



SAN PEDRO BAY PORTS

# CLEAN AIR ACTION PLAN 2017

Framework for Developing  
Feasibility Assessments

**NOVEMBER 2017**

# Framework for Feasibility Assessments Clean Air Action Plan 2017 Update

November 2017



## Framework for Clean Air Action Plan Feasibility Assessments

A series of regular feasibility assessments have been established by the 2017 Clean Air Action Plan (CAAP) Update to help the Ports and CAAP stakeholders to evaluate the status of technology and supporting infrastructure that will be needed to achieve the CAAP strategies for new technologies, including cargo-handling equipment and on-road drayage trucks.

The feasibility assessments will evaluate the following parameters: (i) technical viability, (ii) operational feasibility, (iii) availability of supporting infrastructure and fuels, (iv) key economic considerations such as total cost of acquisition and operation and including cost effectiveness, and (v) commercial availability. In addition, the feasibility assessments will evaluate these same parameters for near-zero emissions technologies or the cleanest available technologies where near-term emissions benefits can be achieved with those technologies during the period of transition to the ultimate goal of zero emissions.

Importantly, these assessments will evaluate feasibility in terms of widespread deployment across the port complex. The Ports recognize that some technologies may be feasible in certain circumstances, for example, at specific terminals or in certain applications where the operational, infrastructure, and financial conditions are unique from the port complex as a whole; however, for the purposes of adopting port-wide policies, the assessments will take a more comprehensive look at the state of technology, infrastructure, operations, and costs and determine feasibility that way.

The framework set forth in this document provides a guide for carrying out the feasibility studies.

### Feasibility Assessment Process

The regular feasibility assessments established by the CAAP are intended to be critical tools in assessing progress toward achieving the CAAP strategies. The process for carrying out the feasibility assessments will be as follows:

#### Scope

The assessments will consider the following issues:

- Characteristics of the existing fleet, including penetration of zero- or near-zero emissions vehicles or equipment by specific equipment type
- Projections of fleet characteristics and technology viability
- Current status of the technology by equipment type and equipment costs, including operational reliability, and results from demonstration projects in port-related operations
- State of infrastructure and/or fueling availability and infrastructure costs
- Anticipated availability of funding assistance (e.g. grants, loans, etc.)
- Characterization of the likelihood of meeting the CAAP strategy deadlines

### Timeframe

Comprehensive assessments are anticipated to be conducted every three years starting in 2018. More frequent updates to these assessments may occur as new information becomes available.

### Stakeholder Engagement

Stakeholder input will be critical for a successful outcome. Development of the feasibility assessments will be a public process with opportunity for review and comment on the draft document. In addition, the Ports, in developing the feasibility assessments, may consult with technical experts who bring unique knowledge or perspective to the evaluation process. These experts may include technology developers, regulatory agencies, academics, and end users with operations expertise. These experts may also provide assistance with outlining assessment scopes and reviewing final documents.

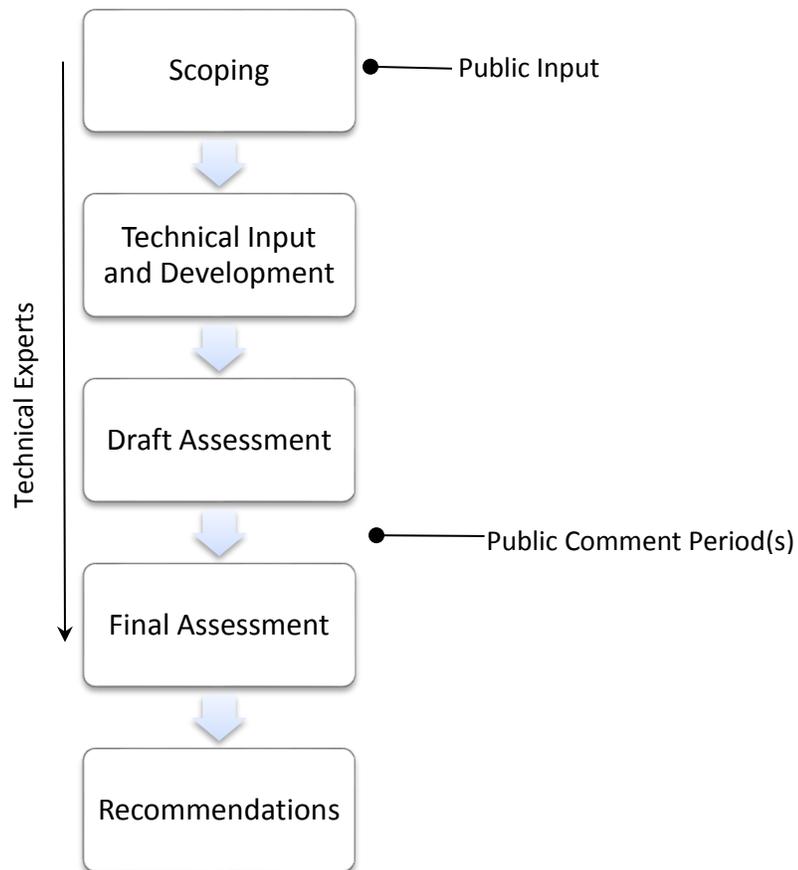
### Information Used

To the extent possible, the Ports intend to reference and use data and trends from publicly available agency reports, duty cycle reports, and/or existing test protocols from agencies such as the California Air Resources Board (CARB), South Coast Air Quality Management District (SCAQMD), and California Energy Commission (CEC). Examples include the CARB Technology Assessments, SCAQMD's annual Clean Fuels Program Report, and final reports from technology demonstrations. Such an approach ensures consistency with previous studies that have already been publicly vetted and reviewed by technical experts.

### Public Review Process

Draft assessments are anticipated to be released for a public comment period. Upon the successful conclusion of the release of draft assessments, public comment periods and possible revised assessments, final feasibility assessments will be reported to the respective Boards of Harbor Commissioners and posted on the CAAP Web site.

**Figure 1: CAAP Feasibility Assessment Process**



## Defining Feasibility

The assessments are intended to evaluate the current state of a technology, the factors necessary to successfully deploy the technology, such as infrastructure and cost, and to project future feasibility. This feasibility assessment will determine the likelihood of the technology availability to meet the CAAP implementation timeline. To do so, the Port may evaluate the following factors:

### Technical Viability

For a technology to be considered ready for wide-scale implementation, it must not only be able to meet the performance requirements, it must also be available in sufficient quantities to meet the demand. Based on reports and data from demonstration projects and technology assessments, and evaluations of the manufacturing capabilities and market forecasts, the feasibility assessment will evaluate whether a specific technology application is both technically viable and commercially available at the time of the writing, or if not, when it can be expected to reach those milestones.

Although there are no common agency definitions of technical viability and commercialization, the Ports generally use the following guidance:

- An advanced, clean technology is considered to be viable when its operational performance meets or exceeds the standard in-use equipment (i.e. diesel equivalent) as demonstrated in real-world port conditions.
- An advanced, clean technology vehicle, engine or emissions technology has been certified by an authorized regulatory agency (Environmental Protection Agency [EPA] or CARB) and complies with applicable standards and regulations, as appropriate.
- An advanced, clean technology is considered to be commercially available when (1) it can be manufactured in large quantities comparable to and within similar timeframes as the in-use equipment (i.e. diesel equivalent), and (2) it has similar long-term warranty, maintenance, and parts support.

#### Commercial Availability

To determine whether the equipment can be manufactured in sufficient quantities and within similar timeframes as the standard equipment for the purposes of meeting CAAP deadlines, the Ports intend to consider the following:

- Involvement of a major equipment manufacturer with sufficient manufacturing capabilities to produce the equipment/vehicle
- Time to manufacture equipment to meet fleet needs
- Existing and future equipment orders
- Manufacturer warranty provisions and long-term support for maintenance and parts replacement (equivalent to those offered for diesel equipment)

#### Operational Feasibility

To determine whether a technology meets or exceeds the operational performance necessary for a port environment, the Ports intend to review demonstration reports and technology assessments for the following:

- Ability of vehicle to meet minimum performance specifications
- Ability of vehicle to handle different types of duty cycles required for port-related operations
- Dynamometer testing results, if applicable
- Maintenance needs, including necessary repairs and time out of service
- Operator feedback on drivability, range, refueling, and comfort
- Technology vendor's commitment to long-term market support, including standard warranties, parts replacement, and maintenance and repairs.

### Infrastructure Availability

The Ports intend to evaluate the availability of infrastructure to support the transition to near-zero and zero emissions within the timeframes prescribed by the CAAP. This aspect of the assessment may look at the following:

- Electric infrastructure on and off terminals
- Hydrogen fuel availability on and off terminals
- Natural gas fuel availability on and off terminals
- Other applicable fuel availability needs

The Ports plan to provide a terminal-by-terminal status of the availability of such infrastructure, regional availability for trucks, and projections of infrastructure needs to meet the CAAP deadlines.

### Key Economic Considerations

The assessments are expected to evaluate the economic factors associated with the CAAP strategies, including direct costs of equipment, infrastructure for the industry end users and the Ports, as well as indirect costs on jobs and potential diversion of goods.

For direct costs, the assessments may consider the following categories and the extent to which expenditures to meet the CAAP goals are achievable for private industry and the Ports for widespread deployment of such technologies. The assessments may characterize the incremental costs in relation to the standard equipment (i.e. diesel) baseline.

- Equipment
  - Upfront capital costs for equipment
  - Fuel and maintenance costs
  - Other applicable costs and fees
- Fueling and terminal infrastructure necessary to support zero emissions
  - Cost of installing electric infrastructure
  - Cost of energy
  - Cost of alternative fuel infrastructure (i.e., renewable natural gas and hydrogen)
  - Cost of fuel

Additionally, the assessments may evaluate:

## Is It Feasible?

### Technical Viability:

- Is its operational performance equivalent to the in-use equipment?
- Is it certified or approved by a regulatory agency, as appropriate?
- Is it commercially available?

### Infrastructure Availability:

- Is there sufficient infrastructure to support electric, fuel-cell and/or natural gas equipment?

### Operational Feasibility:

- Does the technology meet or exceed the performance necessary for a port?

### Key Economic Considerations:

- What is the cost of the new equipment for end users?
- What are the potential economic or workforce impacts of transitioning to the new equipment?
- Is the technology cost effective for portwide deployment?

- Incentive funding provided to date and available in the future, particularly as these incentives are necessary to promote cost-effective technologies
- Whether the technology has the potential to be a cost-competitive purchase option that will lead to commercial adoption
- Potential workforce impacts and benefits
- Potential impacts on diversion of goods
- Cost-effectiveness of a given technology in terms of cost per emissions reduced; the Ports may present this cost-effectiveness analysis as a relative comparison to diesel equipment and other clean technologies and/or as an absolute determinant compared to a specified cost-effectiveness threshold.

## **Outcomes**

Feasibility assessments are intended to consider whether the Ports are on track to meet CAAP goals. These assessments will provide critical information on where challenges remain and where focused attention and support is needed. In addition, this information will also inform whether these timelines may need to be adjusted.

As a result of these assessments, the Ports could:

- Determine what actions need to be taken to reach the deadlines specified for each strategy, for example, additional technology demonstrations, new funding programs, additional infrastructure installments
- Issue advisories or further guidance to the industry in order to provide additional flexibility as necessary to meet the CAAP deadlines

Through the public process and in working with technical experts, the Ports will continue to refine the scope and content of these assessments.