Pacific	JOSELITO O. SINOCRUZ	Port Manager	josinocruz@ppa.com.ph
PMO Bicol	Asia Pacific	MA. MAGNOLIA S. REQUEJO	Port Manager	mmsrequejo@ppa.com.ph
PMO Bohol	Asia Pacific	LORD TYRONE L. AGATON	Acting Port Manager	ltlagaton@ppa.com.ph
PMO Davao	Asia Pacific	ANALEE G. AGUILA	Port Manager	agaguila@ppa.com.ph
PMO Eastern Leyte / Samar	Asia Pacific	MANUEL A. BOHOLANO	Port Manager	mabopholano@ppa.com.ph
PMO Lanao Del Norte / Iligan	Asia Pacific	MEDARDO I. SOSOBRADO, JR.	Acting Port Manager	misosobrado@ppa.com.ph
PMO Marquez	Asia Pacific	ELIGIO P. FORTAJADA	Port Manager	epfortajada@ppa.com.ph
PMO Masbate	Asia Pacific	OLIVER S. RODULFO JR.	Acting Port Manager	osrodulfojr@ppa.com.ph
PMO Mindoro	Asia Pacific	ELVIS R. MEDALLA	Port Manager	ermedalla@ppa.com.ph
PMO Misamis Occidental / Ozamiz	Asia Pacific	SALVADOR L. DELINA	Port Manager	sldelina@ppa.com.ph
PMO Misamis Oriental / Cagayan De Oro	Asia Pacific	ISIDRO V. BUTASLAC, Jr.	Port Manager	ivbutaslacir@ppa.com.ph
PMO NCR North	Asia Pacific	AURORA A. MENDOZA	Acting Port Manager	aamendoza@ppa.com.ph
PMO NCR South	Asia Pacific	CATHERINE R. ESTO	Acting Port Manager	cresto@ppa.com.ph
PMO Negros Occidental / Bacolod / Banago Bredco	Asia Pacific	RODEL G. LAGMAY	Acting Port Manager	rglagmay@ppa.com.ph
PMO Negros Oriental / Siquijor	Asia Pacific	SARAH R. MIJARES	Port Manager	srmijares@ppa.com.ph
PMO Northern Luzon	Asia Pacific	MARIETA G. ODICTA	Port Manager	mgodicta@ppa.com.ph
PMO Palawan	Asia Pacific	ELIZALDE M. ULSON	Port Manager	emulson@ppa.com.ph
PMO Panay / Guimaras	Asia Pacific	ALLAN M. ROJO	Port Manager	amrojo@ppa.com.ph
PMO Socsargen	Asia Pacific	CESAR M. DATAYA	Port Manager	cmdataya@ppa.com.ph
PMO Surigao	Asia Pacific	FROILAN U. CATURLA	Acting Port Manager	fucaturla@ppa.com.ph
PMO Western Leyte / Biliran	Asia Pacific	BERNARD C. CALLEDO	Port Manager	bccalledo@ppa.com.ph
PMO Zamboanga	Asia Pacific	ARCIDI S. JUMAANI	Acting Manager	asjumaani@ppa.com.ph
PMO Zamboanga Del Norte	Asia Pacific	SUBANRIO I. LIM	Port Manager	silim@ppa.com.ph
Port Authority of Paradip	South East Asia	Shri Dharmendra Nath Sondhi	FA & CAO	facao@paradipport.gov.in
Port Authority of Paradip	South East Asia	Shri Himansu Sekhar Rout	Chief engineer	ce@paradipport.gov.in
Port Authority of Paradip	South East Asia	Shri Nilabhra Dasgupta	deputy ceo	dychm@paradipport.gov.in
Port Authority of Paradip	South East Asia	Shri P.L. HARANADH	CEO	chm@paradipport.gov.in
Port Authority of Paradip	South East Asia	Shri Saroj Kumar Das	Chief Mechanical Engineer	cme@paradipport.gov.in
Port Authority Visakhapatnam	South East Asia	A.VENUPRASAD	CHIEF ENGINEER	ce.avp.vpt@gov.in
Port Authority Visakhapatnam	South East Asia	CH BHASKARA RAO	executive engineer	ce.cbr.vpt@gov.in
Port Authority Visakhapatnam	South East Asia	CAPT.T.SRINIVAS	director general	dc.vpt@gov.in
Port Authority Visakhapatnam	South East Asia	CH SRINIVASA RAO	Suprintendent Engineer	ce.csr.vpt@gov.in

Appendix C: Contact List of Contributors

Port Authority Visakhapatnam	South East Asia	G. DEMUDU SUPDT. ENGINEER	Suprintendent Engineer	ce.gdu.vpt@gov.in
Port Authority Visakhapatnam	South East Asia	GVSS NARAYANA	Suprintendent Engineer	ce.gvssn.vpt@gov.in
Port Authority Visakhapatnam	South East Asia	N S R MURTY DY	CHIEF ENGINEER	ce.nsrm.vpt@gov.in
Port Autonome de Sihanoukville	Asia	Lou Kim Chhun	port director	pas@camintel.com
Port Klang	Asia Pacific	Capt. K. Subramaniam	General Manager	subra@pka.gov.my
Port Klang	Asia Pacific	Deevashini A/P Nallathamby	Admin. Officer	deevashini@pka.gov.my
Port Klang	Asia Pacific	Ean Yong Hian Wah	Chairman	onestopagency@pka.gov.my
Port Klang	Asia Pacific	Fazaratul Ain Bt. Zainal Abidin	PA AGM (Engineering)	fazaratul@pka.gov.my
Port Klang	Asia Pacific	Ir. Chong Chai Thiam	Senior Manager engineering	alvinchong@pka.gov.my
Port Klang	Asia Pacific	Izuan B. Natenan	Asst. Engineer (Mechanical)	izuan@pka.gov.my
Port Klang	Asia Pacific	Jaslizam B. Jamil	Asst. Engineer (Civil)	jaslizam@pka.gov.my
Port Klang	Asia Pacific	Kamaredzwan B. Kamaruzaman	Admin. Officer	kamaredzwan@pka.gov.my
Port Klang	Asia Pacific	Kamari B. Mohd Amir	Asist. Engineer (Mechanical)	kamari@pka.gov.my
Port Klang	Asia Pacific	Karnila Yuanti Bt. Marsom	Senior Admin Assist.	karnila@pka.gov.my
Port Klang	Asia Pacific	Koh Chian Cheat	Corporate Communications Department	ckkoh@pka.gov.my
Port Klang	Asia Pacific	Mardiana Bt. Umar	Senior Admin. Officer	mardiana@pka.gov.my
Port Klang	Asia Pacific	Mazlan B. Ismail	Senior Chargeman	mazlan@pka.gov.my
Port Klang	Asia Pacific	Mohamad Kushairi B. Abdul Jal	Asist. Engineer (Electrical)	kushairi@pka.gov.my
Port Klang	Asia Pacific	Mohamad Shafik B. Rosli	Asst. Engineer (Electrical)	m.shafik@pka.gov.my
Port Klang	Asia Pacific	Mohd Azim B. Mohd Yunos	Asst. Engineer (Civil)	mohdazim@pka.gov.my
Port Klang	Asia Pacific	Mohd Hafiz Zulhairi B. Muhamr	Senior Engineer (Civil)	m.hafiz@pka.gov.my
Port Klang	Asia Pacific	Mohd Ngisa B. Sulaiman	Senior Asst. Engineer (Civil)	mohdngisa@pka.gov.my
Port Klang	Asia Pacific	Muzafar B. Selamad	Senior Engineer (Electrical)	muzafar@pka.gov.my
Port Klang	Asia Pacific	Nor Azmi B. Mat Taipur	Asst. Engineer (Civil)	norazmi@pka.gov.my
Port Klang	Asia Pacific	Norsyazreen Binti Ahmad Yani	Customer Service Officer	norsyazreen@pka.gov.my
Port Klang	Asia Pacific	Nur Arlieyantie Bt. Md Saad	Admin Assist.	yantie@pka.gov.my
Port Klang	Asia Pacific	Nur Faizatul Ismah Bt. Rosli	Senior Admin Officer	ismah@pka.gov.my
Port Klang	Asia Pacific	Razman Faiz B. Noor Hashim	Asst. Engineer (Civil)	razman@pka.gov.my
Port Klang	Asia Pacific	Rohana Bt. Abdullah	Chargeman	rohana@pka.gov.my
Port Klang	Asia Pacific	Rosle B. Abidin	Senior Engineer (Civil)	rosle@pka.gov.my
Port Klang	Asia Pacific	Rozana Bt. Hashim	PA General Manager	rozana@pka.gov.my
Port Klang	Asia Pacific	Safina Bt. Ahmat	Senior Admin Assist.	safina@pka.gov.my
Port Klang	Asia Pacific	Sameh B. Shamsuddin	Assist. Admin Officer	sameh@pka.gov.my
Port Klang	Asia Pacific	Shaiful Nazri B. Shaari	AGM (Engineering)	shaifulnazri@pka.gov.my
Port Klang	Asia Pacific	Shakirah Binti Md Nasir	Customer Service Officer	shakirah@pka.gov.my
Port Klang	Asia Pacific	Shamila A/P Subramaniam	Admin Assist.	shamila@pka.gov.my
Port Klang	Asia Pacific	Shanti T. Gunaratnam	Senior Manager Planning & development	shanti@pka.gov.my
Port Klang	Asia Pacific	Suhairi B. Nordin	Senior Manager engineering	suhairi@pka.gov.my
Port Klang	Asia Pacific	Thilagavili a/p Mariappan	Customer Service Officer	thila@pka.gov.my
Port Klang	Asia Pacific	Ts. Muhamad Kamarul Azman B	Senior Engineer (Mechanical)	mkamarul@pka.gov.my
Port Klang	Asia Pacific	Ts. Thiwagar A/L Muniandy	Admin Officer	thiwagar@pka.gov.my
Port Klang	Asia Pacific	Zakiah Bt. Husin	Senior Admin Assist.	zakiah@pka.gov.my
Port Klang	Asia Pacific	Zulaini B. Rohani	Senior Admin Officer	zulaini@pka.gov.my
Port Management Association of the Caribbean	America	Glenn Roach	executive secretary of the CEO	secretary@pmac-ports.com
port od Samui	Asia Pacific			marine@md.go.th
Port of Amsterdam	Europe	Allard Klinkers	Team Lead & Commercial Manager Offshore & Logistics	allardklinkers@gmail.com
Port of Amsterdam	Europe	Dorine Bosman	CIO Chief Investment officer	bosmandorine@gmail.com
Port of Amsterdam	Europe	Emmanuel Polman	Team Lead Strategic Developments & Transactions	epolman@fastmail.net
Port of Amsterdam	Europe	Jair de Paauw	Commercial manager	jairdepaauw@hotmail.com
Port of Antwerp	Europe	Annick De Ridder	Voorzitter raad van bestuur	annick.deridder@vlaamsparlement.be
Port of Antwerp	Europe	Anton Geers	sustainability manager	ageers@telenet.be
Port of Antwerp	Europe	Geert Schrooten	Head Development Port Area	geertschrooten@hotmail.com
Port of Antwerp	Europe	Rob Smeets	COO	robsmeets69@gmail.com
Port of Antwerpen Bruges	Europe	Arne Strybos	PROGRAM MANAGER FUEL TRANSITION	arne.strybos@portofantwerpbruges.com
Port of Antwerpen Bruges	Europe	Didier Van Osselaer	SUSTAINABLE TRANSITION MANAGER	didier.vanosselaer@portofantwerpbruges.c
Port of Antwerpen Bruges	Europe	hanne talboom	project manager	hanne.talboom@portofantwerpbruges.co
Port of Antwerpen Bruges	Europe	Jan de Meyer	PROJECT MANAGER PORT PROJECTS	jan.demeyer@portofantwerpbruges.com
Port of Antwerpen Bruges	Europe	Jelle Dierckx	MANAGER PRODUCT DEVELOPMENT & PROJECTS	Jelle.Dierckx@portofantwerpbruges.com
Port of Antwerpen Bruges	Europe	Marleen Ramakers	SUSTAINABLE TRANSITION EXPERT	marleen.ramakers@portofantwerpbruges.c
Port of Antwerpen Bruges	Europe	Maxime Peeters	PROGRAM MANAGER HYDROGEN	maxime.peeters@portofantwerpbruges.co
Port of Antwerpen Bruges	Europe	Peggy Torfs	PORT AUTHORITY FIELD MANAGER	peggy.torfs@portofantwerpbruges.com
Port of Antwerpen Bruges	Europe	Philip Huybrechts	project manager	philip.huybrechts@portofantwerpbruges.c
Port of Antwerpen Bruges	Europe	Pieter Vandermeeren	COORDINATOR MASTERPLANNING GREEN PORTS	pieter.vandermeeren@portofantwerpbrug
Port of Antwerpen Bruges	Europe	Rob Smeets	COO	rob.smeets@portofantwerpbruges.com
Port of Antwerpen Bruges	Europe	Tomas Thiels	SHORE POWER FOR SEA SHIPPING	Tomas.Thiels@portofantwerpbruges.com
Port of Antwerpen Bruges	Europe	Vincent Thijs	corporate comunication manager	Vincent.Thijs@portofantwerpbruges.com
Port of Assan	Asia	Aylin UYUMAZ - Hazal Ã–ZOGLU	Port TRADE	hazal.ozoglu@assanport.com
Port of Assan	Asia	Gamze AKKILIÃ‡	Port DISCHARGE PROCEDURES / DOCUMENTATION	gamze.akkilic@assanport.com
Port of Assan	Asia	khan Kartal	Customs Contact	gokhan@ozturkgumrukleme.com
Port of Assan	Asia	Sanayi gesi	PORT OPERATOR	info@assanport.com
Port of Barbados	America	Delton Jones	deputy CEO	secretary@pmac-ports.com
Port of Barcelona	Europe	Emma Cobos	Director business strategy	emma.cobos@portdebarcelona.cat
Port of Barcelona	Europe	Lluis Salvado	President	llsalvado@gmail.com
Port of Brisbane	oceania	Rich Farmer	Engineering manager	richard.a.farmer@hotmail.com
Port of Charleston	North America	Barbara Melvin	President & CEO	bmelvin@scspa.com
Port of Chennai	South East Asia	SHRI. S. VEDHAGIRI	SENIOR MARINE ENGINEER	s.vedhagiri64.chpt@gov.in
Port of Chennai	South East Asia	Shri. S.Viswanathan	deputy ceo	dycpt@chennaiport.gov.in
Port of Chennai	South East Asia	Shri. Sunil Paliwal	CEO	chairman@chptmail.chennaiport.gov.in
Port of Chennai	South East Asia	Shri. Sunil Paliwal	CEO	chairman@chennaiport.gov.in
Port of Chennai	South East Asia	Shri.A. Jayasimha	CME chief mechanica engineer	ce@chennaiport.gov.in
Port of Chennai	South East Asia	Sugantheswari Priyadarshini	deputy CME	suganthi.kanthasamy@gmail.com
Port of Colombo Srilanka port Authority	South East Asia	A. B. M.Aswer	Chief Operations Manager	abmaswer@slpa.lk
Port of Colombo Srilanka port Authority	South East Asia	Dr. Ajith Mendis	director	drajithmendis@gmail.com
Port of Colombo Srilanka port Authority	South East Asia	G.U.K. Algewattege	vice CEO	vc@slpa.lk
Port of Colombo Srilanka port Authority	South East Asia	H. M. Prabath Jayantha	managing director	md@slpa.lk
Port of Colombo Srilanka port Authority	South East Asia	J. A. Chandrarathne	Director technical	chandra@slpa.lk
Port of Colombo Srilanka port Authority	South East Asia	Keith D. Bernard	CEO	chairman@slpa.lk
Port of Colombo Srilanka port Authority	South East Asia	L P S Chandana	Chief Operation Manager	lpschandana@slpa.lk
Port of Colombo Srilanka port Authority	South East Asia	M. V. S. Fernando	Chief Engineer - Mechanical Plan	vimalmvsf@slpa.lk
Port of Colombo Srilanka port Authority	South East Asia	Mr. J.R.U. De Silva	director	rohandesilva@mclarens.lk
Port of Colombo Srilanka port Authority	South East Asia	Mrs. N.A.A.P.S. Nissanka	director	nissankaapsara@gmail.com
Port of Colombo Srilanka port Authority	South East Asia	Mrs. Shehara Y. Nawaratne	secretary of the board	boardroom@slpa.lk
Port of Colombo Srilanka port Authority	South East Asia	P. A. S. Athula Kumara	director	dgpe@ped.treasury.gov.lk
Port of Colombo Srilanka port Authority	South East Asia	P. B. S. C. Nonis	director	dgc@customs.gov.lk

Appendix C: Contact List of Contributors

Port of Connecticut	North America	Andrew Lavigne	Manager Special Projects	alavigne@ctportauthority.com
Port of Connecticut	North America	B. Hammond	Manager Special Projects	uhammond@ctportauthority.com
Port Of Duqm Company SAOC	MENA	Anwar Al Balushi	Senior Commercial Manager	anwar.albalushi@portduqm.com
Port of Felixstowe	Europe	Robert Ashton	COO	ashtonr@londonthamesport.co.uk
Port of Fujairah	Middle east	na	COO	Ops_pof@fujairahport.ae
Port of Fujairah	Middle east	na	CEO	Gms_pof@fujairahport.ae
Port of Hamburg	Europe	Dorita Hermes	CSO, Head of Strategy	dorita.hermes@hpa.hamburg.de
Port of Helsinky	Europe	Andreas Slotte	Head of Sustainable Development	andreas.slotte@portofhelsinki.fi
Port of Helsinky	Europe	Anton Aira	Environmental Specialist	anton.aira@portofhelsinki.fi
Port of Houston	North America	Ada Hernandez	Executive Assistant for Government & Public Relations	ahernandez@porthouston.com
Port of Houston	North America	Ahmed Murtaba	ERM Program Manager	amurtaba@porthouston.com
Port of Houston	North America	Alberto Foster	Contract Manager	afoster@porthouston.com
Port of Houston	North America	Andrew Farmer	Deputy Chief-Administrative Support	afarmer@porthouston.gov
Port of Houston	North America	Anthony Flenoy	Facility Security Manager BCT	aflenoy@porthouston.com
Port of Houston	North America	Anthony Kinchen	Deputy Chief-Patrol	akinchen@porthouston.com
Port of Houston	North America	Ashley Cheatham	Director, Diversity & Inclusion	acheatham@porthouston.com
Port of Houston	North America	Ben Licata	Manager, Real Estate Asset	blicata@porthouston.com
Port of Houston	North America	Bianca Gutierrez	Contract Administrator	bgutierrez@porthouston.com
Port of Houston	North America	Brandon Davis	Manager, Business Equity	bdavis@porthouston.com
Port of Houston	North America	Brenda Ruiz	Manager, Supplier Diversity	bruiz@porthouston.com
Port of Houston	North America	Bruce Mann	Director, Freight Mobility	bmann@porthouston.com
Port of Houston	North America	Bryan Seitz	General Manager, Container Terminal Operations	bseitz@porthouston.com
Port of Houston	North America	Cam Spencer	Director, Government Relations	cspencer@porthouston.com
Port of Houston	North America	Candice Armenoff	Execution Planning Manager	carmenoff@porthouston.com
Port of Houston	North America	Carrie Garza	Marine Operations Manager, Bayport	cgarza@porthouston.com
Port of Houston	North America	Chaney Singh	Operations Manager, Multipurpose Facilities	ssingh@porthouston.com
Port of Houston	North America	Charles Thompson	Chief Information Officer	cthompson@porthouston.com
Port of Houston	North America	Charlie Jenkins	Chief Channel Infrastructure Officer	cjenkins@porthouston.com
Port of Houston	North America	Cheryl D. Creuzot	Commissioner	ccreuzot@porthouston.com
Port of Houston	North America	Chris Conti	Manager, Multipurpose Facilities	cconti@porthouston.com
Port of Houston	North America	Chris Kalwick	Gate Manager, Barbours Cut	ckalwick@porthouston.com
Port of Houston	North America	Chris Virk-Brown	Digital Marketing Specialist	marketing@porthouston.com
Port of Houston	North America	Christine Abbruscato	Director, Marketing, Branding and External Communications	marketing@porthouston.com
Port of Houston	North America	Clyde Fitzgerald	Commissioner	cfitzgerald@porthouston.com
Port of Houston	North America	Colin Rizzo	Director, Emergency Management	crizzo@porthouston.gov
Port of Houston	North America	Curtis Duncan	Controller	cduncan@porthouston.com
Port of Houston	North America	David Hill	Facility Security Manager BPT	dhill@porthouston.com
Port of Houston	North America	Dean E. Corgey	Commissioner	dcorgey@porthouston.com
Port of Houston	North America	Diana Sechler	Manager, Real Estate Asset	dsechler@porthouston.com
Port of Houston	North America	Dolores Villarreal	Public Information Manager	dvillarreal@porthouston.com
Port of Houston	North America	Dominic Sun	Director, Trade Development	dsun@porthouston.com
Port of Houston	North America	Easton McIntosh	Gate Manager, Bayport	emcintosh@porthouston.com
Port of Houston	North America	Eddy Kharrazi	Program Manager, Asset Management	ekharrazi@porthouston.com
Port of Houston	North America	Eduardo Mejia	Business Equity Compliance Analyst II	emejia@porthouston.com
Port of Houston	North America	Emergency Operations Center Contact		oem@porthouston.com
Port of Houston	North America	Eric Barron	Director, Strategic Asset Management	ebarron@porthouston.com
Port of Houston	North America	Erica Godfrey	Senior Executive Assistant	egodfrey@porthouston.com
Port of Houston	North America	Erik Eriksson	Chief Legal Officer	eeriksson@porthouston.com
Port of Houston	North America	Evan Mays	Terminal Manager, Bayport	emays@porthouston.com
Port of Houston	North America	Fatima De Leon	Manager, Marketing, Branding and External Communications	marketing@porthouston.com
Port of Houston	North America	Garret Berg	Manager, Community Relations	gberg@porthouston.com
Port of Houston	North America	Garry McMahan	Director, Channel Development Operations	gmcmahan@porthouston.com
Port of Houston	North America	Ilana Harris	Environmental Compliance Coordinator	iharris@porthouston.com
Port of Houston	North America	Inga Berryman	Executive Assistant for Information Technology	iberryman@porthouston.com
Port of Houston	North America	Jacqueline Young-Hall	Manager, Maritime Education Outreach	maritimeed@porthouston.com
Port of Houston	North America	James Christy	Manager, Procurement	jchristy@porthouston.com
Port of Houston	North America	Jarka Vochyan	Real Estate Porfolio Administrator	jvochyan@porthouston.com
Port of Houston	North America	Jeff Davis	Chief Port Operations Officer	jdavis@porthouston.com
Port of Houston	North America	Jennifer Aksoy	Customer Service Manager	jaksoy@porthouston.com
Port of Houston	North America	Jessica Shaver	Chief People Officer	jshaver@porthouston.com
Port of Houston	North America	Jessica Thomas	Security Director	jthomas@porthouston.gov
Port of Houston	North America	Jim Vo	Manager, Real Estate Asset	jvo@porthouston.com
Port of Houston	North America	John Moseley	Chief Commercial Officer	jmoseley@porthouston.com
Port of Houston	North America	Julio Abril	Terminal Manager, Barbours Cut	jabril@porthouston.com
Port of Houston	North America	Kasey Bryant	Safety Manager BPT	kbryant@porthouston.com
Port of Houston	North America	Kelli Gallagher	Envrionmental Compliance Coordinator	kgallagher@porthouston.com
Port of Houston	North America	Kelli Green	Senior Executive Assistant	kgreen@porthouston.com
Port of Houston	North America	Kelly Day	Senior Executive Assistant	kday@porthouston.com
Port of Houston	North America	Ken Gathright	Envrionmental Compliance Coordinator	kgathright@porthouston.com
Port of Houston	North America	Kerrick Henny	Chief Government and Public Relations Officer	khenny@porthouston.com
Port of Houston	North America	Leia Wilson	HSC Operations Manager	lwilson@porthouston.com
Port of Houston	North America	Leticia Garza	Administrative Specialist, M/V Sam Houston	lgarza@porthouston.com
Port of Houston	North America	Liana Christian	Executive Assistant for Legal	lchristian@porthouston.com
Port of Houston	North America	Lisa Ashley	Director, Media Relations	lashley@porthouston.com
Port of Houston	North America	Lori Brownell	Director, Channel Improvement	lbrownell@porthouston.com
Port of Houston	North America	Main Office		questions@porthouston.com
Port of Houston	North America	Marcus Woodring	Chief PSEO Officer	mwoodring@porthouston.com
Port of Houston	North America	Maria Aguirre	Director, Community Relations	maguirre@porthouston.com
Port of Houston	North America	Mark Smith	Chief of Police	msmith@porthouston.com
Port of Houston	North America	Matt Chapman	Safety Manager TBT	mchapman@porthouston.com
Port of Houston	North America	Matt Soloman	Trade Rep (Asia/Oceania)	matthew.soloman@benline.com.my
Port of Houston	North America	Maxine N. Buckles	Chief Business Equity Officer	mbuckles@porthouston.com
Port of Houston	North America	Melinda Solorio	Executive Assistant for People	msolorio@porthouston.com
Port of Houston	North America	NA	Barbours Cut Terminal Operations	bctoperations@porthouston.com
Port of Houston	North America	NA	Barbours Cut Terminal Yard Services	bctyardservices@porthouston.com
Port of Houston	North America	NA	Bayport Terminal Operations	bayoperations@porthouston.com
Port of Houston	North America	NA	Bayport Terminal Yard Services	bayportyardservices@porthouston.com
Port of Houston	North America	Natasha Buckner	Business Equity Training Coordinator	nbuckner@porthouston.com
Port of Houston	North America	Nicole Jones	Business Equity Compliance Analyst I	nnjones@porthouston.com
Port of Houston	North America	Norma Essary	Director, Risk and Safety Management	nessary@porthouston.com
Port of Houston	North America	Pedro Garcia	Outreach Manager, Business Equity	pgarcia@porthouston.com

Appendix C: Contact List of Contributors

Port of Houston	North America	Port Commission		portcommission@porthouston.com
Port of Houston	North America	Randy Stiefel	Director, Multipurpose Facilities	rstiefel@porthouston.com
Port of Houston	North America	Ric Campo	Chairman	rcampo@porthouston.com
Port of Houston	North America	Rich Byrnes	Chief Port Infrastructure Officer	rbyrnes@porthouston.com
Port of Houston	North America	Richard Ruchhoeft	Project Manager, Channel Development	rruchhoeft@porthouston.com
Port of Houston	North America	Rina Lawrence	Manager, Economic Development	rlawrence@porthouston.com
Port of Houston	North America	Roger Guenther	Executive Director	rguenther@porthouston.com
Port of Houston	North America	Roger Hoh	Director, Project and Construction Management	rhoh@porthouston.com
Port of Houston	North America	Rohit Saxena	Director, Facility Planning	rsaxena@porthouston.com
Port of Houston	North America	Roland Gonzalez	Director, Treasury	rgonzalez@porthouston.com
Port of Houston	North America	Roxanne Muniz	Environmental Planning Analyst	rmuniz@porthouston.com
Port of Houston	North America	Roy D. Mease	Commissioner	rmease@porthouston.com
Port of Houston	North America	Ryan Mariacher	Director, Container Terminals	rmariacher@porthouston.com
Port of Houston	North America	Sergio Ojeda Ossa	Trade Rep (Central/South America)	sergiofr8@gmail.com
Port of Houston	North America	Shannon Williams	Chief Audit Executive	swilliams@porthouston.com
Port of Houston	North America	Sommer Freeman	Contract Administrator	sfreeman@porthouston.com
Port of Houston	North America	Stephanie Reyes	Executive Assistant-Multipurpose Facility Operations	sreyes@porthouston.com
Port of Houston	North America	Stephen H. DonCarlos	Commissioner	sdoncarlos@porthouston.com
Port of Houston	North America	Sydney Davis	Marketing Communications Specialist	smdavis@porthouston.com
Port of Houston	North America	Tanika Chukwumerije	Manager, Contracts	tchukwumerije@porthouston.com
Port of Houston	North America	Tim Finley	Chief Financial Officer	tfinley@porthouston.com
Port of Houston	North America	Tom Heidt	Chief Operations Officer	heidt@porthouston.com
Port of Houston	North America	Trae Camble	Director, Environmental Affairs	tcamble@porthouston.com
Port of Houston	North America	Ty Fisher	Marine Operations Manager, Barbours Cut	tfisher@porthouston.com
Port of Houston	North America	Wendolynn "Wendy" Montoya	Commissioner	wcloonan@porthouston.com
Port of Houston	North America	Yvette Camel-Smith	Director, Procurement Services	ysmith@porthouston.com
Port of Hueneme	North America	Christina Birdsey	COO	cbirdsey@me.com
PORT OF JNPA	South East Asia	CMDE JILET KOSHY	NAVAL OFFICER-IN-CHARGE(MAH), INDIAN NAVY	Noicmh-navy@nic.in
PORT OF JNPA	South East Asia	SHRI BHUSHAN KUMAR	JOINT SECRETARY MINISTRY OF PORTS, SHIPPING AND WATERWAYS, MINISTRY OF SHIPPING, GOVT. OF INDIA	bhushan.k@nic.in
PORT OF JNPA	South East Asia	SHRI RAJESH PANDEY	CHIEF COMMISSIONER OF CUSTOMS, MUMBAI	Chiefcom@jawaharcustoms.gov.in
PORT OF JNPA	South East Asia	SHRI UNMESH SHARAD WAGH,	deputy chairman	dychairman@jnport.gov.in
PORT OF JNPA	South East Asia	SHRI. M. P. CHIMOTE	DY. GENERAL MANAGER (M&P)	milindchimote@jnport.gov.in
PORT OF JNPA	South East Asia	SHRI. NG AKODE	DY. GENERAL MANAGER (MAIN CONTAINER BERTH)	nageshakode@jnport.gov.in
PORT OF JNPA	South East Asia	SHRI. NITEEN M. BORWANKAR	CHIEF GENERAL MANAGER (MECHL. & ELECL.) & CEO-SEZ	cme@jnport.gov.in
PORT OF JNPA	South East Asia	SHRI. PRANESH CHANDRA ROY	DY. GENERAL MANAGER (MARINE ENGG.)	pranesh@jnport.gov.in
PORT OF JNPA	South East Asia	SHRI. SANJAY SETHI, IAS	chairman	chairman@jnport.gov.in
PORT OF JNPA	South East Asia	SHRI. VS BABARAM	DY. GENERAL MANAGER (LIQUID BERTH & SWB I&II)	vsbabaram@jnport.gov.in
Port of Kamarajar	South East Asia	Capt C Umashankar	DGM (Marine Services)	cushankar@kplmail.in
Port of Kamarajar	South East Asia	Capt G.M. Balan	General Manager(Marine Services)	balan@kplmail.in
Port of Kamarajar	South East Asia	Dr. V.G. Sravan Kumar	Health Safety Environment (HSE)	sravan@kplmail.in
Port of Kamarajar	South East Asia	Ms.Kavita Satvi	General Manager (Finance) & CFO	gm-fin@kplmail.in
Port of Kamarajar	South East Asia	Shri A. Karuppiah	Chief Manager	karuppiah@kplmail.in
Port of Kamarajar	South East Asia	Shri C S Vemanna	Dy. General Manager (Finance) & CFO	vemanna@kplmail.in
Port of Kamarajar	South East Asia	Shri G. Thiyagarajan	Senior Manager	thiyagu@kplmail.in
Port of Kamarajar	South East Asia	Shri K. Kannan	Chief Manager(HSE)	kkannan@kplmail.in
Port of Kamarajar	South East Asia	Shri M. Vijayan	Manager	vijayan@kplmail.in
Port of Kamarajar	South East Asia	Shri N Senthil	Chief Manager	senthil@kplmail.in
Port of Kamarajar	South East Asia	Shri P. Baskaran	Chief Manager (Projects)	baskaran@kplmail.in
Port of Kamarajar	South East Asia	Shri P. Om Pragesh	Senior Executive Secretary	estocmd@kplmail.in
Port of Kamarajar	South East Asia	Shri P. Radhakrishnan	Deputy General Manager (Civil)	radha@kplmail.in
Port of Kamarajar	South East Asia	Shri P. Sundaramoorthy	Manager	moorthy@kplmail.in
Port of Kamarajar	South East Asia	Shri Sunil Paliwal, IAS	Chairman and Managing Director	chairman@kplmail.in
Port of Kamarajar	South East Asia	Shri Yatin Kishorbhai Patel	General Manager (CS&BD)	gm-csbd@kplmail.in
Port of Kamarajar	South East Asia	Smt S. Priya	Manager	priya@kplmail.in
Port of Kolkata	South East Asia	Abhijit Ghosh	general manager marine	a.ghosh@kolkataporttrust.gov.in
Port of Kolkata	South East Asia	Abhijit Ghosh	general manager marine	gm-marine.hdc@kolkataporttrust.gov.in
Port of Kolkata	South East Asia	aganesh	dock complex manager	aganeshan.hdc@kolkataporttrust.gov.in
Port of Kolkata	South East Asia	Capt. Abhijit Ghosh	Director Marine Department	dmd@kolkataporttrust.gov.in
Port of Kolkata	South East Asia	Shri A. K. Mahapatra	dock complex manager	a.ghosh@kolkataporttrust.gov.in
Port of Kolkata	South East Asia	Shri A. K. Mahapatra	dock complex manager	gm-marine.hdc@kolkataporttrust.gov.in
Port of Kolkata	South East Asia	Shri A.K.Mehra		dc.hdc@kolkataporttrust.gov.in
Port of Kolkata	South East Asia	Shri Amit Kumar Kar	chief mechanical engineer	cme@kolkataporttrust.gov.in
Port of Kolkata	South East Asia	Shri Gautam Mandal	chief engineer	ce@kolkataporttrust.gov.in
Port of Kolkata	South East Asia	Shri Kaushik Chatterjee	planning and research	jt.dir.pr@kolkataporttrust.gov.in
Port of Kolkata	South East Asia	Shri Rathendra Raman	chairman	chairman@kolkataporttrust.gov.in
Port of Kolkata	South East Asia	Shri S.K.Chakraborty	senior deputy manager	sanjayc.hdc@kolkataporttrust.gov.in
Port of Kolkata	South East Asia	Shri Samrat Rahi	deputy chairman	dy.chairman.kds@kolkataporttrust.gov.in
Port of Kolkata	South East Asia	Shri Suman Mukhopadhyay	Chief Hydraulic Engineer (I/C)	che@kolkataporttrust.gov.in
Port of Kuantan	Asia Pacific	Vino Kumar	Chairman	info.kuantanport@iim.com
Port of Labuan	Asia Pacific	Mohd Alias Haji Abd. Rahman	managing director	labuanport@llpm.com.my
Port of Long Beach	North America	Mario Cordero	CEO	
Port of Los Angeles	North America	Mike Galvin	Commercial & Industrial RE	
Port of Lumut	Asia Pacific	Dato Moubarak	CEO	general@lumutport.com
Port of Makassar	South Asia	Fanny Herling, SE	Operational Manager Assistant	fanny.manado@yahoo.co.id
Port of Makassar	South Asia	Henry	Operation Manager	ricogue.pi4@gmail.com
Port of Makassar	South Asia	Muh. Manyur Sangkala	Information System Manager	muhammadmansyur@inaport4.co.id
Port of Malbourne Tasmania	oceania	Marion Kloos	Head business development	marion.kloos@portofmelbourne.com
Port of Malbourne New South Wales	oceania	Leatrice Treharne	Head business development	leatrice.treharne@portofmelbourne.com
Port of Malbourne Western Victoria/South Austra	oceania	Tina Dreher	Head business development	tina.dreher@portofmelbourne.com
Port of Melbourne - Port of Hastings Corporation	oceania	Jade Brain	Environment & Sustainability Manager	jadeoybrain@gmail.com
Port of Montreal	North America	Martin Imbleau	President	martin.imbleau@outlook.com
Port of Nanaimo	Canada	Arlene Rolston	Corporate secretary of the CEO	arolston@npa.ca
Port of Nanaimo	Canada	Douglas Wood	Manager of Health, Safety & Environment	dwood@npa.ca
Port of Nanaimo	Canada	Emil Tomescu	VP, Asset Management	etomescu@npa.ca
Port of Nanaimo	Canada	Ian Marr	President and CEO	imarr@npa.ca
Port of Nanaimo	Canada	Mike Davidson	COO	mdavidson@npa.ca
Port of Nanaimo	Canada	Satinder Singh	VP, Operations and Harbour Master	ssingh@npa.ca
Port of Nigeria	africa	ANAS KAWU SULEIMAN	GENERAL MANAGER, PROCUREMENT	ak.suleiman@nigerianports.gov.ng

Appendix C: Contact List of Contributors

Port of Nigeria	africa	CAPTAIN JEROME, BITRUS ANGY	GENERAL MANAGER, MARINE & OPERATIONS	j.angyunwe@nigerianports.gov.ng
Port of Nigeria	africa	EDOSOMWAN, A. ANTHONY	GENERAL MANAGER, ICT	a.edosomwan@nigerianports.gov.ng
Port of Nigeria	africa	ENGR. AJIBOLA S. OLAGOKE	GENERAL MANAGER, SUPERANNUATION	s.ajibola@nigerianports.gov.ng
Port of Nigeria	africa	ENGR. SHAFARU ABEEB ADEWA	GENERAL MANAGER, LAND & ASSET ADMINISTRATION	a.shafaru@nigerianports.gov.ng
Port of Nigeria	africa	ENGR. YUNUSA IBRAHIM ANJI	GENERAL MANAGER, ENGINEERING	ya.ibrahim@nigerianports.gov.ng
Port of Nigeria	africa	FAWOLE ADELEKE STEPHEN	GENERAL MANAGER, FINANCE	a.fawole@nigerianports.gov.ng
Port of Nigeria	africa	IYAWE SEYI AKINYEMI	GENERAL MANAGER, MONITORING & REGULATORY SERVICES	s.iyawe@nigerianports.gov.ng
Port of Nigeria	africa	KHALIL, Mr. MOHAMMED JAMI	GENERAL MANAGER, SECURITY	jk.mohammed@nigerianports.gov.ng
Port of Nigeria	africa	MADUBUIKE, Mrs. UGO ESTHER	GENERAL MANAGER, PUBLIC PRIVATE PARTNERSHIP	u.madubuike@nigerianports.gov.ng
Port of Nigeria	africa	SHEHU MUSA YARO	GENERAL MANAGER, SERVICOM	m.yaro@nigerianports.gov.ng
Port of Nigeria	africa	UMAR, Mr. GAMBORO INNOCE	GENERAL MANAGER, CORPORATE & STRATEGIC PLANNING	ag.umar@nigerianports.gov.ng
Port of Nola, New Orleans	North America	Amanda Coates	Head of Business Development	amanda.coates@portnola.com
Port of Nola, New Orleans	North America	Ann HanksCruise Manager	Cruise Manager	ann.hanks@portnola.com
Port of Nola, New Orleans	North America	Laura Mellem	Chief of Staff	laura.mellem@portnola.com
Port of Nola, New Orleans	North America	Tony Evett	Chief Engineer and Vice President of Engineering and Facilities	anthony.evett@portnola.com
Port of Oslo	Europe	Jens Eirik Hagen	Head of Energy Transition	jens.eirik.hagen@oslohavn.no
Port of Oslo	Europe	Trude Thingelstad	Head of Communication	trude.thingelstad@ohv.oslo.no
Port of Palm beach	North America	Baker, Jeff	Port Duty Officer	jbaker@portofpalmbeach.com
Port of Palm beach	North America	Ciklin, Blair J.	port commissioner	BCiklin@PortofPalmBeach.com
Port of Palm beach	North America	Coddington, Ronald	Port Engineer	rcoddington@portofpalmbeach.com
Port of Palm beach	North America	Fawcett, Al	Facilities Superintendent	afawcett@portofpalmbeach.com
Port of Palm beach	North America	Greffin Pompey, Beatrice	Deputy Director of Business Operations and Administration	bgreffin@portofpalmbeach.com
Port of Palm beach	North America	Lall Dass, Varisa	port commissioner	vldass@portofpalmbeach.com
Port of Palm beach	North America	Leggett, Keith	Assistant Director of Operations	kleggett@portofpalmbeach.com
Port of Palm beach	North America	Meekins, Michael	Executive Director	mmeekins@portofpalmbeach.com
Port of Palm beach	North America	Placeres, Rick	Director of Operations	rplaceres@portofpalmbeach.com
Port of Palm beach	North America	Richards, Wayne M.	chairman	WRichards@PortofPalmBeach.com.
Port of Palm beach	North America	Williams, Michael	Deputy Director of Finance and Capital Improvement	mwilliams@portofpalmbeach.com
Port of Penang	Asia Pacific	Encik Vijayaindiaran	managing director	sppp@penangport.gov.my
Port of Peru	south america	Main office		perurep@dicapi.mil.pe
Port of Peru	south america	Main office		dicatramar@dicapi.mil.pe
Port of Peru	south america	Main office		costerapaita@dicapi.mil.pe
Port of Peru	south america	Main office		costeracallao@dicapi.mil.pe
Port of Peru	south america	Main office		costeramollendo@dicapi.mil.pe
Port of Peru	south america	Main office		huaoperations@tramarsa.com.pe
Port of Phnom Penh Ts11	Asia	Kong Channy	head of planning	k_channy@yahoo.com
port of phuket	Asia Pacific	Ravinder Ghai		ravinder@tpni.co.th
port of phuket	Asia Pacific			tpni@tpni.co.th
Port of Pilbara	oceania	Matthew Bowdler	Principal Sustainability Advisor	matthew.bowdler@hotmail.com
Port of Pilbara	oceania	Tahir Usman	Ports Engineering Manager	tahirusman77@hotmail.com
Port of Portland	North America	Curtis Robinhold	Executive Director	curtis.robinhold@portofportland.com
Port of Portland	North America	Jenn Bies	Director of Environmental Operations	Jenn.bies@portofportland.com.
Port of Portland	North America	Rose Arsers		rose.arsers@portofportland.com
Port of Portland	North America	Tamara Kennedy	Director of Economic Development	tkennedyhill@gmail.com
Port of Pourthmouth	Europe	Elly Howe	Environmental and Sustainability Coordinator	Eleanor.howe@portsmouth-port.co.uk
Port of Ranong	Asia Pacific			patonline@port.co.th
Port of Rotterdam	Europe	Edwin van Espen	Manager of Delta Corridor	edwinvanespen@hotmail.com
Port of Rotterdam	Europe	hanna stelzel	Head of Port & Supply Chain Performance	hanna.stelzel@gmail.com
Port of Rotterdam	Europe	Léon Voogd	Manager operations & safety	leonvoogd@hotmail.com
Port of Rotterdam	Europe	Oscar Van Veen	Director of Innovation	oscarvanveen@gmail.com
Port of Rotterdam	North America	Saskia Mureau	Was connected to Terry by Martijn Schouten	sac.mureau@portofrotterdam.com
port of Saigon	Asia	Huynh Van Cuong	chairman	csg@hcm.vnn.vn
port of Saigon	Asia	Huynh Van Cuong	chairman	saigonnewport@hcm.vnn.vn
port of Saigon	Asia		terminal 1	cms@tanthuanport.vn
port of Saigon	Asia		terminal 2	khaithachiepphuoc@saigonport.vn
port of Saigon	Asia		terminal 3	tchc.brvt@saigonport.vn
port of Saigon	Asia		terminal 4	tugserco@saigonport.vn
port of Saigon	Asia		terminal 5	kdkt.ldtb@saigonport.vn
port of Saigon	Asia		terminal 6	khanhdb@saigonport.vn
port of Saigon	Asia		terminal 7	vvphuong71@yahoo.com
port of Saigon	Asia		terminal 8	Binh.vo@spl.com.vn
port of Saigon	Asia		terminal 9	cms@tanthuanport.vn
Port of San Diego	North America	Rafael Castellanos	**Chairman**	rc@smcdslaw.com
port of Shuwaikh KUWAIT	Middle East	Jujan	manager	jujan@agamltd.com
port of Shuwaikh KUWAIT	Middle East	Zahoor Illahi	manager	zahoor_95@yahoo.com
port of Shuwaikh KUWAIT	Middle East	Anooj K.R.	Business Manager	info@dolphinkuwait.com
Port of Singapore	Asia-Pacific	Adeline Ho	Assistant Manager	Adeline_HO@mpa.gov.sg
Port of Singapore	Asia-Pacific	Andrea Wong	Manager	Andrea_WONG@mpa.gov.sg
Port of Singapore	Asia-Pacific	Angeline Tan	media and external comunication	angeline_tan@mpa.gov.sg
Port of Singapore	Asia-Pacific	Angella Chan (Technical Suppo	Executive	Angella_CHAN@mpa.gov.sg
Port of Singapore	Asia-Pacific	Astenn Mun	sustianability engineer	astennmun@gmail.com
Port of Singapore	Asia-Pacific	Benjamin Wong	strategy and policy matters	benjamin_wong@mpa.gov.sg
Port of Singapore	Asia-Pacific	Capt MUHAMMAD SEGAR	Assistant Chief Executive (Operations)	m_segar@mpa.gov.sg
Port of Singapore	Asia-Pacific	Cheryn Chia	Manager	Cheryn_CHIA@mpa.gov.sg
Port of Singapore	Asia-Pacific	Cindy Sim	finance, procurement and admin	cindy_sim@mpa.gov.s
Port of Singapore	Asia-Pacific	Damien Ng	Manager	Damien_NG@mpa.gov.sg
Port of Singapore	Asia-Pacific	David FOO Suan Jiong	Assistant Chief Executive (Operations Technology)	david_foo@mpa.gov.sg
Port of Singapore	Asia-Pacific	David Ng	Maritime and Port Authority of Singapore Manager	david_ng@mpa.gov.sg
Port of Singapore	Asia-Pacific	Deputy Director (Shipping) / D	Mr CHEN Kit Jam	CHEN_Kit_Jam@mpa.gov.sg
Port of Singapore		Desmond Tay	leading Singapore's Regional Centre in the Americas,	desmond_tay@mpa.gov.sg
Port of Singapore	Asia-Pacific	Desmond TAY	Deputy Director (Maritime Innovation Ecosystem)	desmond_tay@mpa.gov.sg
Port of Singapore	Asia-Pacific	Director (Shipping) / Director o	Mr CHEAH Aun Aun	CHEAH_Aun_Aun@mpa.gov.sg
Port of Singapore	Asia-Pacific	Gan Hao Zhi	Manager	GAN_Hao_Zhi@mpa.gov.sg
Port of Singapore	Asia-Pacific	george_goh@mpa.gov.sg	media and external comunication	george_goh@mpa.gov.sg
Port of Singapore	Asia-Pacific	Goldwin Koh	Assistant Manager	Goldwin_KOH@mpa.gov.sg
Port of Singapore	Asia-Pacific	Gwen Chen	Assistant Manager	Gwen_CHEN@mpa.gov.sg

Appendix C: Contact List of Contributors

Port of Singapore	Asia-Pacific	Jamie Chen	Maritime and Port Authority of Singapore Manager	jamie_chen@mpa.gov.sg
Port of Singapore	Asia-Pacific	jason leong	legal	jason_leong@mpa.gov.sg
Port of Singapore	Asia-Pacific	Karen Koh	Manager	Karen_KOH@mpa.gov.sg
Port of Singapore	Asia-Pacific	Kenneth LIM Khoon Seng	Assistant Chief Executive (Industry & Transformation)	kenneth_ks_lim@mpa.gov.sg
Port of Singapore	Asia-Pacific	Kenneth LIM Khoon Seng	Quality Service Manager	qsm@mpa.gov.sg
Port of Singapore	Asia-Pacific	Lim Hui Wen	Senior Manager	LIM_Hui_Wen@mpa.gov.sg
Port of Singapore	Asia-Pacific	Lim Jun Ming	interational	lim_jun_ming@mpa.gov.sg
Port of Singapore	Asia-Pacific	Low Lay Leng	finance, procurement and admin	low_lay_leng@mpa.gov.sg
Port of Singapore	Asia-Pacific	Mike Formoso	Regional Head of Partnerships and Sustainability Solutions, PSA Middle East and South Asia	mikeformoso@hotmail.com
Port of Singapore	Asia-Pacific	Minerva Lim	Senior sustainability manager	minflim@gmail.com
Port of Singapore	Asia-Pacific	Ms Angela PNG Lian Neo	Corporate Secretary	angela_png@mpa.gov.sg
Port of Singapore	Asia-Pacific	Ms CHOW Mei Lun	Principal Executive	chow_mei_lun@mpa.gov.sg
Port of Singapore	Asia-Pacific	Ms Jaslyn TANG Qiuling	Manager	jaslyn_tang@mpa.gov.sg
Port of Singapore	Asia-Pacific	Ms Jaslyn TANG Qiuling	Manager	jaslyn_tang@mpa.gov.sg
Port of Singapore	Asia-Pacific	Ms Kris ANG	Senior Deputy Director (Innovation, Technology & Talent Development)	kris_ang@mpa.gov.sg
Port of Singapore	Asia-Pacific	Ms Linda ANG	Principal Executive	linda_ang@mpa.gov.sg
Port of Singapore	Asia-Pacific	Ms Pauline GOH Guat Hoon	Personal Assistant to Assistant Chief Executive (Operations Technology)	pauline_goh@mpa.gov.sg
Port of Singapore	Asia-Pacific	Ms Sally WONG Choi Kuen	Personal Assistant to Chief Executive	sally_wong@mpa.gov.sg
Port of Singapore	Asia-Pacific	Ms TAN Beng Tee	Senior Advisor	tan_beng_tee@mpa.gov.sg
Port of Singapore	Asia-Pacific	NG Yi Han	Director (Innovation, Technology & Talent Development)	ng_yi_han@mpa.gov.sg
Port of Singapore	Asia-Pacific	NIAM Chiang Meng	Chairman	niam_chiang_meng@mpa.gov.sg
Port of Singapore		Sahrine Tan	connected by Minerva as she can help fill out survey	sharine_tan@mpa.gov.sg
Port of Singapore	Asia-Pacific	Senior Executive	Ms Purlynn HENG	Purlynn_HENG@mpa.gov.sg
Port of Singapore	Asia-Pacific	Senior Manager	Ms Siying WANG	WANG_Siying@mpa.gov.sg
Port of Singapore	Asia-Pacific	Sharon Wong	MPA Academy	sharon_wong@mpa.gov.sg
Port of Singapore	Asia-Pacific	Shen Wanling	interational	shen_wanling@mpa.gov.sg
Port of Singapore	Asia-Pacific	Tan Chong Yuan	Manager	TAN_Chong_Yuan@mpa.gov.sg
Port of Singapore	Asia-Pacific	TAN Hoe Soon, PPA(P)	Assistant Chief Executive (Corporate & Strategy) / Chief Risk Officer	tan_hoe_soon@mpa.gov.sg
Port of Singapore	Asia-Pacific	Tan Suan Jow	MPA Academy	tan_suan_jow@mpa.gov.sg
Port of Singapore	Asia-Pacific	TEO Eng Dih	Chief Executive	teo_eng_dih@mpa.gov.sg
Port of Singapore	Asia-Pacific	Tham Wai Wah	Chief Sustainability Officer	thamww@yahoo.com.sg
Port of Singapore		Thomas Ting	connected by Minerva as he can help fill out survey	thomas_ting@mpa.gov.sg
Port of Singapore	Asia-Pacific	Thomas TING Cheng Heong, PBM	Director (Technology & Innovation) / Chief Technology Officer	thomas_ting@mpa.gov.sg
Port of Split Croatia	Europe	Alen Vrbat	operations manager	alen.vrbat@lukasplit.hr
Port of Split Croatia	Europe	Filip Rogošić	CEO	filip.rogosic@lukasplit.hr
Port of Split Croatia	Europe	Goran Žižak	Quality HSE manager	goran.zizak@lukasplit.hr
Port of Split Croatia	Europe	Ines Dević	secretary of the CEO	ines.devic@lukasplit.hr
Port of Stockholm	Europe	Karl Lagerlof	Head of Strategic Port Development	karl.lagerlof@stockholmshamnar.se
Port of Stockholm	Europe	Kjel Karlsson	Director of port infrastructure	kjel.karlsson@stockholmshamnar.se
Port of Stockholm	Europe	Mattias Sandell	Port Development Strategist	mattias.sandell@stockholmshamnar.se
Port of Stockholm	Europe	Sebastian Zaar	Technical manager	sebastian.zaar@stockholmshamnar.se
Port of Tanjus	South East Asia	Puteri Nizar	Sustainability - Transformation	puteri.megadnizar@gmail.com
Port of Thunder Bay Ontario	canada	Chris Heikkinen	Director of Business Development & Terminal Operations	chris@tbport.on.ca
Port of Thunder Bay Ontario	canada	Mel Parker	corporate secretary of the CEO	mel@tbport.on.ca
Port of Thunder Bay Ontario	canada	Tim Heney	CEO	tim@tbport.on.ca
Port of Townsville queensland	oceania	Ranee Crosby	CEO	rcrosby@townsville-port.com.au
Port of Vancouver	North America	Othman AlFaseeh	Project Manager - Ports & Terminals	othman.alfaseeh@gmail.com
port or Taipei	Asia	Chen, Shao-liang	president	president@twport.com.tw
port or Taipei	Asia	Chen, Shao-liang	president	director@motcmpb.gov.tw
port or Taipei	Asia	Lee Hsien-Yi	Chairman	chairman@twport.com.tw
port or Taipei	Asia		manager	david2@twport.com.tw
port or Taipei	Asia		manager	allen1362@twport.com.tw
port or Taipei	Asia		manager	cuc@twport.com.tw
port or Taipei	Asia		manager	hcchang@twport.com.tw
port or Taipei	Asia		Operation Management	janet@twport.com.tw
port or Taipei	Asia		Operation Management	wei316@twport.com.tw
port or Taipei	Asia		logistic management	rouen6213@twport.com.tw
port or Taipei	Asia		logistic management	t03391@twport.com.tw
Port Shepstone	SSA	Hermanus Bothma	CEO	hsbothma@bothma.co.za
PORTO PONTA DO FELIX	South America	ALEX AVILA	INSTITUCIONAL DIRECTOR	alex.avila@tppf.com.br
PUCALLPA AND IQUITOS	South America	Edison Chapiama Hidalgo	Gerente General	informacion@transpacificosac.com
Puerto Antioquia		Andres Felipe Bustos,	Vicepresident	abustos@piosas.com
Puerto de Antofagasta	South America	David Sjnchez Heredia	Gerente Ejecutivo	contacto@aspb.gob.bo
Puerto de Antofagasta	South America	Enrique Arteaga Correa	Gerente General	terminal@atiport.cl
Puerto de Antofagasta	South America	Leon Alberto Cohen Delpiano	Presidente del Directorio	comunicaciones@puertoantofagasta.cl
Puerto de Antofagasta	South America	Oscar Hasb¤nMart-nez	Presidente	servicioalcliente@saam.cl
Puerto de Arica	South America	David Sjnchez Heredia	Gerente Ejecutivo	contacto@aspb.gob.bo
Puerto de Arica	South America	Diego UribeEtxeverr-a	Gerente General	contacto@ultraport.cl
Puerto de Arica	South America	Juan BilbaoGarc-a	Director Principal	tpa@tpa.cl
Puerto de Arica	South America	Loreto Seguel King	Presidenta	puertoarica@puertoarica.cl
Puerto de Ilo	South America	David Sjnchez Heredia	Gerente Ejecutivo	contacto@aspb.gob.bo
Puerto de Ilo	South America	Walter Espinoza Donayre	Gerente Puerto de Ilo	wespinoza@enapu.com.pe
Puerto de Matarani	South America	David Sjnchez Heredia	Gerente Ejecutivo	contacto@aspb.gob.bo
Puerto de Matarani	South America	Gabriel Monge Aguirre	Gerente General	gmonge@tisur.com.pe
RUMOI	Asia Pacific	na	Economy and Port Section Rumoi City	kouwan@e-rumoi.jp
SAKAI	Asia Pacific	na	Cruise Department	sekim@pref.tottori.lg.jp
SAKAI-SEMBOKU	Asia Pacific	na	Department of Port Promotion, Port and Harbor Bureau, Osaka Prefectural Government	kowankyoku@sbox.pref.osaka.lg.jp
SAKAIDE	Asia Pacific	na	Port & Harbor Division,City of Sakaide	minato@city.sakaide.lg.jp
SAKATA	Asia Pacific	na	Ports and Harbors Division, Yamagata Prefectural Government	yminato@pref.yamagata.jp
Salalah	MENA	Ashraf Mabrouk	Marine manager	ashrafmabrouk13@hotmail.com
Salalah	MENA	Bart van de Graaf	CFO	bart.vandegraaf@apmterminals.com
Salalah	MENA	Keld Mosgaard Christensen	CEO	keld.mosgaard@gmail.com
Salalah	MENA	Mohamed AL Mashani	Chief Corporate Affairs Officer	mohammedaufait@icloud.com
SALAVERRY	South America	Diego Cassinelli Montero	Gerente General	dcassinelli@sati.com.pe
Santa Marta	South America	Mr. Albeiro Barreto	Production Manager	commercial@intertug.com
Santa Marta	South America	Mr. Domingo Segundo Chinea	General Manager	sac@spsm.com.co

Appendix C: Contact List of Contributors

Santa Marta	South America	Ms. Alicia Brice±o Corredor	Foreign Trade Analyst	servicioalcliente@almagrario.com
SASEBO	Asia Pacific	na	Port Promotion & Management section,Port & Harbor	koukanri@city.sasebo.lg.jp
SHIMIZU	Asia Pacific	na	Shimizu Port Promotion Division	shimizukou@city.shizuoka.lg.jp
SHIMONOSEKI	Asia Pacific	na	Cruise Promotion Office,Promotion Division,Port and Harbour Bureau	kwshinko@city.shimonoseki.yamaguchi.jp
SOMA	Asia Pacific	na	Ports and Harbours Division,Fukushima Prefectural Government	kouwan@pref.fukushima.lg.jp
SRIRACHA HARBOUR	Asia Pacific	Chavalit Sethameteekul	President	natphasit@sriracha port.com
SRIRACHA HARBOUR	Asia Pacific	Mr. Sawasdi Horrungruang	Chairman	natphasit@sriracha port.com
SRIRACHA HARBOUR	Asia Pacific	Prawim Horrungruang	Chief Operation Office	natphasit@sriracha port.com
SRIRACHA HARBOUR	Asia Pacific	Vikit Horrungruang	Chief Executive Officer	natphasit@sriracha port.com
St. Kitts & Nevis International Ship registry authori	America	Wayne Edmeade	Manager	waynejrsm@gmail.com
St. Lucia Saint Lucia Air And Sea Ports Authority	America	Paul Cassel	Manager	cassel.paul@slaspa.com
St. Vincent & the Grenadines Division of Maritime	America	Jillianjoy Davis	Manager	registrar.svgmarad@gmail.com
St. Vincent and the Grenadines Port Authority	America	Walwyn Nichols	treasurer	wnichols@svgpa.com
Suriname Maritime Authority of Suriname (MAS)	America	Raoel Coulor	Manager	rcoulor@mas.sr
TAGONOURA	Asia Pacific	na	Tagonoura Port Authority	tago-kanri@pref.shizuoka.lg.jp
TAKAMATSU	Asia Pacific	na	Exchange Promotion Division,Kagawa Prefectural Harbour Bureau	kouryu@pref.kagawa.lg.jp
Talagnaro	Africa	Mr Mark BULTER	Director	mbulter@stxgroup.net
Tanger Med Compte officiel - TMSA Morocco	SSA	Hicham KHAROUFI	Port Call Optimization Manager	hicham.kharoufi@gmail.com
Tanzania Ports Authority	Africa	Abdullah Mwingamno	Director of Marine & Ports Operations(Harbour Master)	dms@ports.go.tz
Tanzania Ports Authority	Africa	Boniphace Nobeji	Director of Corporate Planning, Quality and Risk Management	dpqrm@ports.go.tz
Tanzania Ports Authority	Africa	Erasto Ndunguru	Director of Infrastructure, Planning & Investment	dipi@ports.go.tz
Tanzania Ports Authority	Africa	Ferdinand S. Nyathi	Ag. Port Manager - Lake Victoria Ports	pmmwanza@ports.go.tz
Tanzania Ports Authority	Africa	George S. Fasha	Director of Marketing and Public Relations	dm@ports.go.tz
Tanzania Ports Authority	Africa	Isaack Godson	Director of Procurement and Contracts Management	dpc@ports.go.tz
Tanzania Ports Authority	Africa	Juma Kijavara	Deputy Director-General	ddg@ports.go.tz
Tanzania Ports Authority	Africa	Manga Gassaya	Port Manager, Lake Nyasa Ports	pmkyela@ports.go.tz
Tanzania Ports Authority	Africa	Miraji S. Kipande	Director of Finance and Accounts	df@ports.go.tz
Tanzania Ports Authority	Africa	Mrisho S. Mrisho	Port director	pddsm@ports.go.tz
Tanzania Ports Authority	Africa	na	Director of Engineering Services	des@ports.go.tz
Tanzania Ports Authority	Africa	Norbert J. Kalembwe	Ag. Port Manager - Mtwara Port	pmmtwara@ports.go.tz
Tanzania Ports Authority	Africa	Plasduce Mkeli Mbossa	Director general	dg@ports.go.tz
Tanzania Ports Authority	Africa	Stanslaus Kagisa	Director of Legal Services	dls@ports.go.tz
Tanzania Ports Authority port of Tanga	Africa	Masoud Mrisha	Port Manager - Tanga Port	pmtanga@ports.go.tz
TATEYAMA	Asia Pacific	na	Port and Harbor Division	kousin2@mz.pref.chiba.lg.jp
Toamasina	Africa	Mr Barthelemie Randrianrison	Port Officer	madacruise@gmail.com
Toamasina	Africa	Mr Eric RATSIMBA	Regional Director	eric@apmf.mg
Toamasina	Africa	Mr KWONG Jean EugÃ¨ne	Port Officer	s.m.s.d.seatrans@gmail.com
Toamasina	Africa	Mr Sylvain	Port Officer	s.m.s.d.seatrans@gmail.com
Toamasina	Africa	Mr Zo	Port Officer	herizo.hbc@gmail.com
Toamasina	Africa	Mr. Jami INJONA	Port capitain	capitainerie@port-toamasina.com
Toamasina	Africa			spdg@port-toamasina.com
Toamasina	Africa			contact@smmc.mg
TOBA	Asia Pacific	na	Harbor and Coastal Affairs Division,Mie Prefectural	kowan@pref.mie.jp
TOKACHI	Asia Pacific	na	Port of Promotion Section,Hiroo town office Harber Unit	k-shinko@town.hiroo.lg.jp
TOKYO	Asia Pacific	na	Port Promotion Section,Bureau of Port & Harbor,Tokyo Metropolitan Government	S0000517@section.metro.tokyo.jp
Tolagnaro	Africa	Mr Maminiaina RAKOTOMALALA	Port Officer	m.rakotomalala@ehoalaport.com
Tolagnaro	Africa	Mr Neil JILLAM	Manager	njillam@stxgroup.net
Tolagnaro	Africa	Mr Sonn RABARY	Port Officer	sonnrabary@apmf.mg
Toliara	Africa	Mr Augustin JAOJY	Manager	semstul.dir@moov.mg
Toliara	Africa	Mr Ronsard Franck RAKOTOZAF	Regional Director	ronsarda@yahoo.fr
Toliara	Africa			ger@smoi.mg
Toliara	Africa			mg.compta.pasynet@sps.com
Toliara	Africa			administrateur@logpetro.com
TOMAKOMAI	Asia Pacific	na	Tomakomai Port Authority Policy Promotion Division	ac06sinkou@jptmk.com
TOTTORI	Asia Pacific	na	Port and Air Port Measures Office	kanri@city.sakaiminato.lg.jp
Trinidad and Tobago maritime division	America	Marcia Charles-Elbourne	general manager	marciac@patnt.com
Trinidad and Tobago maritime division	America	Richmond Bassant	Manager	msdadminenviron@mowt.gov.tt
TSURUGA	Asia Pacific	na	Ports and Airports Division,Department of Public Works,Fukui Prefectural Government	kowan@pref.fukui.lg.jp
UBE	Asia Pacific	na	Yamaguchi Prefectural Government Tourism	a16200@pref.yamaguchi.lg.jp
UNO	Asia Pacific	na	Ports and Harbors Division Department of Public Works Okayama Prefectural Government	kowan@pref.okayama.lg.jp
Uwajima	Asia Pacific	na	Person in charge of construction section Port,Uwajima City Office	kensetsu@city.uwajima.lg.jp
Valparaíso	LatAm	Sabah Zrari	Executive Director	sabah.zrari@iipc.cl
Visakhapatnam, Andhra Pradesh	South East Asia	Gayatri V	port operations	gayatriv1983@gmail.com
Vohemar	Africa	Cpt Henri BEFOUROUACK	Manager	commandant@sepivohemar.com
Vohemar	Africa	Mr Arlo SOANDRO	Manager	soandroarlo@gmail.com
WAKAYAMA SHIMOTSU	Asia Pacific	na	Harbor and Airport Promotions Division	e0824001@pref.wakayama.lg.jp
Walvis Bay	SSA	Adian Hill	Port Operations Automation Project Manager : Automation and Integration	adianhill@gmail.com
YATSUSHIRO	Asia Pacific	na	Port sales promotion Division,Kumamoto Prefectural	kigyouricchika@pref.kumamoto.lg.jp
YOKKAICHI	Asia Pacific	na	Tread Promotion Division	shinko@yokkaichi-port.or.jp
YOKOHAMA	Asia Pacific	na	Port Promotion Division,Port and Harbor Bureau	kw-cruise@city.yokohama.jp
YURIMAGUAS	South America	Ing. Carmen BenÃ-tez	General Manager	cbenitez@copam.com.pe
YURIMAGUAS AND IQUITOS	South America	VÃ-ctor Hugo RodrÃ-guez	Gerente General	j1989_6@hotmail.com
Zona Quequen – Mar del Plata	south america	Main office		gian@copetel.com.ar
Zona Rio de la Plata & Puerto Buenos Aires	south america	Main office		pilots@ripla.com.ar
Zona Rio de la Plata/Rio Parana	south america	Main office		mijail@serviciosmaritimos.com
Zona Rio de la Plata/Rio Parana	south america	Main office		pilots@rosariopilots.com

Acknowledgements and Endnotes

Primary authors and advisors contributing to this report include:

- Terry Tamminen, AltaSea at the Port of Los Angeles, CEO; The Catalytic Finance Foundation (US office), Director; 7th Generation Advisors, President,
- Greg Cogut, 7th Generation Advisors, Climate Finance Program Director; AltaSea at the Port of Lost Angeles, Special Advisor - Climate Finance; The Catalytic Finance Foundation (US office), Deputy Director
- Mebus Whiting, Special Advisor, 7th Generation Advisors
- Kristina Haddad, Executive Director, 7th Generation Advisors
- Dan Gura, PharmD, MPH, Director of Business Development, Hugo Neu Co.
- Staff of the Port of Los Angeles, CA
- Staff of the Port of Kearny, NJ
- Staff of the Port of Singapore
- Staff of the Zero Emissions Maritime Buyers Alliance
- Our thanks to the numerous other port and stakeholder authorities that have been consulted for this report.

---

[i] https://www.portofamsterdam.com/en/discover/sustainable-port/energy-transition and https://www.hamburg-port-authority.de/fileadmin/user_upload/Geschaeftsbericht/Sustainability_Report_2020.pdf and https://www.mpa.gov.sg/who-we-are/newsroom-resources/publications/annual-report

[ii] https://www.youtube.com/watch?v=H6hrdK7IjOI

[iii] https://www.sciencedirect.com/science/article/abs/pii/S1366554522002228

[iv] https://www.portvancouver.com/environmental-protection-at-the-port-of-vancouver/climate-action-at-the-port-of-vancouver/shore-power/#:~:text=Through%20our%20EcoAction%20Program%2C%20the,call%20the%20Port%20of%20Vancouver

[v] https://www.portvancouver.com/environmental-protection-at-the-port-of-vancouver/climate-action-at-the-port-of-vancouver/shore-power/#:~:text=Through%20our%20EcoAction%20Program%2C%20the,call%20the%20Port%20of%20Vancouver

[vi] https://www.portvancouver.com/wp-content/uploads/2018/06/2018-05-29-Shore-Power-Container-Qs-and-As-_final.pdf

[vii] https://www.britishports.org.uk/content/uploads/2021/10/BPA_Shore_Power_Paper_May_2020.pdf

[viii] https://www.gov.ca.gov/wp-content/uploads/2022/09/9.2.22-Heat-Wave-EO.pdf?emrc=92d675#:~:text=Ocean%2Dgoing%20vessels%20that%20are,Saturday%2C%20September%2010%2C%202022.

[ix] https://polb.com/port-info/news-and-press/port-of-long-beach-clean-air-project-receives-30-1-million-10-28-2022/#:~:text=About%2017%25%20of%20the%20cargo,years%20before%20the%202035%20goal

[x] https://polb.com/port-info/news-and-press/the-making-of-a-state-of-the-art-terminal-08-26-2021/

[xi] https://polb.com/port-info/news-and-press/port-of-long-beach-clean-air-project-receives-30-1-million-10-28-2022/#:~:text=Funding%20for%20the%20new%20clean,%2C%20human%2Doperated%20yard%20tractors.

[xii] https://polb.com/port-info/news-and-press/the-making-of-a-state-of-the-art-terminal-08-26-2021/

[xiii] https://ww2.arb.ca.gov/lcti-commercialization-polb-road-technology-c-port-demonstration

[xiv] https://www.mordorintelligence.com/industry-reports/container-handling-equipment-market

[xv] https://www.offshore-energy.biz/cote-divoire-terminal-receives-electric-cranes-readies-for-november-opening/
[xvi] https://www.reuters.com/business/autos-transportation/ivory-coast-completes-second-shipping-container-terminal-2022-11-25/#:~:text=Port%20authorities%20said%20the%20project,Maersk%20(MAERSKb.CO)

[xvii] https://new.abb.com/news/detail/90964/port-of-abidjan-upgrades-its-electrical-infrastructure-with-abbs-safe-and-reliable-solutions-manufactured-in-egypt

[xviii] https://www.apmterminals.com/en/news/news-releases/2022/220519-new-zero-emission-cote-d-ivoire-terminal-receives-first-port-equipment
[xix] https://www.apmterminals.com/en/news/news-releases/2022/220519-new-zero-emission-cote-d-ivoire-terminal-receives-first-port-equipment
[xx] https://polb.com/environment/energy-initiatives/#microgrid-demonstration-project

[xxi] https://www.freightwaves.com/news/california-asks-shipping-lines-to-avoid-shore-power-during-brutal-heat-wave

[xxii] https://www.vale.com/w/vale-innovates-by-using-battery-storage-to-reduce-electric-energy-consumption-and-costs-at-ore-terminal
[xxiii] https://www.bnamericas.com/en/news/brazils-vale-installing-battery-energy-storage-system

[xxiv] https://www.theafricareport.com/171011/south-africas-ports-need-private-investment-to-break-inefficiency-logjam/

[xxv] https://energycapitalpower.com/transnet-partner-durban-container-terminal/
[xxvi] https://www.aveva.com/content/dam/aveva/documents/perspectives/success-stories/SuccessStory_AVEVA_Transnet_03-20.pdf.coredownload.inline.pdf
[xxvii] https://maritime-executive.com/article/california-expands-emissions-regulations-for-ships-in-port
[xxviii] https://ww2.arb.ca.gov/resources/fact-sheets/advanced-clean-fleets-regulation-summary
[xxix] https://www.hamburg-port-authority.de/fileadmin/user_upload/Geschaeftsbericht/Sustainability_Report_2020.pdf
[xxx] https://www.hamburg-port-authority.de/fileadmin/user_upload/Geschaeftsbericht/Sustainability_Report_2020.pdf
[xxxi] https://www.offshore-energy.biz/port-of-hamburg-becomes-more-sustainable-with-solar-powered-mooring-systems/
[xxxii] https://www.portseattle.org/blog/power-led-reduced-emissions-lower-costs-longer-life

[xxxiii] https://www.portseattle.org/page/century-agenda-strategic-objectives

[xxxiv] https://dailylogistic.com/port-operators-2022/
[xxxv] https://www.ecoports.com
[xxxvi] https://ww2.arb.ca.gov/our-work/programs/carl-moyer-memorial-air-quality-standards-attainment-program/about and https://ww2.arb.ca.gov/our-work/programs/clean-off-road-equipment-voucher-incentive-project/about#:~:text=CORE%20is%20intended%20to%20accelerate,come%2C%20first%2Dserved%20basis.
[xxxvii] https://missionpossiblepartnership.org/action-sectors/shipping/
[xxxviii] https://www.subnational.finance and https://globalfundcoralreefs.org

From:	Renee Krause
To:	Casey Siekaniec; mark@southcentralradar.com; Ian@fortunesea.net; velskolacey@gmail.com; Jaredgarth@live.com; bobshavelson@gmail.com; bruce.friend@gmx.com
Cc:	Amy Woodruff; Zach Pettit; Samantha Jacobsen
Subject:	FW: Port of LA finance policies for distribution
Date:	Monday, April 22, 2024 2:20:08 PM
Attachments:	Financial Policies for the City of Los Angeles Harbor Department Port of Los Angeles.pdf
Importance:	High

Please see attached

Renee Krause, MMC
Acting City Clerk/ADA Coordinator

From: Rachel Lord <RachelLord@ci.homer.ak.us>
Sent: Monday, April 22, 2024 2:00 PM
To: Melissa Jacobsen <MJacobsen@ci.homer.ak.us>
Cc: Bryan Hawkins <BHawkins@ci.homer.ak.us>; Amy Woodruff <AWoodruff@ci.homer.ak.us>; Jason Davis <JasonDavis@ci.homer.ak.us>; Renee Krause <RKrause@ci.homer.ak.us>
Subject: Port of LA finance policies for distribution

Hi All,

As an example of high-level finance policies for the PH Enterprise, attached are the Financial Policies for the Port of LA.
Renee - could you please pass this document along via email to the Council and the Port & Harbor Commission?

Thanks!
Rachel

FINANCIAL POLICIES FOR THE HARBOR DEPARTMENT OF THE CITY of LOS ANGELES

HARBOR DEPARTMENT OF THE CITY OF LOS ANGELES
FINANCIAL POLICIES

Table of Contents

SECTION 1 – INTRODUCTION

Financial policies assist in effective financial management. Such policies help in establishing and managing controls and in reporting accurate financial results. The maintenance of financial policies will:

1. Promote consistent financial procedures, operational efficiencies and best practices.
2. Assist in compliance with applicable laws, regulations, and accounting and reporting standards.

The City of Los Angeles Harbor Department (Port or Department) is a self-supporting proprietary department. As such, the Port operates independently, administering and controlling its own fiscal activities. The Port is under the control of a five-member Board appointed by the Mayor, subject to the oversight of the Council and administered by an executive director.

The Port, held in trust for the people of the State of California pursuant to a series of tideland grants and administered by the City of Los Angeles (City) under the City Charter (Charter), is located in San Pedro Bay, approximately 20 miles south of downtown Los Angeles. The Port's facilities lie within the shelter of a nine-mile long breakwater constructed by the Federal government in several stages, the first of which commenced in 1899. The California State Legislature granted tidelands occupied by the Port to the City under the State Tidelands Trust Act in 1911 for promoting commerce, navigation, and fishery. The Tidelands Trust Act has been amended many times, most recently in 2002 by Assembly Bill 2769 that expanded the permitted uses of tidelands to include recreational, environmental, and public meeting and assembly activities that are water-oriented and are intended to be of statewide benefit. The granted lands are subject to a public trust imposing certain restrictions on their use of the revenues derived from these lands.

The Port collects and deposits all fees, charges, rentals, and revenues in connection with its possession, management, and control of the Harbor District and Harbor Assets in the Harbor Revenue Fund. The Harbor Revenue Fund is a separate fund established by the Charter. The Port's operating expenses, as well as the construction, acquisition, purchase, lease, or maintenance of Harbor Assets are paid from the Harbor Revenue Fund.

The Port currently holds long-term debt ratings of AA/Aa2/AA from Standard & Poor's, Moody's, and Fitch Investor Services, the highest credit ratings of any non-tax backed seaport in the nation. These ratings reflect a variety of factors, including its competitive position, deep-draft waterways, facilities, large local service area, intermodal transportation links, and fiscal management. Adhering to a prudent financial policy will help to sustain the Port's credit position.

The Harbor is committed to maintaining strong financial policies and fiscal discipline. The Board of Harbor Commissioners may review and amend policies outlined in this document when necessary but on an annual basis, an update will be provided to the Board of Harbor Commissioners.

Responsibility

The Chief Financial Officer (CFO) or designee will be responsible for the maintenance and drafting of Financial Policies. The Board of Harbor Commissioners (Board) will approve all policies and amendments and all staff members of the Port are responsible for following these policies.

SECTION 2 – FISCAL POLICY

INTRODUCTION

These Fiscal Policies have been developed to codify and reinforce the Port's tradition of fiscal responsibility. The key objective is to balance prudently the Port's core business requirements and strategic objectives with its financial resources.

All fees, charges, rentals and revenue collected by the Port in connection with its possession, management and control of its assets are deposited in the Harbor Revenue Fund. All such moneys and revenues deposited in the Harbor Revenue Fund are under the direction and control of the Board.

Pursuant to the Charter, moneys deposited in the Harbor Revenue Fund may be appropriated or used only for the following core business purposes:

A. **Operations and Maintenance** – For the necessary expenses of operating the Port, including salaries and benefits, the operation, promotion and maintenance of the lands and waters, and interests therein, and Port improvements, works, utilities, facilities and watercraft, owned, controlled or operated by the Port;

B. **Development of Assets** – For the acquisition, construction, completion and maintenance of the Port and for the acquisition or taking by purchase, lease, condemnation or otherwise of property, real or personal, or other interest necessary or convenient for Port purposes;

C. **Debt Service Payment** – For the payment of the principal and interest on debt issued by the Port;

D. **Reimbursements** – For reimbursements to another department or office of the City on account of services rendered, or materials, supplies or equipment furnished to support Port purposes. (Such reimbursements must be for appropriate expenses that have been specifically authorized by the Port for services rendered at the request of Port.)

Annually, the Board will adopt a budget that is consistent with the Port's commitment to its strategies and goals as outlined in its strategic plan. Any recommendation put forth to the Board that does not comply with these Policies will be indicated as part of an appropriate report.

The annual audited financial statements, prepared by the Port, will be presented to the Board upon conclusion of the audit process.

The Port will maintain fiscal policies that will be consistent with its intent to:

- Hold ratings commensurate with strategy,
- Sustain transparency and accountability to its stakeholders.

BUDGETARY POLICY

The adopted budget represents the ongoing commitment of management and staff to operate and maintain the Port in a fiscally sound manner according to the guidelines, policies and direction set forth by the Mayor and the Board. The budget spans a fiscal year beginning July 1 and ending June 30 and contains operating and non-operating revenues and expenses, grants, capital expenditures and reserves for the Port. The budget is an appropriation document that gives the Port the authority to spend and allocate funds for the components outlined above.

Each year, the Port staff will develop a budget plan that will lead to the Board's review and adoption of the subsequent year's budget. The timing of this process will be consistent with the established strategy and priorities at the Port and within the requirements of the Charter and the guidelines of the Mayor.

A budget calendar for the fiscal year is to be established to make clear deliverables and deadlines.

After consultation with the Board, the Executive Director will start each budget year with a letter addressed to Division Heads discussing the broad financial targets for the coming fiscal year.

I. Each year the Port will establish a budget by:

- A. Providing a comprehensive view of Port's sources and uses of funds for operating and capital expenditures.
- B. Tailoring the budget process into an effective management tool for setting financial priorities and meeting strategic objectives.
- C. Managing financial resources in a manner that:
  1. Is prudent and sustainable
  2. Meets financial requirements of medium and long-term capital improvements
- D. Producing budget information that is:
  1. Clear, comprehensible and transparent to employees and other stakeholders
  2. Accurate, timely, and easy to access
- E. Monitoring and analyzing revenues and expenditures throughout the fiscal year for compliance and accountability.

II. A cash flow forecast report will be maintained as part of a 10-year projection model on an on-going basis.

III. Fund appropriations are limited to the sum of available, unrestricted cash balances, revenues estimated to be received in the current budget year, and , when necessary, debt issuance.

IV. All Port Divisions will operate within the adopted budget. From time to time, the Port will consider spending requests for new or expanded programs during the course of the fiscal year and, to the extent possible, such increases to current operations will be funded by current revenues. On occasion, there may be a need for Board action to draw funds from the Port's unappropriated balance in order to meet unforeseen financial requirements.

V. Capital assets owned by the Port shall be maintained on a regular schedule. The Port will recognize the impact of wear and tear of existing capital assets on the annual operating budget. Maintenance costs will be identified and incorporated into the annual operating budget as necessary. These costs include items such as renovations, maintenance and service contracts.

VI. All Port funds shall be reconciled at the close of the fiscal year to determine the available cash balance at year-end.

VII. Reports to the Board shall include Fiscal Impact and Economic Benefit discussions as to how the proposed action may affect the budget, the Department's financial condition, any benefits to the job market, plus the estimated cost and or benefit of the program or service in the current and future years.

REVENUES AND EXPENSE POLICY

I. The Port does not rely on any tax revenues to carry on its operations. Therefore, the Port charges fees for facilities and services provided to its customers. Each fee is structured to allow for marginal cost pricing and for the recovery of both direct and indirect costs incurred in the operation of the Port.

II. Consistent with the leasing policy and the required rates of return, the Port charges its occupants for the use of Port land, docks, wharves, transit sheds, terminals and other facilities pursuant to various permit agreements. These permit agreements are similar in form to lease agreements. Under the various permit agreements the occupants agree to pay the Port tariffs or fees in exchange for the right to use and occupy those properties permitted for use and occupancy by shipping or terminal companies, agents and other private firms. Although the Port owns these facilities, it has no direct hand in managing the daily movement of cargo. The Port also serves as a landlord to various oil terminals, fish markets, boat repair yards, railroads, restaurants and other similar operations.

III. The Port has three major sources of operating revenues: shipping revenues, rental revenues, and fee and royalty revenues. The Port recovers its costs of providing services and improvements through these charges for shipping services and permitted use and occupancy of facilities. The Port conducts regular reviews of its fee structure, rentals and charges for services, and other operating revenues and expenditures.

IV. Sufficient user charges, rents and fees shall be pursued and levied to support the cost of operations for which fees and rents are charged, including operating (direct and indirect) and capital costs. For any operating activity, the marginal revenue should exceed the marginal cost of the activity. The Port will monitor user charges, rents, and fees for the Port to determine that rates are adequate and appropriate. If fees, rents or charges are not set at a level that results in at least 100 percent full cost recovery, the Board will specifically recognize the subsidy and shall take specific action to appropriate the necessary funds to subsidize the fee for service. Operating expenses must be funded in whole by operating revenues.

V. The Port will pursue federal, state, and private grants but will assess the necessary on-going financial support of these programs to make clear the commitments that continue beyond available funding. The proceeds of such grants will be used to enhance security, construction of capital assets, the improvement of the surrounding environment, and the overall efficient operations of the Port.

VI. The Port should seek to maintain a stable and diverse revenue stream to the extent consistent with its business objectives.

SECTION 3 – LEASING POLICY

INTRODUCTION

In August 2013, the Board adopted a Leasing Policy for the Harbor Department for when the Department is the lessor. The Leasing Policy, in conjunction with the Debt Policy and this Financial Policy, provide guidance to financing decisions of the Harbor Department. The Port administers close to 300 property agreements throughout the Port's jurisdiction. These types of leases include agreements, concession agreements, leases, orders, permits and revocable permits. The objective of the Port of Los Angeles Leasing Policy is to provide a framework governing leasing and rental decisions as they relate to tenant retention, selecting new tenants, development of new agreements and, as appropriate, modifications to existing agreements by amendments. Leasing and rental decisions will be made in a transparent environment, while maintaining compliance with City, State and Federal laws.

POLICIES

Please see the Leasing Policy for complete information.

SECTION 4 – CAPITAL IMPROVEMENT PLAN FUNDING POLICY

INTRODUCTION

Amounts budgeted for Capital Improvements are taken from the Port's Capital Improvement Plan (CIP). The CIP is a planning document only, any appropriations for specific projects in excess of the authority of the Executive Director must be approved by the Board.

The CIP includes the purchase, renovation, or construction of Port facilities and may be funded by a variety of funding vehicles: the Harbor Revenue Fund, debt, and depending on availability, grants. While the Port develops and maintains a multi-year CIP encompassing all Port capital needs for its facilities, as well as the acquisition of land, a CIP is approved by the Board on an annual basis as part of the budget approval process.

POLICIES

The Project Development Committee reviews all Port capital projects to be recommended for inclusion in the CIP subject to the oversight and approval of the Board. A capital project either creates a new asset or significantly extends the life of an existing asset. Large capital equipment purchases, those in excess of $5,000, should be included and considered as part of the overall annual budget process. Expenditures for land and property acquisition and certain payments made for environmental mitigation purposes are also identified as Capital Projects.

In this capacity, the Project Development Committee will:

1. Affirm the linkage between proposed Capital Projects and Port's strategic goals and objectives;
2. Assess the linkage between the capital and operating budgets to ensure appropriate allocation of resources;
3. Reaffirm the validity of a proposed CIP for annual approval by the Board of Harbor Commissioners;
4. Provide discipline and enforcement to the approved CIP;
5. Monitor the progress of Capital Projects. Major changes in project scope or direction shall be presented to the Board for approval;
6. Review the qualitative and quantitative (including financial analysis) evaluation of Capital Projects to determine the priority of projects;
7. Review, assess and approve or deny the placement of proposed Capital Projects on to the CIP;

8. Review CIP policies and procedures periodically and implementing changes as necessary;
9. Provide a mechanism for financial and resource planning for the Port;
10. Ensure compliance with the City Charter, Section 610, by submitting a Debt Accountability and major Capital Improvement Plan to the Mayor, City Council and Controller every two years in conjunction with the submittal of Port' s annual budget;
11. Authorize total project cost and fiscal year cost allocation changes.

Capital Projects are evaluated on many criteria of which financial impact is only one key factor. The critical information required for a financial analysis is summarized below:

1. **Revenue**: A description of the anticipated level of revenue that might be generated due to the completion of the capital project should be explained. Potential revenue sources may include cost recovery mechanisms such as fees and terminal rentals, new facility rentals, new concession, parking or other third party revenues, and revenues from increased Port activity.
2. **Maintenance and Operations Expenses**: These are maintenance and operations (M&O) expense estimates for the operational costs of an asset after it has been placed into operation. These expense estimates should include incremental direct and incremental indirect costs.
3. **Total Project Cost**: Total project cost must include all components of the project (e.g., design, construction management, contingency, demolition of existing facilities, new building, infrastructure and support systems, etc.). Total project costs should include contractual payments for planning, construction and other services, internal Port direct costs, and appropriate contingencies.
4. **Project Contingency**: As a component of total project cost, the project contingency depends upon the level of planning and design completed for the project. At a preliminary stage, the contingency may be 5% - 25%. As the details of the project become more specific, the level of contingency may be adjusted accordingly. The level of contingency should be clearly identified in the proposal for each project. While the maximum contingency amount for a proposed project should be 5%, a higher percentage may be warranted, subject to Board approval.
5. **Economic Benefits**: A description of how the design, building, and maintenance of each project contribute to maximizing job creation in the 5-county region will be presented.

6. **Recreation**: A description is required if a particular project promotes recreation, which is one of the purposes of the tidelands trust.

All Port Capital Projects must be approved by the Board

SECTION 5 – FINANCIAL RESERVE AND TARGET BALANCE POLICY

INTRODUCTION

This policy seeks to manage the Port's financial reserves in order to:

A. Meet or exceed all debt indenture and Charter requirements, if any;

B. Maintain access to capital markets and other sources of capital funding at the most efficient cost of funds for each of the Port's programs; and

C. Manage financial risks prudently to meet the Port's financial needs

POLICIES

The Port establishes financial reserves to follow defined financial requirements under its bond indentures and other legal obligations. This is in order to meet needs that may occur that were not known during the budget cycle or were insufficiently defined to allow for a more specific appropriation. Additionally, reserves provide for liquidity to support one of the Port's key financial objectives of maintaining strong debt ratings. In doing so, the Port will seek, through the approval of the Board, the establishment of reserve funds for the department. Currently, the Port's reserve funds include an Emergency Fund, Debt Service Reserve Funds and a variety of mitigation reserve funds.

A. Emergency/ACTA Fund: This account holds funds for unanticipated expenditures, disaster related recovery and Alameda Corridor Transportation Authority revenue shortfalls. Any withdraws of the money that would bring the balance below the targeted minimum would require Board approval. The approved minimum amount to be held in this account is $47 million.

B. Debt Service Reserve Fund:- The Indentures for the Port, as amended and supplemented, pursuant to which Revenue Bonds have been issued to date, establish a Reserve Requirement of the lesser of:

1. Maximum Aggregate Annual Debt Service for Reserve Requirement for all Series of Bonds participating in the Reserve Fund or a separately created Debt Service Reserve Fund created pursuant a Supplemental Indenture,

2. 10% of the principal amount of Bonds that have been issued and are participating in the Reserve Fund or in a separately created Debt Service Reserve Fund created pursuant a Supplemental Indenture, less the amount of original issue discount with respect to

any Bond if such original issue discount exceeded 2% on such Bond at the time of its original sale,

3. 125% of the average Aggregate Annual Debt Service for Reserve Requirement for all Series of Bonds participating in the Reserve Fund or a separately created Debt Service Reserve Fund created pursuant a Supplemental Indenture.

This Reserve Requirement may be funded with a combination of cash, securities, an insurance policy or surety bond, or a letter of credit, in accordance with the requirements of the Indentures.

C. **Special Operating Fund:** The target balance in this fund will be considered in combination with the Emergency/ACTA Fund. The target balance in this Fund will be the difference between the average of the Port's operating expenses over a five year period and the Emergency/ACTA Fund. The five-year average period will be comprised of audited operating expenses for the four previous most recent fiscal years and the adopted budget for operating expenses for the current fiscal year. From this average will be subtracted the minimum level specified for the Emergency/ACTA Fund. Any surplus above the combined minimum balance may be transferred to Harbor Revenue Fund at any time. Any withdraws that would cause the combined minimum balance to drop below the target balance requires Board approval.

As an example, in June 2014, the average annual operating expenses as defined above over five years stood at $207 million, being four years of audited operating expense data from fiscal years 2010 through 2013 and the budgeted operating expense for fiscal year 2014. Finding the difference between the $207 million and the $47 million target minimum for the Emergency/ACTA Fund, generates a target minimum of $160 million for the Special Operating Fund.

SECTION 6 – RISK MANAGEMENT POLICY

INTRODUCTION

The Port is to be protected to a prudent extent against any liability or loss that would significantly affect personnel, property, finances or the ability of the Port to continue to fulfill its responsibilities as an independent, self-supporting proprietary port. This is to be accomplished through the continuous identification, analysis, and control of risk exposures, the determination of the best methods of preventing or limiting losses and the selection of the most economical method of insurance or other means.

POLICY

I. After identification of loss potential and development of loss prevention programs, the mitigation of the financial impact of loss, as it may occur, shall be based on the most economical method of providing funds to meet the obligations of the Port and to restore its facilities.

II. Risk management techniques shall include:
   A. Assumption of loss
   B. Use of available government programs
   C. Purchase of insurance
   D. Transfer options and any other program that will provide the Port with the most economical method of financing losses

III. The purchase of insurance shall be considered when:
   A. The estimate of the cost of potential loss exceeds an amount considered as an allowable retention of risk and there are no other techniques available at a lesser cost
   B. Services of loss adjustment and loss prevention are best secured through an insured program
   C. Legal or contractual obligations require insurance

SECTION 7 – DISCLOSURE POLICY

The Chief Financial Officer or designee shall establish and maintain reasonable procedures for the preparation, review and dissemination of the disclosure documents of the Harbor Department, including primary offering disclosure documents and continuing disclosure filings, to ensure the accuracy, completeness and timeliness of such disclosure documents. Disclosure includes posting to the Port's web site its comprehensive annual financial report, quarterly financial statements, and following annual disclosure requirements under the Municipal Securities Rulemaking Board.

DEBT MANAGEMENT POLICY

INTRODUCTION

The purpose of the Debt Management Policy (Debt Policy) of the Department is to establish guidelines for the issuance and management of the Harbor Department's debt. The Port has the authority, subject to Mayor and Council review in certain instances, to borrow money and issue debt under Section 609, Article VI of the Charter. The City Council has defined the procedure for the proprietary departments to issue debt in a Bond Procedural Ordinance, which is set forth at Sections 11.18.9 through 11.28.1 of the Los Angeles Administrative Code. Each proprietary department has the power to borrow money and to issue bonds, refunding bonds, notes, and other evidences of indebtedness (collectively referred to in this section as Revenue Bonds). Although the Port will apply its Debt Policy as a guideline, the actual terms and conditions governing debt issued by the Port are set forth in the actual documents associated with each Revenue Bond issuance.

This Debt Policy confirms the commitment of the Board, management, staff, advisors and other decision makers to adhere to sound financial management practices, including full and timely repayment of all borrowings, and achieving an appropriate level of capital within prudent risk parameters. Certain terms used in this Debt Policy are defined in the glossary located at the end of this document.

I. OBJECTIVES

The objectives of the Debt Policy include the following:

A. Maintain the Port's existing high credit ratings;

B. Provide for an efficient overall cost of borrowing for the Port;

C. Provide specific guidelines with respect to the overall management of the Port's debt;

D. Set forth a process for selecting various consultants who will assist the Port in the issuance and management of the Port's debt;

E. Support for the Port's strategic plan objectives;

F. Establish for three years a pool of underwriters from which firms will be chosen to assist in any financings;

G. Encourage participation of minority and women owned businesses in the pool of underwriters in compliance with the Departmental Small Business Enterprise (SBE) Program as well as local firms.

II. SCOPE AND AUTHORITY

This Debt Policy shall govern the issuance and management of all financings and shall include all obligations and ancillary facilities related to those financings, including investment of bond proceeds not otherwise covered by the City of Los Angeles' Investment Policy.

While adherence to this Debt Policy is required in applicable circumstances, the Port recognizes that changes in the markets and other unforeseen circumstances may produce situations that are not covered by the Debt Policy or require modifications or exceptions to achieve Debt Policy goals. In these cases, the Port will seek authorization from the Board.

The Debt & Treasury Section shall have the day-to-day responsibility and authority for structuring, implementing, and managing the Port's debt and finance programs, in accordance with Board approved authorizations. The Debt Policy requires that any financing be specifically authorized by the Port's Board.

III. CAPITAL BUDGETING AND DEBT ISSUANCE PROCESS

A. Capital Budgeting

1. The Capital Improvement Plan: A Capital Improvement Plan (CIP) shall be developed as outlined within the Capital Improvement Plan Policy for consideration and adoption by the Board. In addition to capital project costs, the CIP will include the following elements:

   a) Timing of capital projects;
   b) Effect of capital projects on the Department's debt burden; and,
   c) Debt service requirements.

2. Authorization for Issuance: Any debt issuance to fund capital project expenditures must be authorized by the Board. The Board's adoption of the Annual Budget and/or CIP does not, in and by itself, constitute authorization for debt issuance for proposed capital projects. Each financing shall be presented to the Board in the context of the Annual Budget or the CIP.

3. Review of the Capital Improvement Plan: Modifications to the CIP shall be preceded with a report, which among other items, discusses the impact of the proposed modifications on the Annual Budget and the CIP. The ten-year CIP is to be reviewed and presented to the Board at least annually. Modifications to the CIP may be included as a separate section to the Annual Budget and CIP. Major modifications to the CIP, which occur during a particular fiscal year, will be presented under a separate report to

the Board.

B. Debt Financing

1. Appropriate Use of Long-Term Debt

   a) Purpose – Long-Term Debt should be used to finance essential capital facilities, projects, and certain equipment where it is cost effective and fiscally prudent. The scope, requirements, and demands of the Annual Budget or the CIP, and the ability or need to expedite or maintain the programmed schedule of approved capital projects should also be factored into the decision to issue long-term debt. The Port recognizes that the future viability of the Port is a result of capital investment. As a result, long-term debt will be used on an as needed basis to fund the Port's capital investment needs.

   b) Lease Financing – Lease obligations are a routine and appropriate means of financing capital equipment. These types of obligations may be considered for equipment and assets that are not financed under a revenue-based financing program. The useful life of the capital equipment, the terms and conditions of the lease, and the direct impact on debt capacity and budget flexibility will be evaluated prior to the implementation of a lease program. Efforts will be made to fund capital equipment with pay-as-you-go financing where feasible. Cash flow sufficiency, capital program requirements, lease program structures and cost, and market factors will be considered in conjunction with a pay-as-you-go strategy in lieu of lease financing. Short-term equipment leases that do not access the capital markets are not covered by this policy.

2. Use of Short-Term and Variable Rate Debt

   a) Commercial Paper – Commercial Paper is routinely used to provide interim new money funding to finance the acquisition and construction of various new capital facilities, projects, and equipment. When appropriate but no later than when these facilities are constructed and operational, it is the Port's intention to retire this debt with either long-term bonds or Harbor Revenue Fund. The scope and nature of these financed capital facilities will be evaluated in conjunction with the Port's long-term debt policy and included in the Annual Budget and/ or the CIP.

b) Variable Rate Debt – It may occasionally be appropriate to issue variable rate debt to diversify the debt portfolio, reduce interest costs, expand the pool of buyers for the Port's debt, provide interim funding for capital projects and improve the matching of assets with liabilities. The amount of unhedged, long-term variable rate debt will generally not exceed 20% of all outstanding debt, and be consistent with liquid financial assets of the Department. Variable rate debt shall be issued in conformance with applicable tax arbitrage restrictions. If variable rate debt is used, the Port will periodically, but at least annually, determines whether it is appropriate to convert the debt to fixed interest rates. The Port may use various forms of variable rate debt for construction financing or where pre-payment flexibility is desired.

c) Lines of Credit – It may be useful to hold available lines of credit from commercial banks as an additional source of liquidity. Such lines would be solely for working capital purposes and may also be used for providing a bridge for long term capital project financings.

IV. Debt Service Target Level

The target debt service coverage for the Port is listed below. This limit, in combination with the CIP and multi-year planning, will ensure that the Port will be able to continue providing its essential operational services while planning for replacement, rehabilitation, and expansion of its capital investments.

A. The Port will maintain a target minimum Debt Service Coverage of 2.0x, however, the actual terms and conditions specific to each bond issue are controlled by the bond documents.

B. The Port will seek to maintain its level of cash reserves and minimize the level of debt. Any prepayment or payment of debt will consider cost and term.

V. Purpose of Financing

For each financing, documentation will be prepared and retained in a permanent "deal file" regarding the various vendor selections, the decision process for sizing and structure, the method of bond sale, and investment decisions.

A. New Money Financing

New money issues are those financings that generate additional funding to be available for expenditure on capital projects. These funds will be used for acquisition, construction, and major rehabilitation of capital assets. New money bond proceeds may not be used to fund operational activities. For competitive issuances, the structure for any financing is based on the market conditions at the time of the sale.

The Port may utilize its commercial paper programs to provide interim new money funding.

B. Refunding Bonds

A present value analysis must be prepared that identifies the economic effects of any refunding to be proposed to the Board. It is acknowledged that some refundings may be executed for other than economic purposes, such as to restructure debt, change the type of debt instruments being used, or to retire a bond issue and indenture in order to achieve more desirable covenants. A finding by Chief Financial Officer and approval by the Board is required in such cases.

Target savings amounts shall be measured by using a call option pricing model. The target savings from any particular refunding candidate should be in the range of 80% of the expected value of the call option, net of all transaction expenses. Alternatively, the more traditional methodology of measuring the net present value savings as a percentage of the refunded par amount may be used with a minimum present value savings of 3% for any one refunding transaction. The Chief Financial Officer shall have discretion in making the final determination to include individual refunding candidates that are above or below the target in order to optimize the Port's policy and/or financial objectives.

Certain circumstances may require the Port to deviate from use of these refunding targets, such as the need to update inefficient covenants, restructure debt service payments or to alter bond payment dates. When any such circumstance arises, specific Board approval will be obtained.

When bonds are refunded, staff shall consider whether call features are to be preserved. Once decided to be preserved, staff, the financial advisors, the bond counsel, and disclosure counsel shall assure that documents prepared meet all requirements unless expressly waived.

VI. Types of Products

A. Current Coupon Bonds

Current Coupon Bonds are bonds that pay interest periodically and principal at maturity. They may be used for both new money and refunding transactions. Current coupon bonds may be structured to meet the demands of the investor and, thereby, reduce the cost of borrowing. Features such as annual principal maturities, the use of discounts, maturity of the debt, the parameters of the call provisions, or cash funded debt service reserve funds are adjusted to the market conditions at the time of sale.

B. Zero Coupon and Capital Appreciation Bonds

Zero coupon bonds and capital appreciation bonds have principal amortization that is much slower than level debt service resulting in increased interest expenditure over the life of the bond issue and, therefore, shall only be recommended in limited situations.

C. Lease Purchase Financing

Lease purchase financing represents a long-term financing lease that is suitable for financing capital equipment or the acquisition and construction of real property.

1. Equipment: It has been the Port's practice to purchase equipment on a pay-as-you-go basis; however, the Port shall have the ability to consider lease purchase transactions, as an alternative to long-term vendor leases, including the ability to implement a master lease program. Only the highest priority equipment purchases will be lease purchased.

2. Real Property: Principal payments related to real property acquisition or construction is to be amortized such that it results in level debt service payments although the Port may consider rapid amortization to meet its repayment objectives.

D. Derivative Products

Derivative products may be considered where appropriate in the issuance or management of debt only in instances where it has been demonstrated that the derivative product will either provide a Hedge that reduces risk of unfavorable fluctuations in expense or revenue, or alternatively, where it will reduce total project cost. An analysis of early termination costs and

other conditional terms will also be performed given certain financing and marketing assumptions. Such analysis will document the risks and benefits associated with the use of the particular derivative product. Derivative products will only be utilized with prior Board approval. If the derivative product requires any contracts with third parties, such as a Letter of Credit or Swap agreement, the Port will only enter into contracts with financial institutions that have a long-term credit rating equal to or higher than the Port's long-term credit rating. If such long-term rating is not available to a particular financial institution, guarantees or collateralization will be required, such that an equivalent or higher long-term rating can be obtained.

VII. Structural Features

A. Maturity of Debt

The final maturity of the debt shall be equal to or less than the useful life of the assets being financed. In general, the average life of the financing should not exceed 120% of the average life of the assets being financed unless tax or other restrictions require a lesser percentage. In no case will the final maturity exceed 30 years. Exceptions to the matching of the average lives must be approved by the Board.

B. Debt Service Structure

Combined principal and interest payments for any particular bond issue should be structured to have approximately equal debt service payments over the life of the bond. Exceptions may occur depending on the type of bonds being issued. While the objective is to have level debt service in aggregate for each lien, with the debt service trailing off as bonds mature, depending on market availability, exceptions may be considered subject to Board approval.

C. Lien Levels

Net Revenues are the primary repayment source for the Port's outstanding debt. The Port's long-term and short-term debts are generally issued on a senior lien, parity basis; subordinate debt may be considered when appropriate. All senior lien debt will be utilized in a manner which will maximize the most critical constraint, typically either cost or capacity; thus, allowing for the most beneficial use of Net Revenues. Any subordinate lien debt must be considered in light of overall debt capacity and may only be issued with the approval of the Port's Board.

D. Capitalized Interest

The Port will seek to avoid the use of capitalized interest. Certain types of financings such as lease-secured financings, and certain revenue bond projects may require that interest on the bonds be paid from capitalized interest until the Port has constructive use of the project.

E. Discount Bonds

While discount and deep discount bonds may reduce the interest cost of the bonds below that of non-discount bonds, they should only be recommended in limited situations as they reduce the potential for savings from refunding of the bonds.

F. Debt Service Reserve Fund

A long term debt issue may require the establishment of a Debt Service Reserve Fund (DSRF), the amount of which is determined by Section 5 – Financial Reserve Policy, Debt Service Reserve Fund. Under current conditions, the Port's Debt Service Reserve will likely be funded by cash.

The Chief Financial Officer and the Director of Debt & Treasury will evaluate and document the DSRF funding decision. Factors to be considered in this evaluation include: arbitrage yield restrictions, current interest rates, availability and cost of a surety policy, and opportunities for the use of the funds withdrawn from the DSRF including additional capital projects or investment opportunities.

When a debt service reserve is funded with cash, the funds are maintained by trustee bank throughout the life of the bond issue. A cash funded DSR is invested pursuant to investment of proceeds guidelines within the issue's respective indenture and interest earnings are generally used to offset debt service payments. In the final year of the bond issue, the cash available in the DSR is usually used to make the final debt service payment. Since a cash-funded DSRF generates interest income, the Port will have the potential to be in a financially neutral position if the interest earnings equal or exceed the interest rate of the bonds.

G. Financial and Risk Analysis of Issuance

Net present value cost analysis, assessment of structural risks and complexities, and consideration of restrictions to future financing flexibility will be assessed and documented to determine the most efficient bond type and structuring features. The weighted average cost of capital or the marginal rate of borrowing long-term debt, whichever is higher, may be used as the discount rate when comparing alternatives.

H. Call Provisions

In general, the Port's securities will not include a redemption feature that is longer than 10 years. It is the Port's intent to maximize prepayment flexibility on all bond issues.

I. Credit Enhancement

1. The current market no longer ascribes economic value to bond insurance as risk mitigation for bonds so the Port no longer contemplates or uses credit enhancement tools to improve the ratings of its bond issues.

2. Letters of Credit – Letters of Credit (LOC) represent a bank's promise to pay, on behalf of the Port, the principal and interest when due for a defined period of time, and subject to certain conditions. In the case of a direct pay LOC, the trustee can draw upon the letter of credit to make debt service payments; under a stand-by LOC, the LOC can be used to cover the Port's default. If a letter of credit is to be used, the Debt & Treasury section shall prepare and distribute to qualified banks as described in paragraph (b) below, a request for qualifications that includes terms and conditions that are acceptable to the Port;

   a) Liquidity Facility – The issuance of variable rate debt, including variable rate bonds and commercial paper, requires the use of a liquidity facility. Debt & Treasury, with the approval of Chief Financial Officer, is hereby authorized to appoint a bank(s) to ensure the availability of liquidity support should the bonds or commercial paper be tendered or not remarketed.

   b) Provider selection – Only those banks with the necessary long and short-term ratings to support the contemplated credit may be solicited.

   c) Selection criteria will also include, but not be limited to the following:

      1. Terms and conditions acceptable to the Port; the Port will provide a term sheet along with the request for qualifications to which the banks will highlight modifications;
      2. Representative list of clients for whom the bank has provided liquidity facilities; and,
      3. Fees; specifically, cost of LOC, draws, bank counsel and other administrative charges and estimate of trading differential cost.

VIII. Documentation of Transactions

The decision processes used in each financing process will be fully documented. The documentation will capture information regarding, selection of the financing team, decisions on product selection and structuring features, selection of vendors providing ancillary services, and selection of investment securities or products. This information will be compiled into a post-pricing book, "deal file", which will be retained for each financing.

IX. Credit Objectives

A. The Port will actively seek to maintain the credit ratings of its to be issued and outstanding bonds.

B. The Port will adhere to appropriate benchmarks, overall debt ratios and affordability targets.

C. The Port will maintain communications with the credit rating agencies through the provision of monthly volume statistics, quarterly financial updates and annual personal visits, at the minimum.

X. Method of Bond Sale

The Port will follow the code established under the Charter of the City of Los Angeles under Section 609 (d) in the bond issuance process. There are three potential methods of sale: competitive, negotiated, and private placement. Each type of bond sale has the potential to provide the lowest cost given the right conditions. The conditions under which each type of bond sale is best used are provided below. All or some of the conditions discussed will affect the method of sale.

A. Competitive Sale

1. Bond prices are stable and/or demand is strong.
2. Issuer has a strong credit rating.
3. Issuer is well known to investors.
4. There are no complex explanations required during marketing, regarding: issuer's projects, media coverage, political structure, political support, funding, or credit quality.
5. The bond type and structural features are conventional.
6. Bond insurance is included or pre-qualified (available).
7. Manageable transaction size.
8. Market timing and interest rate sensitivity are not critical to the pricing.

B. Negotiated Sale

1. Bond prices are volatile and/or demand is weak or supply of

competing bonds is high.
2. Market timing is important, such as for refundings.
3. Coordination of multiple components of the financing is required.
4. Participation from MBE/ WBE/ OBE firms is enhanced, and the process will be in compliance with the Department's Small Business Enterprise (SBE) Program.
5. Issuer has lower or weakening credit rating.
6. Issuer is not well known to investors.
7. Sale and marketing of the bonds will require complex explanations about the issuer's projects, media coverage, political structure, political support, funding, or credit quality.
8. The bond type and/or structural features are non-standard, such as for a forward bond sale, issuance of variable rate bonds or where there is use of derivative products.
9. Bond insurance is not available or not offered.
10. Early structuring and market participation by underwriters desired.
11. Pre-qualified underwriters pool.
12. Large transaction size.
13. Expected high retail demand.
14. The Los Angeles Administrative Code under Section 11.28.4 requires that CFO issue a report specifying why a negotiated sale is required as a condition precedent to a negotiated sale.

C. Private Placement

A Private Placement is a sale that is structured specifically for one purchaser such as a bank. While the Port has not previously used this method of sale, the Port reserves the right to privately place its securities if the need arises. Furthermore, any member of the active underwriting pool who presents the Port with a cost savings financing plan, will be awarded to manage the financing/restructuring transaction.

XI. Small Business Enterprise (SBE) Program

The Port's policy is to provide minority business enterprises (MBE), women business enterprises (WBE) and all other business enterprises (OBE) with an equal opportunity to participate in the performance of Department contracts. This policy will be in compliance with Department's Small Business Enterprise Program and continues to be a high priority of management and the Board of Harbor Commissioners in all transactions.

XII. ADMINISTRATION OF BOND PROCEEDS

A. INVESTMENT OF BOND PROCEEDS

1. Purchase and Sale of Investments

   The Port shall competitively bid the purchase of securities, investment agreements, float contracts, forward purchase contracts, and any other investment products used to invest bond proceeds and which are "Permitted Investments" within the meaning of the respective bond indentures. The Port shall comply with all applicable Federal, State, and contractual restrictions regarding the use and investment of bond proceeds. This includes compliance with restrictions on the types of investment securities allowed, restrictions on the allowable yield of some invested funds, as well as, restrictions on the time period over which some bond proceeds may be invested. Each bidding process and result shall be available to the public.

2. Diversification

   The Port shall diversify invested proceeds in order to reduce risk exposure to providers, types of investment products, and types of securities held.

3. Disclosure

   The Port will require that all fees resulting from investment services or sale of products to the Port be fully disclosed to ensure that there are no conflicts of interest and investments are being purchased at a fair market price. Underwriters of the bonds may bid on the sale of investment products for the proceeds. All bidding process and results shall be documented and it should be certified in writing that the Port received a competitive and fair market price on the investments based on the bidding process.

B. INTERNAL CONTROL PROCEDURES FOR APPLICATION OF BOND PROCEEDS

The Debt Policy's internal controls are procedures designed to ensure the proper application of the bond proceeds to the costs of capital improvements. The duties from the procurement of capital expenditures to the disbursement of bond proceeds are segregated among different sections of the Port, the City, and the bond trustee.

The Port utilizes the Oracle Enterprise Resource Planning (ERP) as its primary cost accounting system and Oracle Hyperion as its budget planning and performance monitoring system. All costs of capital improvements pending approval by Project Development Committee (PDC) are accumulated in detail in Project Information Control System (PICS) at the work order level. The project work orders in PICS are integrated into ERP and Hyperion systems using general ledger account numbers. Within ERP, work order costs are accumulated and will be identified for debt financing.

1. Purchasing Authority

   The Port makes purchases under the authority granted by the Los Angeles City Charter. Competitive bidding is solicited and award is made based on the evaluation criteria established by the divisions in the Port. Such determination may be made on the basis of the lowest ultimate cost to the Port.

2. Accounts Payable

   The Accounts Payable Section performs a three-way match by matching invoices against the goods or services received, and the purchase authority. A purchase authority can be in the form of contract, legal agreement, purchase order, or board resolution. After the invoice is processed for payment, a voucher is generated, and then routed to appropriate personnel for approval. Invoices and voucher above $5,000 are routed to the City Controller's Demand Auditors for further review. Invoices are paid out of the Harbor Revenue Fund.

   A set of daily jobs are run from ERP that processes all transactions for a given day. This step creates an outbound flat payment file that is sent to the City Controller's Financial Management System (FMS). Thereafter payments are processed and made by the City Controller, and an inbound file is received by the Port to reconcile with the transactions in ERP.

3. City Controller's Office

   All invoices greater than $5,000 must be approved by the City Controller's Demand Auditors after Accounts Payable performs its review. The City Controller Demand Audit Section independently validates invoices against the goods or services received, and verifies compliance with the purchasing authority. Payment will not be issued until the City Controller Demand Audit Section has removed the hold on a voucher to indicate approval.

4. Debt & Treasury Management

The Debt & Treasury Management Division receives the journal voucher from the Accounts Payable Section including work order and project information and prepares a requisition and memorandum for presentation to the bond trustee to draw funds from the Construction Fund of a particular bond series to reimburse the Harbor Revenue Fund for the accumulated capital expenditures. A Debt & Treasury Management staff person prepares the requisition list and a Debt & Treasury Management supervisor approves. The memorandum is prepared by the Debt Manager and approved by the CFO.

5. Bond Trustee

A trustee bank has been appointed for all of the Port's outstanding debt. The bond trustee performs all functions and duties required under the terms and conditions set forth in the respective bond indentures and trust agreements, including the administration of bond proceeds, maintaining records of fund balances and investments. The Port, as party to such bond indentures, provides required requisitions for any disbursement of bond proceeds as well as direction for investments. Disbursement and investments align with the Port's planning/program goals. The Port actively monitors monthly statements, account activity, and closes accounts when necessary. The Port also adheres to indenture covenants, as well as the tax covenants, to maintain tax-exempt status of bond proceeds – see below XIV.A Compliance With Federal Tax Law.

The Port's Construction Funds are managed by the bond trustee. The Debt Manager of the Port, in compliance with the respective bond indentures, provides instructions to the bond trustee to schedule anticipated drawdowns. The Construction Fund drawdown is processed through the bond trustee and approved by the Port.

XIII. Market Relationships

A. Rating Agencies and Investors

The Chief Financial Officer and the Director of the Debt & Treasury Section shall be primarily responsible for maintaining the Port's relationships with Moody's Investors Service, Standard & Poor's, and Fitch Ratings. In addition to general communications, the Chief Financial Officer or an appropriate designee, shall: 1) meet with each agency's credit analyst, and 2) communicate with each agency's analysts prior to

each competitive or negotiated sale. The Chief Financial Officer or appropriate designee will be responsible for communication with existing and potential bondholders. All efforts will be made to accommodate reasonable requests for information from investors in the Port's debt. When, and if appropriate, institutional investor communications may take the form of conference calls, one-on-one meetings, investor tours, and "virtual" road shows.

B. Board Communication

As a means of providing feedback from rating agencies and/ or investors regarding the Port's financial strengths and weaknesses as perceived by the market place, information will be provided to the Board as material information develops.

XIV. Compliance With Tax Law and Disclosure Obligations

A. Compliance with Federal Tax Law

The Chief Financial Officer shall establish a system of record keeping and reporting to meet the arbitrage rebate compliance requirements of the Federal tax code and ensure compliance with other Federal tax regulations as required by Bond Counsel at the time of issuance of the debt. This effort shall include tracking investment earnings on proceeds, retention of a rebate consultant to prepare and calculate rebate payments in compliance with tax law and remitting any earnings subject to rebate to the Federal government in a timely manner in order to preserve the tax-exempt status of the Port's outstanding debt issues that have been issued on a tax-exempt basis. The Port will comply with all covenants contained in tax certificates.

Trustee banks have been appointed for the Port's outstanding debt. The bond trustees shall perform all functions and duties required under the terms and conditions set forth in the respective bond indentures and trust agreements, including maintaining records of fund balances and investments.

B. Initial Disclosure

The Port and Board acknowledge their responsibilities under the securities laws to avoid material misstatements and omissions in offering documents used in the marketing of Port debt. The Chief Financial Officer shall coordinate the preparation of appropriate Disclosure documentation when required, with assistance from the City Attorney and the Port's Disclosure Counsel.

C. Continuing Disclosure

It is the policy of the Port to remain in compliance with Securities & Exchange Commission Rule 15c2-12 [17CFR Section 240.15c2-12] by filing, with the Municipal Securities Rule Making Board (MSRB) by posting to the Electronic Municipal Market Access (EMMA) its Annual Continuing Disclosure Statement and its audited financial statements; and statements of those material events which may occur during the year as Rule 15c2-12 requires.

In the interest of transparency, accountability, and educating the investor community, the Port will post its unaudited quarterly financial statements to the Port's website within forty-five days after the close of each quarter. In addition, the Port will post its Financial Policies and its Comprehensive Annual Financial Report (CAFR) to the Port's general website.

D. Government Code Section 8855 Compliance

At least 30 days prior to the sale of any debt issue or as soon as practicable following Board authorization of a debt issuance, the CFO or designee (or bond counsel on behalf of the Port) shall submit a report of the proposed issuance to the California Debt and Investment Advisory Commission (CDIAC). To the extent applicable, such report shall include a self-certification that the Port has adopted a policy concerning the use of debt that complies with law and that the contemplated debt issuance is consistent with that policy.
Not later than 21 days after the sale of any debt issue, the CFO or designee (or bond counsel on behalf of the Port) shall submit a report of final sale to the CDIAC. A copy of the final official statement for the issue shall accompany the report of final sale. If there is no official statement, the issuer shall provide each of the following documents, if they exist, along with the report of final sale:

1. Other disclosure document.
2. Indenture.
3. Installment sales agreement.
4. Loan agreement.
5. Promissory note.
6. Bond purchase contract.
7. Resolution authorizing the issue.
8. Bond specimen.

On or before January 31 of each year, the CFO or designee shall submit a report to the CDIAC regarding the debt authorized, the debt outstanding, and the use of proceeds during the reporting period from July 1 to June 30 of the prior fiscal year for debt issued on or after January 21, 2017.

XV. POST-ISSUANCE TAX COMPLIANCE

The Chief Financial Officer shall establish and maintain reasonable procedures to ensure the Department, as a municipal bond issuer will remain in compliance with post-issuance tax regulations.

XVI. Consultants

The Port will select its financial advisors and its bond counsel by competitive process. The Port's contracting policies, which are in effect at the time, will apply to all contracts with finance professionals. Selection may be based on a best value approach for professional services or the lowest responsive cost effective bid based upon pre-determined criteria.

A. General

All financial advisors, bond counsel and underwriters will be selected through a Request for Proposals (RFP) or Request for Qualifications (RFQ) process, whichever is most appropriate given the circumstances. In isolated instances, such contracts may be awarded on a sole source basis if it is clear that a RFP/RFQ process would not be feasible or in the Department's interests. The City's contracting policies, including Affirmative Action, Child Care, Small Business Enterprise (SBE) Program, Minority/Women/Other Business Enterprise (MBE/WBE/OBE) participation, Living Wage, and any other policies in effect at the time, will apply to all contracts with finance professionals, as permitted by Federal and State law.

A. Financial Advisors

The Department may retain one or more financial advisory firms to provide general advice on the Department's debt management program, financial condition, budget options, arbitrage rebate review, and rating agency relations. Additionally, a financial advisor may assist with the structuring of the Department's Revenue Bond issuances and may be used on an as-needed basis to provide financial advisory services that do not fall into the other categories of Department debt obligations.

B. Financing Teams

Financial advisors, bond counsel, and underwriters, where applicable, will be selected through a competitive process. Depending on particular

expertise and consultant availability, some firms may be used on more than one program. However, efforts will be made to establish different teams to provide a number of firms the opportunity to participate in Department contracts.

D. Bond Counsel

The Port debt will include a written opinion by legal counsel affirming that the Port is authorized to issue the proposed debt, that the Port has met all constitutional and statutory requirements necessary for issuance, and a determination of the proposed debt's federal and state income tax status. A nationally recognized bond counsel firm (or firms) will prepare this approving opinion and other documents relating to the issuance of debt with extensive experience in public finance. The firm(s) will be selected from the pool of bond counsel firms.

E. Disclosure Counsel

The Port will hire Disclosure Counsel(s) to prepare official statements in the event of any debt restructuring/refinancing, or new bond issue. Disclosure Counsel(s) will be responsible for ensuring that the official statement complies with all applicable rules, regulations and guidelines. Disclosure Counsel(s) will be well-recognized firm(s) with extensive experience in public finance. The firm(s) will be selected from the pool of bond counsel firms.

F. Disclosure by Financing Team Members

The Port expects that all of its financial advisory team will at all times provide the Port with objective advice and analysis, maintain the confidentiality of the Port's financial plans, and be free from any conflicts of interest. All financing team members will be required to provide full and complete disclosure, under penalty of perjury, relative to any and all agreements with other financing team members and outside parties that could compromise any firm's ability to provide independent advice that is solely in the best interests of the Port or that could be perceived as a conflict of interest. The extent of disclosure may vary depending on the nature of the transaction. Firms will be required to certify compliance with prohibition of underwriter gifts and political contributions under Charter section 609(e).

GLOSSARY OF TERMS

Aggregate Annual Debt Service: The sum of all interest and principal to be paid in one fiscal year.

Amortization: The gradual reduction in principal of an outstanding debt according to a specific repayment schedule, which details specific dates and repayment amounts on those dates.

Balloon Maturity: Final payment on a debt that is substantially larger than the preceding payments. An issue may be structured with such a Balloon Maturity when some projected event is expected to provide extra cash flow or when refinancing is anticipated.

Bond Counsel: The legal firm that provides an opinion as to the tax status, authenticity and legality of a bond or note issue as of the date of its issuance.

Bond Insurance: A financial guaranty issued by a private insurance company that guarantees the timely payment of principal and interest for a debt issue. In the event that an issuer is unable to make a timely payment, the company issuing the bond insurance is responsible to make the payment.

Bullet Bond: A debt instrument, which provides for regularly scheduled interest only payments up until a single and final principal payment is made upon the issue's maturity date.

Call Provisions: Mandatory or optional provisions that allow or require an issuer to prepay a bond prior to its stated maturity date. These provisions identify which bonds may be called, when they may be called, and what premium, if any, must be paid upon redemption prior to the stated maturity date of the bond.

Capital Appreciation Bond: Non-interest bearing bonds which are sold substantially below par value. The difference between the discounted price and par value represents the compounded annual interest rate for the investor. Capital appreciation bonds are also known as zero-coupon bonds.

Capitalized Interest: Specific interest payments of a bond issue which are funded in advance, or capitalized, through proceeds of the same bond issue. These proceeds are set aside in a specially designated fund in order to pay these designated interest payments. In other words, the bond issue pays for itself for a designated period of time.

Commercial Paper: Promissory notes issued by state and local governments to finance construction of facilities, which are secured by pledged revenues of the issuer and a credit agreement. Commercial paper is issued with a short maturity of less than 270 days from the date of issue.

Competitive Sale: A method of sale in which an issuer solicits bids from underwriters to purchase its debt offering via electronic bidding, fax, sealed envelope, verbal or other type of auction method. The issue is awarded to the bidder judged to have submitted the best bid by offering the lowest interest rate, taking into account underwriting spread, interest rates and any discounts or premiums. A

competitive sale is most frequently used when the credit structure of the issue is relatively simple, market conditions are stable and the issue is highly rated or insured.

Credit Rating Agencies: Firms that evaluate the credit quality and ability of debt issuers (corporations and governments) to repay obligations as well as their likelihood of defaulting on an obligation. The three major credit rating agencies are Moody's Investor Service, Standard and Poor's and Fitch Ratings, Inc.

Current Coupon Bonds: Traditional "plain vanilla" bond issues where the coupon is set at a fixed rate to maturity at the time of their issuance and immediately, upon issuance, begins to accrue interest, which is payable on pre-set interest payment dates.

Debt Affordability: The principal amount of debt that an issuer can afford within the constraints of net revenues and debt service coverage requirements.

Debt: A promise to pay back a specified sum of borrowed money, or the principal loan amount, according to a specified repayment schedule. For municipalities, a debt is usually incurred in the form of a bond issue, with a specific principal and interest repayment schedule.

Debt Service Coverage: The ratio of the Department's annual Operating Income divided by the principal and interest due in that same fiscal year. Debt service coverage ratios are most often used by rating agencies to determine repayment sufficiency with respect to bonds secured by a specific revenue stream.

Debt Service Reserve Fund: Traditional bond issues are structured with a debt service reserve fund, which assures the timely availability of sufficient moneys for the payment of debt service in the event that an issuer cannot make the required debt service payment(s). Typically, the required size of the reserve fund is determined by the lesser of: 100% of maximum annual debt service; 125% of average annual debt service; or 10% of the aggregate issue price. Reserve funds are usually fully funded out of bond proceeds and are set-aside in a separate fund held by the issue's trustee. Interest earned on the debt service reserve fund, as long as the debt service fund is fully funded, can be used to offset debt service payments.

Debt Service Safety Margin: (Net revenues - debt service) / Gross revenues and income. This measures how much revenue remains after meeting all O&M and debt service costs. For example, a debt service safety margin of zero indicates the port paid debt service without a penny left over. A higher ratio is better.

Derivative Product: A product, such as an option or futures contract, whose value is derived from the performance of an underlying security. Forward contracts, futures contracts, calls, puts and swaps are the most common types of derivatives.

Disclosure Counsel: The legal firm that provides the legal disclosure documentation for an issue, most often in the form of the preliminary and final official statement and continuing disclosure agreement, for dissemination to the public.

Discount Bonds: Debt sold for less than the stated principal or maturity value. If a discount bond pays no coupon throughout the life of an issue, it is called a zero coupon bond.

Discount Rate: The interest rate used for adjusting for the time value of money for net present value calculations, option pricing models and other market models. The term "discount rate" can also refer to the rate that the Federal Reserve Bank charges its members for overnight deposits.

Financial Advisor: Generally, an independent consulting firm that advises an issuer on financial matters ranging from the comprehensive financial health of an issuer to specific financings. Financial Advisors are generally not part of the underwriting syndicate that markets financings for an issuer.

Float Contracts: A contract which gives an investment provider the right to invest, for certain time periods, certain uninvested moneys. Generally, a float period is a period of time in which moneys of an escrow or similar vehicle are uninvested.

Forward Purchase Agreement: An agreement between an underwriter and an issuer, where the underwriter agrees to take delivery of certain bonds, at a predetermined interest rate and structure, at some point in the future. Forward delivery bonds which are "sold today" are usually delivered three months to a year from the sale date. Forward delivery bonds are normally structured in such a way to lock in "today's" interest rates and legally perform a current refunding on bonds which are not eligible to be advance refunded.

Indenture: A contract between the issuer of municipal securities and a trustee for the benefit of bondholders. The trustee administers the bonds on behalf of bondholders. The indenture establishes the rights, duties, responsibilities, and remedies of the issuer and the trustee and the exact nature of the security for the bonds.

Hedging: A strategy designed to reduce investment risk using call options, put options, short-selling, or future contracts. A hedge can help lock in profit; its purpose is to reduce the volatility of a portfolio by reducing the risk of loss.

Hybrid: An issue that combines features of more standard forms of issuance with derivative products. An example would be a variable rate bond issue that has been swapped into a fixed rate issue.

Investment Agreement: A contract between an investment provider and their client specifying the rights and responsibilities of each party in the structuring and operation of an investment product.

Lease Obligation: A lease obligation generally comes in the form of a lease revenue bond or a certificate of participation and is repaid much like a standard bond issue. The lease obligation represents an undivided interest in the payments made by a public agency pursuant to a financing lease or an installment purchase agreement. A portion of each lease payment is designated as being principal and the remainder as interest. Even though leases are not treated as indebtedness of the issuer under state law (particularly the California Constitution), the federal tax law treats the lease obligation as if it were a debt,

and, as a result, the interest component of each lease payment may be treated as tax-exempt interest.

Letter of Credit: An agreement issued by a bank that guarantees the payment of a customer's drafts for a specified period and up to a specified amount. A letter of credit can be a form of supplement or, in some cases, direct security for a municipal bond under which a commercial bank or private corporation guarantees debt service payment on the bond under certain specified conditions.

Line of Credit: An arrangement in which a bank or other financial institution extends a specified amount of unsecured credit to a specified borrower for a specified time period.

Liquidity Facility: Variable rate securities are often secured by a liquidity facility, either in the form of a letter of credit or a line of credit. Such credit enhancement assures note holders that in the event of a tender and failed remarketing, funds will be available to purchase the notes on the tender date, with the issuer becoming obligated to the letter of credit or line of credit bank on a prearranged basis.

Long Term Debt: Loans and other financial obligations with a maturity of longer than one year; usually accompanied by interest payments.

Maturity Date: The date upon which a specified amount of principal or bonds matures, or becomes due and payable by the issuer of the bonds.

Negotiated Sale: A method of sale for bonds, notes or other financing vehicles in which an issuer selects in advance, on the basis of proposals received or by other means, one or more underwriters to work with it in structuring, marketing and finally offering an issue to investors. The negotiated sale method is often used when the issue is: a first time sale by a particular issuer (a new credit), a complex security structure, such as a variable rate transaction, an unusually large issue, or in a highly volatile or congested market.

Net Revenue: Gross revenues less operating and maintenance expenses.

Net Take Down: Net revenue / Gross revenue and income. This measures how much revenue is left from all sources after meeting O&M costs. The higher the ratio the better.

Option Pricing Model/Call Option Value: A financial model that calculates a value for an issue's outstanding call option based upon the probability of future interest rate movements, remaining years to maturity and other variables. It is useful in determining whether a refunding should be executed or if the call should be preserved until a later date in the hopes of providing greater value.

Official Statement: A comprehensive statement issued by a governmental entity prior to the sale of bonds, notes or other financing vehicles that contains all the salient facts concerning the issuer, the issuer's financial condition, the security pledged for the securities being offered, the projected use of the proceeds of the sale, and other facts deemed necessary to enable the investor to judge the quality of the securities being offered. Also known as the Disclosure Statement.

P-1/A-1+/F-1+: Ratings reflecting the credit quality of commercial paper and other short-term securities awarded by credit firms based on an evaluation of the issuer's ability to repay obligations or its likelihood of not defaulting. Moody's Investor Service (P-1), Standard and Poor's (A-1+) and Fitch Ratings, F-1+.

Present Value Analysis: An analysis used to determine the value today of a future payment, or to a stream of payments, discounted at some appropriate compound interest – or discount rate.

Private Placement: A private placement is a variation of a negotiated sale in which an issuer, usually with the help of a financial advisor or placement agent, will attempt to place the entire issue directly with an investor. The investor will negotiate the specific terms and conditions of the financing before agreeing to purchase the issue.

Redemption: Depending on an issue's call provisions, an issuer may on certain dates and at certain premiums, redeem or call specific outstanding maturities. When a bond or certificate is redeemed, the issuer is required to pay the maturities' par amount, the accrued interest to the call date, plus any premium required by the issue's call provisions.

Refunding Bond: A bond that retires another bond before the first bond matures in order to reduce financing costs, improve covenants, or alter maturities.

Rule 15c2-12: A Securities and Exchange Commission obligation on public issuers of securities to provide annual updating of financial information and operating data of the type included in the official statement for the primary bond offering. The issuer is obligated to provide a notice of the occurrence of certain material events.

Self-Insurance Fund: A cash reserve fund set aside by an entity to serve as a reserve in the case of an accident, catastrophe, or other such unexpected liability. The fund is an asset of the entity and is not an insurance policy issued by a private company.

Securities: Instruments of debt or ownership sold or traded on publicly organized exchanges and/or in over-the-counter markets.

Senior Lien Debt: Debt whose terms require it to be repaid with a priority claim on pledged revenues.

Short-Term Debt: Generally, debt that matures in one year or less.

Subordinate Lien Debt: Debt whose terms require it to be repaid with pledged revenues net of the amount necessary to make debt service payments on senior lien debt.

Surety Bond: An alternative to a fully funded debt service reserve fund. A surety bond can be purchased from a bond insurance provider to fulfill the role of a debt service reserve fund and can be drawn upon in the event an issuer cannot make a regularly scheduled debt service payment. A surety bond must be purchased and is subject to credit approval by a bond insurance provider. The provider charges an upfront fee for the surety bond of approximately 3.00% to 5.00% of the debt service reserve requirement.

Swap: A generic terms used to describe a broad range of Derivative products, including interest rate swap contracts.

Synthetic Variable Rate Debt: Debt created by issuing fixed rate debt and entering into an interest rate swap agreement to make floating rate payments in exchange for fixed receipts. The fixed rate swap receipts are intended to offset the fixed rate debt service payment, resulting in a net floating rate payment.

Tender: With variable rate debt, a bond or note holder has the option of tendering or putting his or her bonds or notes back to the remarketing agent upon specific dates (monthly, weekly) for the full par amount held. The remarketing agent then re-offers the tendered notes to investors. The proceeds received by the remarketing agent from the sale of the tendered notes are paid to the tendering note holder in full satisfaction of the obligation to purchase the notes on the tender date. A new interest rate is set at the lowest rate necessary to remarket the tendered notes at par.

Trading Differential: The interest rate spread between similar bond/note maturities based upon differences in credit quality, state tax issues and tax-exempt status of various bond issues.

Underwriter: A securities dealer who purchases a bond or note issue from an issuer and resells it to investors. If a syndicate or selling group is formed, the underwriter who coordinates the financing and runs the group is called the senior or lead manager.

Variable Rate Demand Bonds (or Notes): Variable rate demand bonds, which are often referred to as floating rate debt, are instruments that provide the purchaser with an option to tender or "put" the bonds back to the issuer, at par, at the end of each tender or "re-set" period. For example, an issue with a term of 30 years could have a tender period that is daily, weekly, monthly, quarterly or semi-annually. Since the variable rate bonds give the purchaser the option of a put at par at the end of each tender period, the yield on each bond approximates the yield on comparably rated securities having a final maturity equal to the selected tender period. In other words, a holder of an issue with a weekly tender period is only entitled to a seven-day interest rate. Variable rate issues can be viewed as short-term instruments containing a built-in refinancing mechanism.

Wrapped Debt Service: Debt service that has been structured in such a way as to be "wrapped" around an outstanding issue or issues. Debt service is often wrapped in order to achieve overall level debt service or to match the issuer's revenue constraints.

Yield: The net rate of return, as a percentage, received by an investor on an investment. Yield calculations on a fixed income investment, such as a bond issue, take purchase price and coupon into account when calculating yield to maturity.

Zero Coupon: Non-interest bearing bonds that are sold substantially below par value. The difference between the discounted price and par value represents the compounded annual interest rate for the investor. Zero coupon bonds are also known as capital appreciation bonds.