Sustainable Supply Chain Advisory Committee
Harbor Craft Recommendation
January 2021

The San Pedro Bay Ports Sustainable Supply Chain Advisory Committee (SSCAC, or Committee) submits the following recommendation for reducing air pollution and greenhouse gas emissions at the San Pedro Bay Ports to the Mayor of Long Beach, Robert Garcia; the Mayor of Los Angeles, Eric Garcetti; the Executive Director for the Port of Long Beach, Mario Cordero; and the Executive Director for the Port of Los Angeles, Gene Seroka.

This recommendation is made in alignment with previous SSCAC recommendations made in support of the joint ports' Clean Air Action Plan (CAAP) for achieving emissions reductions across the San Pedro Bay Port (SPBP) complex. Prior recommendations stress the accelerated use of harbor craft equipment that meets or exceeds the Tier 4 standard in order to meet air quality targets in the South Coast Air Basin.

Committee Research and Findings

SPBP Context

The harbor craft (HC) segment of the SPBP inventory comprises approximately 800 vessels, 34% of which are commercial fishing vessels and 33% of which are evenly divided among crew boats, harbor tugs and assist tug boats. In 2020, only two of the HC vessels operating in the SPBP were powered by engines meeting the US EPA Tier 4 standard; the majority of HC were powered by engines meeting the Tier 2 standard or lower. Although smaller in size and population, tug boats are responsible for the majority of HC emissions due to their large engine sizes and long operating hours.

Analyses by the Ports and the SSCAC have determined that investments in emissions reductions in the HC segment are a cost-effective strategy to reduce NOx and PM2.5 emissions. While the HC segment presents an opportunity for cost-effective emission reductions in the SPBP complex, several material challenges are prohibiting larger scale investment in such projects.

Funding Sources are Insufficient for Project Scopes

The Ports currently support several HC demonstrations including two under their joint Technology Advancement Program (TAP): an advanced emission control system project, and an electric drive tugboat project. While these projects have yielded useful preliminary results, they have also confirmed a number of technical and funding challenges for the widespread adoption and scaling of such technologies throughout the port complex.

The average new tug boat powered by a Tier 4 engine costs approximately $15 million. To retrofit the cleanest commercially available vessel with additional emission control equipment requires several million dollars of additional capital, and significant equipment downtime for engineering and installation. Grants and incentives in the $500,000 to $1.0 million range are helpful to offset such costs but the remaining incremental costs are significant. Additionally, the unique design of commercial tugboats requires unique engineering for each installation including the addition of emissions control technologies, eliminating potential efficiencies from economies of scale. Finally, a lack of a clear

business case to justify such a large investment in these technologies further compounds the operators' barrier to adoption.

Similarly, while a zero-emission standard is anticipated in the long term, this technology for the HC segment is in the early pre-commercial stage. As with any pre-commercial technology, the initial prototypes and demonstration units require significant capital and time to develop. Additionally, significant infrastructure challenges must be addressed. HC operators are engaged under a leasing structure - those that lease through the ports are typically contracted on a month-to-month basis - and rely on fueling infrastructure over which they often do not have direct control. Due to the short-term nature of their service agreements HC operators do not typically get involved in dockside infrastructure upgrades, and, major upgrades such as those required for new technologies are difficult for the ports to justify given the short-term nature of the typical HC lease. For these reasons, HC equipment developers do not currently see a funding horizon that can sustain the innovation required to achieve a ZE standard over the long term.

Funding Program Requirements are Incongruent with Industry Standards

The Ports and operators observe that most funding programs offer incentives well below the level required to support the cost of a full repower, new purchase, or new technology deployment; therefore projects must secure funding from multiple sources. Such a patchwork approach to securing funding presents additional burdens of unique reporting requirements and program conditions on project developers. The following conditions are common across existing funding programs, and problematic for operators.

- Funding Program Condition: Project must retrofit an existing vessel; new build projects are unable or unlikely to qualify.
    - Issue: Tug boats are typically custom-built with engine cavity designs that are specific to the original engine, making them challenging to retrofit. For many vessels, installing selective catalytic reduction (SCR) and diesel particulate filter (DPF) equipment to meet a Tier 4 standard is is infeasible given space constraints and technical limitations.
    - Tug boats have a 35-50 year life, and represent a significant investment to be paid off over a long period of time. Retrofitting vessels with many years of useful life significantly reduces the operator's return on its original investment.
- Funding Program Condition: Retrofit systems must be CARB-certified.
    - Issue: Many retrofit systems are unique to the vessel, and, there are few existing CARB- and marine- certified retrofit systems available today. Furthermore, no currently certified system meets the Tier 4 standard - a strong indicator of the challenge this industry faces in meeting emissions reductions requirements.
- Funding Program Condition: Funds may not be used to secure certification for new technology.
    - Issue: Certifying new technology is time- and cost- intensive, and the certified equipment may only support a small number of vessels.
- Funding Program Condition: Funded equipment must be operated in a fixed geographic area over the long term.
    - Issue: Vessels are highly mobile, and operators frequently move them between port complexes. Restricting a vessel's operations to a given port is incongruent with the HC industry's standard of operations, and compromises an operators' competitiveness. Tug operators expressed concerned that certain towing vessels covered by the HC definition

are operated in coastal trade in competition with vessels that are not covered by the HC definition.

Regulatory Pressures Impede Innovation

Finally, HC operators face mounting regulatory pressure to achieve the goals laid out under the CAAP. As described above, the Tier 4 standard is difficult to attain due to the engineering challenges and high costs of both retrofitting existing vessels and building new vessels. In a regulatory environment that is moving towards an even higher standard, many operators are additionally wary of purchasing new vessels at the Tier 4 standard which may become non-compliant before satisfying their useful life. For smaller operators, these costs and levels of risk are simply prohibitive. Many of these smaller operators raised equity concerns about meeting compliance challenges against significantly better capitalized competitors.

Committee Recommendation for Port Action

Based on the findings described above, the SSCAC asserts that prompt, tangible action is required by the joint ports to ensure that the vessel manufacturer, operator and fueling industries can make timely investments to support the goals of the CAAP, and comply with upcoming regulations from CARB. The SSCAC recommends that the ports take the following specific actions.

- Prioritize investments in ship-assist and tanker escort tugs, the most significant portions of the HC segment for emissions reductions.
- Advocate for expanded funds with larger incentives, including incentives supporting new build as well as retrofit projects, and modify funding terms to better align with the HC industry's needs and standards.
- Support development and deployment of demonstration projects with advanced technology, aiming for repeatable and scalable project designs.
- Coordinate with HC operators to facilitate reliable access to electricity at the ports as zero emission vessels become commercially available.