

## EXECUTIVE SUMMARY

In October of 2001, the Board of Harbor Commissioners for the Port of Los Angeles (Port) established a new environmental policy, which set as a goal, No Net Increase (NNI) in air emission from future Port operations, and set 2001 as the baseline year. This report documents the results of an eight-month stakeholder process set in place by Mayor James K. Hahn and Councilwoman Janice Hahn “...to build consensus on an innovative and realistic strategy to achieve ‘No Net Increase’ at the Port of Los Angeles.”<sup>i</sup>

### **Background**

The status of the Port as a gateway for international commerce and a local, regional and national economic resource, has resulted in increased air emissions from the predominantly diesel-fueled equipment used to transport the increasing cargo destined for all parts of the nation. The 2001 baseline air emission inventory for the Port indicates that goods movement within the South Coast Air Basin, in which the Port is located, from Port activities contributes approximately twelve percent of the basin’s total diesel particulate matter (DPM) emissions. Since the 1990s there has been growing awareness of the potential effects of diesel exhaust including its identification as a toxic air contaminant by the California Air Resources Board in 1998. Research also documents an association of asthma and other acute and chronic respiratory impairments from exposure to diesel particulate matter. The South Coast Air Basin is also designated by the U.S. Environmental Protection Agency as a non-attainment area for ozone, carbon monoxide, and particulate matter (defined as PM<sub>10</sub>, particles less than ten microns in diameter). Oxides of nitrogen gases (NO<sub>x</sub>) are important precursors to the formation of photochemical smog, including ozone. Port operations collectively contribute substantial amounts of NO<sub>x</sub> (thousands of tons per year) to the regional airshed. Regional plans to reduce ozone levels across the basin must therefore include reduction of NO<sub>x</sub> emissions. Community concerns over health, and the above considerations, focused the discussion primarily on NO<sub>x</sub> and particulate matter (as PM<sub>10</sub> or DPM) reduction strategies.

A Task Force was appointed by Mayor Hahn, composed of representatives from national, state, and regional air quality regulatory agencies; several neighborhood councils; community environmental organizations; maritime, rail, and commerce representatives; port labor representatives; Harbor Department staff; environmental and health experts. The Task Force was co-chaired by Harbor Commissioners Camilla Townsend and Thomas Warren.

The No Net Increase (NNI) Task Force met regularly between October 2004 and June 2005 to suggest, discuss, refine, and debate information needed and available for use in emissions growth projections, pollution reduction approaches, and related feasibility issues. Sub-groups of the larger Task Force were informally established to address the development of technical measures for pollution reduction, the financial costs of potential emissions reduction measures, and the legal/jurisdictional issues associated with implementation of specific reduction approaches and measures.

## **Emissions and Growth Estimates**

Accurate information, including credible baseline inventory data of port-related emissions and likely scenarios for port-related cargo and emissions growth, were critical for Task Force progress. To estimate future growth, the Task Force selected four specific years for comparison – 2008, 2010, 2012, and 2025. These milestone years were selected to provide a near-term estimate (2008), mid-term evaluations (2010 and 2012), and a long-term out-year (2025) to assess the ability to maintain emission reductions in the face of predicted growth. The 2001 Port-wide Baseline Emissions Inventory was exploited as the most current, accurate, and appropriate reference to apply in evaluating current port operations and emissions. Growth scenarios based on historical growth rates of cargo throughput and proportional emissions increases were evaluated for each of the five emissions inventory components (ships, harbor craft, off-road cargo handling equipment, rail, and on-road trucks). Significant differences of opinion were present within the Task Force regarding selection of the most appropriate growth rate scenarios to apply to cargo throughput growth. Ultimately, a conservative approach that assumed relatively unconstrained continued growth at recent annualized rates was applied to cargo throughput activities. This resulted in a 422% increase in activities for ocean-going vessels over 2001 levels, a 443% increase in cargo handling equipment activities, essentially no change in harbor craft activity, a 355% increase in rail locomotives activity, and a 372% increase in truck activity.

To estimate emissions growth, the Task Force elected to focus on emissions projections for near-term years (2005-2010) and to make estimates based on a worst-case/highest impact scenario, the mitigation of which would be most protective of public health. Application of this estimated approach, without additional emission controls, leads to linear increases in NO<sub>x</sub> and PM<sub>10</sub> emissions from their estimates of 25,940 and 1,580 tons per year in 2005, respectively, to 37,290 and 2,650 tons per year, respectively, in 2025.

Task Force members and support staff proposed over 70 control measures for possible consideration. This included adopted measures, engine standards, fuel requirements, retrofit/repower, and operational efficiencies or improvements. Emission reduction estimates for several of the proposed measures could not be made, due to insufficient detail, development, or evolution of some of the potential reduction approaches. The remaining 68 measures were evaluated for emissions reduction opportunities and included in the projected emissions reduction calculations.

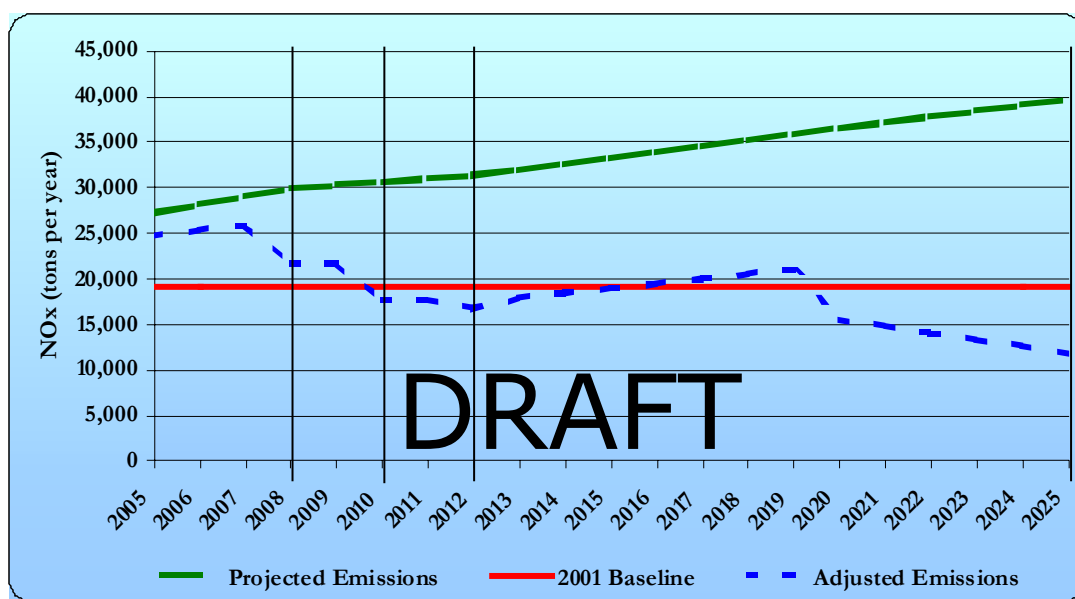
Emission contributions and the number of control measures identified for each of the five major source categories associated with port-related diesel emissions are summarized in Table ES-1. Ship emissions, followed by trucks calling at the Port, represent the largest sources of port-related emissions.

**Table ES-1. Port Emission Sources and NNI Control Measures**

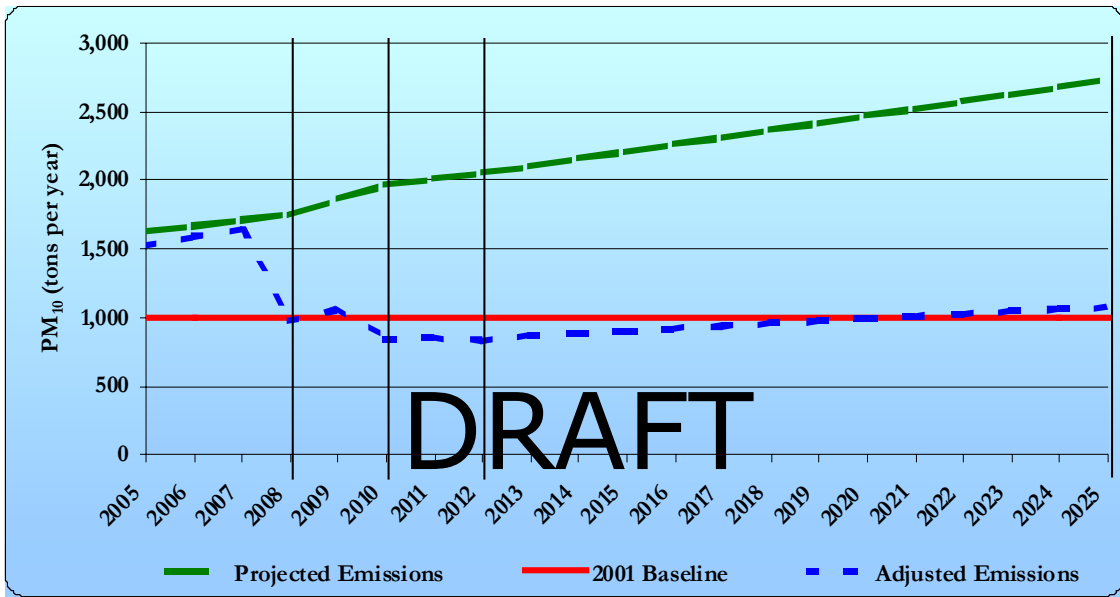
<b>Emission Source</b>	<b>Percent of Inventory (NO<sub>x</sub>)</b>	<b>Percent of Inventory (PM<sub>10</sub>)</b>	<b>Number of Measures</b>
Ships	36.1	54.8	17
Harbor Craft	18.3	18.4	11
Cargo Handling Equipment	9.6	11.5	9
Rail Locomotives	12.8	6.2	12
Trucks	23.2	9.1	19
<b>Total Measures</b>			<b>68</b>

If (a) future cargo growth activity increases as forecasted, (b) the direct proportional relationship between cargo growth and emissions is valid, and (c) all 68 proposed emissions reduction measures are implemented as scheduled, then it is estimated that the goal of No Net Increase could be attained by or around 2009. A summary of predicted emissions levels, and the impact of the proposed reduction measures, are summarized in Figures ES-1 for NO<sub>x</sub> and ES-2 for PM<sub>10</sub>.

**Figure ES-1. Total NO<sub>x</sub> Emissions, Adjusted For Implementation of Control Measures**



**Figure ES-2. Total PM<sub>10</sub> Emissions, Adjusted For Implementation of Control Measures**



The predicted growth in cargo throughputs, even with the described control measures, will drive emissions of NOx and DPM over the 2001 baseline around 2015 and 2021, respectively. In fact, these two principles (forecasted cargo growth activity and the relationships between growth and emissions levels) are the fundamental foundation on which the NNI technical and financial analyses are based. NOx emissions can be reduced in future years (circa 2020) through application of new ship engine technology while DPM emissions will require application of undetermined control measures to remain below the baseline.

### Financial Analysis

A financial analysis of the proposed control measures estimated “Order of Magnitude” costs associated with each respective measure, potential funding sources to provide for the anticipated costs, and the potential cost benefits, in terms of health care cost savings, achieved by the emissions reduction. Preliminary cost estimates are provided for 52 of the 68 measures. Undiscounted estimates of annual regulatory and non-regulatory costs (e.g., unfunded) ranged between \$10 Million and \$1.8 billion per year through 2025. Total costs associated with the evaluated NNI control measures through 2025 are estimated to range between \$11.6 billion, with \$15.7 billion, with the unfunded non-regulatory costs ranging from \$9.5 billion to \$13.6 billion. Absent federal, State and regional funding, the Port and its tenants would likely be looked to for funding of these non-regulatory unfunded costs. Assuming the most likely financial scenario, net revenues from Port operations would be unable to fund NNI without a substantial deficit of the Harbor Revenue Fund. In comparison, preliminary estimates of avoided undiscounted health care costs and costs attributable to premature death associated with

NOx and PM emissions from Port-related goods movement is \$11 to \$28 billion. Its important to note that these “Order of Magnitude” cost estimates rely on a long string of assumptions that were made during the technical analysis and the Task Force process. The cost estimates have not been reviewed by the sources that will be asked to implement the proposed control measures and therefore, should only be considered as preliminary estimates.

There were several costing issues that were not settled in the Financial Working Group (FWG) and still need further analysis as the process moves forward and for some measures there were opposing cost estimates that were developed by different stakeholders. For example, two rail measures were estimated independently by the SCAQMD and the rail group, resulting in two different costing scenarios. After considerable debate, consensus could not be reached on accepting one scenario over the other and therefore, both scenarios were included in the cost measure estimates. The California Air Resources Board evaluated the potential health benefits associated with the projected emissions reductions from the control measures and developed estimates of the potential health benefits from these reductions, which ranged from \$9 to \$28 billion. There was considerable debate on the projected health benefits of the NNI control measures and the monetary values assigned to those benefits, and consensus was by no means reached. Table ES-2 presents the aggregated NNI emissions reductions, unfunded costs associated with the control measures considered, and the potential health benefits valuation associated with the reduced emissions.

**Table ES-2. Aggregated NNI Emissions Reductions, Unfunded Costs, Total Costs, and Health Benefits Valuations**

	2005 - 2009	2010 - 2014	2015 - 2019	2020 - 2025	Totals
Oxides of Nitrogen Reductions (tons)	25,040	67,260	69,720	141,910	303,930
Diesel Particulate Matter Reductions (tons)	1,870	5,850	6,620	9,020	23,360
Unfunded Costs (SCAQMD rail measure estimates)	\$620,000,000	\$1,990,000,000	\$2,310,000,000	\$4,530,000,000	\$9,500,000,000
Cost Ranking & Prioritization Value (\$/ton reduced)	\$14,175	\$15,824	\$16,995	\$19,517	
Unfunded Costs (Rail group measure estimates)	\$736,000,000	\$2,109,000,000	\$6,428,000,000	\$4,318,000,000	\$13,600,000,000
Cost Ranking & Prioritization Value (\$/ton reduced)	\$16,827	\$16,770	\$47,293	\$18,603	
Total Costs (SCAQMD rail measure estimates)	\$740,300,000	\$2,433,800,000	\$2,913,000,000	\$5,513,600,000	\$11,600,000,000
Total Costs (Rail group measure estimates)	\$856,300,000	\$2,552,800,000	\$7,031,000,000	\$5,301,600,000	\$15,700,000,000
Health Benefits Valuation (Mean)	\$1,400,000,000	\$4,700,000,000	\$5,500,000,000	\$8,567,000,000	\$20,200,000,000

\* - Cost ranking & prioritization values are not the same as common cost effectiveness values, and are not comparable

## Legal Analysis

A legal evaluation of the plan and control measures was undertaken. The evaluation looked at the legal authority of the Port and City of Los Angeles in implementing the control measures, federal preemption issues, interstate and foreign commerce issues, potential limitations on municipal powers, and statutes and agreements governing railroads among others. Selected control measures were also reviewed individually. There was a general consensus on the various issues involved in implementation of NNI; however, there were significant differences of opinion on how the courts would resolve those issues.

## **Implementation**

Implementation of an NNI Plan would be a phased process, incorporating a number of control methods and requiring further development strategies and regular reevaluations. Control measures will be implemented using a combination of voluntary, incentive-based, and enforceable approaches. Voluntary measures are those implemented by participants without legal obligation and include procedural efficiency improvements, vessel speed reduction programs, use of cleaner fuels in exempt equipment, and purchase of newer lower-emission equipment for port operations. Incentive-based measures seek to make adoption of the respective control measure cost-neutral for the participant. Examples of such measures include subsidized use of lower sulfur or alternative fuels and conversion of engines through the Carl Moyer funding program. Enforceable measures ensure mandatory compliance by regulatory ordinance, contractual obligation, or other similar means. Examples of such measures include mandated emissions reductions, use of specific low-sulfur fuels or engine types. Near-term measures are largely adopted well-understood control measures that would be implemented between 2005 and 2007. Mid-term measures are technologies that are being developed and will become available between 2008 and 2010, while long-term measures require further research and development and would be added/applied from 2011 on. Contingency measures that were considered include identification of emerging technology, implementing operational capacity restraints and regular reevaluations to examine progress and adjust the program as necessary.

The NNI process should include plan review and revision on a regular basis, such as every three years, to incorporate the latest emissions, technology, and cargo forecast information, as well as to gauge progress and adjust measures, as needed. Implementation should also include a comprehensive integration of findings and stakeholder involvement to ensure compliance and measure/document improvement.

Approval of the Plan in its entirety or in part by a decision making body (e.g., the Los Angeles Harbor Department) would require evaluation in accordance with the California Environmental Quality Act (CEQA). Individual control measures could be found to be exempt from CEQA on a case-by-case basis, while approval of some measures and a comprehensive plan would likely require preparation of an Environmental Impact Report (EIR).

## **Limitations and Constraints**

This report is subject to a large number of caveats and limitations due the short time frame in which the report was prepared, and assumptions necessary due to the state of technical knowledge and future projection period of 20 years (through 2025). Conservative estimates of growth, which may have resulted in an over-prediction of emissions, were purposely used to provide an added margin of emission reductions. If these estimates do turn out to be high, the resulting emissions reductions will be achieved in a more timely fashion, to the public health benefit of the regional population.

Therefore, this first analysis of NNI should be considered a starting point for further analyses, which should utilize updated cargo forecasts, new emission inventories and updated emission control technology.

This report is based on an assumption of unconstrained growth in port activity, and has not factored in physical constraints on port infrastructure, such as available land or space for facility expansion, layout, or modification. Other logistic and infrastructural support needed to support a dynamic goods movement (including distribution of the shipped goods via roads or rail to warehouses and distribution centers) may effectively limit port growth and port emissions.

This document does not represent a consensus among the involved stakeholders on No Net Increase. During its development significant technical, legal, financial and policy-related issues arose which would be difficult to resolve even within a longer time frame. Significant among these issues are the following:

- The reliability of the assumptions made in forecasting future cargo activity and the relationships between growth and emissions.
- The methodologies used to generate the cost and benefits analysis.
- The technical and cost feasibility of some of the proposed emission control measures.
- The legal authority of local, regional, state and federal governments to control emission sources pre-empted by higher authority (e.g. state control over federal sources).
- The over- or underestimate of the health implications associated with exposure to diesel particulate matter.
- The broad policy implications of the economic vitality versus chronic and acute health implications of implementing or not implementing NNI.

Having documented these outstanding issues, the document does represent an incredible effort on behalf of the parties involved, over a very constrained period of time. While there is no clear consensus on all of the specific means to reduce diesel toxics, it is clear that all parties acknowledge the significance of the issue and the need to continue aggressive programs to improve air quality.

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<sup>i</sup> Letter to Mr. Larry A. Keller, Executive Director, Port of Los Angeles from Mayor James Hahn and Los Angeles City Councilmember Janice Hahn, District 15. August 6, 2004.