Building on pioneering clean air initiatives at the San Pedro Bay ports, the Port of Los Angeles has drafted a proposed plan for advancing promising zero emission technologies. The port’s Zero Emission White Paper focuses on guidelines and near-term strategies for testing zero and near-zero emission yard tractors and short-haul drayage trucks.

The recommendations in the white paper are based on lessons learned from early testing of zero emission technologies through implementation of the port’s Clean Truck Program and its Technology Advancement Program. These programs were advanced under the landmark San Pedro Bay Ports Clean Air Action Plan (CAAP), which has led to a dramatic reduction in harmful emissions from ships, trains, trucks, cargo-handling equipment and harbour craft. The blueprint for moving forward with Zero Emissions Technologies at the Ports of Long Beach and Los Angeles, released in 2011.

This paper is a summary of the central arguments outlined in the White Paper, which is available in full on the Port of Los Angeles website.

Zero emission technologies
The economic benefits of operations at America’s busiest container port complex are felt throughout the nation, but the environmental impact is felt in the surrounding region. Recognition of these environmental health consequences led to the CAAP, jointly developed and adopted by the Port of Los Angeles and the Port of Long Beach in 2006.

In 2010, the ports updated the CAAP. The updated version established the San Pedro Bay Standards and set aggressive new goals for reducing the health risk and emissions from sources associated with port operations. The ports are working together to reduce the population-weighted cancer risk of diesel particulate matter (DPM) 85% by 2020. By 2023, the ports aim to reduce nitrogen oxides (NOx) 59%, sulfur oxides (SOx) 93%, and DPM 77%. The baseline for the targets is 2005 emission levels.

Separately, federal, state and local agencies have mandated goals for reducing greenhouse gas (GHG) emissions. By 2050, California is required to cut GHG emissions 80% from 1990 levels. Recently, California Governor Jerry Brown set an accelerated 2030 reduction target of 40% below 1990 levels.

Working with industry, the community, regulatory agencies and other stakeholders, the Port of Los Angeles has already made unprecedented progress toward reaching these targets. But in order to achieve and maintain the goals set by the CAAP and the GHG goals set by the City of Los Angeles and the State of California, port staff believe it is necessary to move away from combustion-based equipment, where operationally feasible and economically viable.

The transition to zero emission technologies must be sustainable. The port remains committed to striking a balance between pursuing important environmental goals and staying competitive within the maritime goods movement marketplace.

Activity to date
To date, the Port of Los Angeles and its partners have carried out a series of zero emission vehicle tests and demonstrations. A total of 30 electric drayage truck and yard tractor projects have been completed, are ongoing or are about to get underway. The earliest projects demonstrated the basic technology, but they fell short of performance goals. Recent projects have shown greater promise and better performance potential. To support these projects, the port has invested more than US$7 million.

Still, the total amount of testing to date is less than the average annual operating miles/hours of a single typical short-haul drayage truck or yard tractor operating in a maritime goods movement environment. Consequently, new projects slated to begin over the next several months will undergo extensive field demonstration and evaluation of between one and two years. These long-term evaluations in a maritime environment are critical to establishing technical viability and operational reliability and durability, attracting the large equipment manufacturers that will help lower costs and advance commercial availability of this equipment, and...
pursuing effective strategies for building future infrastructure.

Moving forward

We believe that widespread deployment of zero emission equipment will only occur when adequate infrastructure is in place to support it. For regional and long-haul applications, this will require planning by multiple parties to facilitate the major investment in infrastructure needed to charge and support a large zero emission goods movement fleet. For this reason, port staff believe that near-zero combustion-based emission technologies will continue to play an important role in maritime goods movement activities in the immediate future, while regional and long-haul zero emission infrastructure issues are resolved.

By contrast, we believe that more localised operations, such as cargo handling inside the terminals and short-haul drayage within the harbour area, are where zero emission solutions have an opportunity to develop in the near term. By design, this equipment never goes far from its supporting infrastructure. In particular, cargo handling equipment – yard tractors, yard goats and yard hostlers – is the source category that offers the most straightforward platform for testing and has the earliest potential for a market to develop.

By providing for technology transfer at the component level and demonstrating zero emission technology in a more controlled environment, off-road zero emission yard tractors can also accelerate the commercialisation of on-road short haul drayage trucks, which remain a key near-term pursuit.

Several ongoing projects serve as an important starting point. In partnership
By 2020, the port hopes to have facilitated testing and development of up to 200 additional zero emission vehicles at the Port of Los Angeles, and to have these vehicles evaluated using a standardised protocol developed in partnership with a regional stakeholder group. At that time, we believe the transition to onsite zero emission heavy duty equipment will be well underway. We also hope our testing and deployment activities will help stimulate the use of zero emission vehicles for short trips to areas adjacent to the port (as the equipment range continues to grow). The transition to zero emissions cannot be seen as a distant goal; it must be a reality in the near-term. We’d like to be one of the leaders to make that reality happen.

Readers can access a full version of the Port of Los Angeles Zero Emission White Paper at www.portoflosangeles.org.

About the author
With more than more than 25 years of experience in the environmental services industry, Port of Los Angeles Chief Sustainability Officer Christopher Cannon has worked with the Los Angeles Harbor Department since 2004 and was appointed head of the Environmental Management Division in 2010. His award-winning team is actively focused on clean technology and zero emissions solutions at North America’s largest gateway of containerised trade.

About the organisation
The Port of Los Angeles is America’s premier port and has a strong commitment to developing innovative strategic and sustainable operations that benefit Southern California’s economy and quality of life. As North America’s leading seaport in terms by container volume and cargo value, the Port of Los Angeles facilitated $290 billion in trade during 2014.

Enquiries
Environmental Management Division
Port of Los Angeles
P.O. Box 151
San Pedro, CA 90733-0151

Tel: +1 (310) 732-3675
ZEwhitepaper@portla.org

with federal, state, and local agencies and a variety of electric truck technology development companies, the port is co-funding five major technology development projects to test 22 yard tractors and short-haul drayage units for long-term in-use demonstration. Objectives range from testing a hybrid retrofit that allows all-electric range within or near a terminal, to demonstrating hydrogen fuel cell range extenders on zero emission trucks. All tests are being done in a fully operational marine terminal environment.

Widespread deployment of zero emission technology hinges on overcoming the fundamental challenges of cost and infrastructure. To facilitate solutions, the port recommends a five-year action plan focused on the following three goals:

• **Funding**: the port would identify strategic opportunities to secure funding to expand near-term testing and support long-term capital investment and operations. With adequate grant funding, the port can facilitate the purchase of up to 40 new zero emission vehicles each year for a five-year period starting in 2016. The port estimates the cost at $20 million per year for a total of $100 million. Based on its success with the Clean Truck Program, the port sees an incentive program as an effective short-term strategy to help transition this technology to a market-based model.

• **Infrastructure**: working with agencies, industry partners and stakeholders, the port would develop a comprehensive regional near-zero and zero emission infrastructure plan to prepare for the future deployment of hundreds, if not thousands, of zero emission trucks. This plan will consider the charging or fueling needs of both on-road drayage and on-terminal electric yard tractors. Special consideration will be given to infrastructure standardisation and the potential impact on the California electrical grid. This effort is proposed to begin in the fourth quarter of 2015.

• **Supporting the advancement of Zero Emission Technology**: the port would continue to monitor regional technology initiatives to advance on-road zero and near-zero emission drayage trucks. Where appropriate, the port could support relevant projects.

The five-year plan would be integrated into key port guiding documents, including the Port of Los Angeles Capital Improvement Plan and the next update of the CAAP. Work on the latter has already begun.

Coordination with agencies, industry partners and other stakeholders is vital to the long-term success of zero emission technology at the port and in the maritime and goods movement industry. As a major test site, the port can continue to play a leadership role in developing consistent and equitable zero emission testing, performance standards and reporting guidelines. In doing so, it would serve as a regional catalyst by stimulating the pace of technology development and promoting economic development in Southern California and throughout the state.