GOODS MOVEMENT ACTION PLAN

PHASE I: FOUNDATIONS

Prepared by

Business, Transportation and Housing Agency
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PREFACE

Much work has been done at local and regional levels to address important issues facing the goods movement industry. Most notable long-term efforts include work conducted by the Southern California Association of Governments[1] and the Metropolitan Transportation Commission.[2] In elevating the discussion to a statewide level, the challenge is to preserve the integrity of local and regional processes while finding a means to distill common elements that can benefit from a statewide approach.

Beginning in June 2004, the Schwarzenegger Administration began a concerted effort to assemble goods movement stakeholders to learn about the problems, opportunities, and challenges facing the future of goods movement within the State. The input generated by these meetings resulted in the formation of the Cabinet Goods Movement Working Group in December 2004, co-chaired by Secretary Sunne Wright McPeak of the Business, Transportation and Housing Agency (BTH) and Secretary Alan Lloyd of the California Environmental Protection Agency (CalEPA). Their efforts led to the formation of the Administration Goods Movement Policy, "Goods Movement in California," in January 2005, (see attached).

Secretaries McPeak and Lloyd then convened a series of "listening sessions" in Los Angeles on January 27, 2005 and March 24, 2005, and in Oakland on February 11, 2005, to hear from the full range of stakeholders engaged or impacted by goods movement activities. Collectively, these sessions attracted 325 participants who offered specific ideas and recommendations to resolve issues associated with the growth of the goods movement industry and the mitigation of its impacts. Summaries of participants' oral comments and submitted written testimony are posted on the BTH and CalEPA websites.[3]

The Goods Movement Action Plan is a two-phase process. This draft document represents the Phase I report. It is an attempt to characterize the "why" and the "what" of the State's involvement in goods movement in the following four segments: (1) the goods movement industry and its growth potential; (2) the four "port-to-border" transportation corridors that constitute the state's goods movement backbone and the associated inventory of infrastructure projects being planned or are underway; (3) the extent of environmental and community impacts—as well as a description of mitigation approaches; and (4) key aspects of public safety and homeland security issues.

Substantial effort was focused on developing the inventory of existing and proposed goods movement projects. The listing includes previously identified projects in various Regional Transportation Plans (RTP) and Regional Transportation Improvement

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[1] Southern California Association of Governments, "Southern California Strategy for Goods Movement: A Plan for Action," February 2005.

[2] Metropolitan Transportation Commission, "Regional Goods Movement Study for the San Francisco Bay Area", December 2004.

[3] The URL for the Business, Transportation, and Housing Agency website is www.bth.ca.gov and for the California Environmental Protection Agency website is www.calepa.ca.gov.

Programs (RTIP) prepared by Municipal Planning Organizations (MPOs), Transportation Commissions and Councils of Governments (COGs). In addition, the listings include a wide range of outlined projects underway or under consideration by the ports, railroads, and other third parties. Prior to this compilation, no comprehensive statewide inventory was available.

The Phase II Action Plan to be completed by December 2005 will develop a statewide implementation plan for goods movement capacity expansion, goods movement-related environmental and community mitigation, and goods movement-related homeland security and public safety enhancement. It will define the "how," "when," and "who" required to synchronize and to integrate efforts to achieve relief and improvement as quickly as possible.

The Phase II effort will be executed by work groups comprised of various stakeholders in conjunction with team leaders from BTH and CalEPA staffs. Phase II will include business plans for each of California's four goods movement corridors. Over a four-month period, each of the work groups will be tasked with the responsibilities of developing business plans which will detail the timing, sequencing, and funding of corridor expansion projects. Each corridor working group will also review, evaluate, and recommend corridor-specific operational improvements; environmental and community impact mitigation strategies; and homeland security and public safety enhancements. The working groups will also be responsible for identifying how the costs of improvements and mitigation measures could be funded.

Phase II also will include the Port and Intermodal Goods Movement Comprehensive Emission Reduction Plan, a plan that will be developed by the California Air Resources Board (ARB) in consultation with all stakeholders. Other work groups will prepare a homeland security and public safety plan and a workforce development plan.

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January 27, 2005

GOODS MOVEMENT IN CALIFORNIA

Improving the movement of goods in California is among the highest priorities for Governor Schwarzenegger. The State's economy and quality of life depend upon the efficient, safe delivery of goods to and from our ports and borders. At the same time, the environmental impacts from goods movement activities must be reduced to ensure protection of public health.

The goods movement and logistics industry is an increasingly important sector of good jobs for Californians. It is vital to grow the industry by improving the essential infrastructure needed to move goods from California's ports throughout California and to the rest of the country with a focus on the entire "coast to border" system of facilities, including seaports, airports, railways, dedicated truck lanes, logistics centers, and border crossings. This system of facilities is critical to the national goods movement network and must be the focus of a partnership with the federal government. Improving the goods movement infrastructure also is pivotal to relieving congestion on freeways and increasing mobility for everyone in California. Further, it is vital that local, state and federal authorities cooperate to ensure port, rail and road safety and security.

It is the policy of this Administration to improve and expand California's goods movement industry and infrastructure, in a manner which will:

- Generate jobs
- Increase mobility and relieve traffic congestion
- Improve air quality and protect public health
- Enhance public and port safety
- Improve California's quality of life

The Schwarzenegger Administration has established a Cabinet Work Group to lead the implementation of this policy for goods movement and ports by working collaboratively with the logistics industry, local and regional governments, neighboring communities, business, labor, environmental groups and other interested stakeholders to achieve shared goals.

GOODS MOVEMENT ACTION PLAN

PHASE I: FOUNDATIONS

TABLE OF CONTENTS

PREFACE
ACKNOWLEDGMENTS

I. EXECUTIVE SUMMARY I-1

II. INTRODUCTION II-1

A. THE CONSUMER PERSPECTIVE II-1
B. BENEFITS TO CALIFORNIA II-2
C. CHALLENGES FOR EXPANSION II-4
D. THE STATE'S INTEREST II-5
E. THE GOODS MOVEMENT ACTION PLAN II-6

III. GUIDING PRINCIPLES III-1

IV. THE CALIFORNIA GOODS MOVEMENT INDUSTRY AND ITS GROWTH POTENTIAL IV-1

A. OVERVIEW IV-1
B. CHANGES DRIVING GOODS MOVEMENT INDUSTRY ISSUES IV-1
C. NATIONAL PROJECTIONS IV-10
D. ESTIMATING CALIFORNIA'S SHARE IV-13
E. OPPORTUNITY COST TO CALIFORNIA/U.S. AS A CONSEQUENCE OF CONGESTION AND CAPACITY LIMITATIONS IV-16

V. CHARACTERIZATION OF CALIFORNIA'S "PORT TO BORDER" GOODS MOVEMENT CORRIDORS AND PROJECT INVENTORY V-1

A. OVERVIEW OF CALIFORNIA'S FOUR GOODS MOVEMENT CORRIDORS V-1
B. INFRASTRUCTURE PROJECT CONTEXT AND IDENTIFICATION V-5
C. LOS ANGELES/INLAND EMPIRE REGION V-6
D. BAY AREA REGION V-11
E. SAN DIEGO/BORDER REGION V-14
F. CENTRAL VALLEY REGION V-17
G. STATE GATEWAYS AND CENTRAL COAST V-20
H. SHORT-TERM RELIEF MEASURES V-21
I. PERFORMANCE ESTIMATES V-24

J. ENERGY FUELS AND PRODUCTS INFRASTRUCTURE V-25

VI. THE CALIFORNIA GOODS MOVEMENT INDUSTRY'S ENVIRONMENTAL IMPACT AND MITIGATION ALTERNATIVES VI-1

A. OVERVIEW OF THE ENVIRONMENTAL CHALLENGE..... VI-1
B. AIR POLLUTANTS OF CONCERN..... VI-2
C. HEALTH AND ECONOMIC IMPACTS FROM GOODS MOVEMENT EMISSIONS VI-4
D. OTHER COMMUNITY AND ENVIRONMENTAL IMPACTS VI-7
E. CONTRIBUTION OF SPECIFIC PORT-RELATED SOURCES TO AIR POLLUTION PROBLEMS VI-7
F. CURRENT EFFORTS VI-12
G. MITIGATION ALTERNATIVES..... VI-13
H. IMPLEMENTATION APPROACHES VI-21
I. COSTS AND IMPACTS OF CONTROLLING EMISSIONS VI-22
J. OTHER EFFORTS VI-23

VII. THE SAFETY AND HOMELAND SECURITY DIMENSION..... VII-1

A. OVERVIEW VII-1
B. ONGOING EFFORTS VII-2

VIII. NEXT STEPS VIII-1
A. OVERVIEW OF PHASE II EFFORT..... VIII-1
B. WORK GROUP OVERVIEW VIII-1
C. PROCESS AND SCHEDULE..... VIII-6

IX. APPENDICES IX-1

A. ARB LIST OF EMISSION REDUCTION ACTIVITIES CURRENTLY UNDERWAY A-1
I. STATE LEVEL ACTIONS AND ACTIVITIES A-1
II. PORT AND LOCAL ACTIONS..... A-4
B. GLOSSARY/ABBREVIATIONS.....B-1

GOODS MOVEMENT ACTION PLAN
EXECUTIVE SUMMARY

Consumers demand the best products at the best prices at the right time and in the right place. As more and more products become "commoditized," finding means to differentiate becomes a key focus as businesses look to establish competitive advantage in a global marketplace. This has led industries to more closely examine the "value chain" over the cycle from product design to ultimate consumer use. Increasingly, companies look to the innovative execution of logistics to achieve that value.

One such innovation has been adoption of "just-in-time" processing, the reduction or elimination of inventories as goods move from vendors and suppliers to manufacturers, retailers, and consumers. Just-in-time enables businesses worldwide to focus on the customer, making sure products are available when and where the customer wants or needs them.

Just-in-time systems are one element in the application of logistics and the discipline known as supply chain management. These systems have transformed disparate transportation activities around the world into integrated, multi-modal transportation networks. Collectively, the sophisticated activities, systems, and infrastructure that underpin this capability are described by the shorthand moniker, as "goods movement."

While California serves as an important hub in the global goods movement network, the State's large population and market size create huge demands on the goods movement-related infrastructure within its own borders. Even if California was a landlocked state without seaports and did not provide goods movement services to the rest of the country, it would still require a complex and sophisticated goods movement infrastructure to serve its residents.

In addition to serving the domestic needs of Californians, the State's goods movement system must also accommodate the needs of the State's large agricultural, natural resources, and manufacturing sectors. Combined, these industries employ 2.7 million Californians, providing more than one out of six civilian jobs within the State.[1] In 2004, these California industries exported more that $110 billion worth of goods and products, 13.5 percent of all United States (U.S.) exports.[2]

Of these uses, the loading and unloading of energy fuels at the ports requires special consideration. The State's interest in maintaining a reliable energy supply for its people and its economy requires that the specialized needs of delivering energy stocks be considered in land use decisions at the State's ports. While the ports may search for means to increase containerized cargo handling facilities that might displace existing fuel handling operations, the feasibility of developing alternative energy fuel handling sites must be considered.

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[1] California Employment Development Department, Labor Market Information Division, "Industry Employment & Labor Force," April 15, 2005.
[2] WiserTrade, "State Exports by HS Database," WISER, at http://www.wisertrade.org, from US Census Bureau, Foreign Trade Division, April 12, 2005.

With the world's sixth largest economy[3] and the distinction of being the place where one out of eight persons in the United States calls home, California's 36.8 million people[4] require a labyrinth of roads, railways, seaports, airports, and distribution centers to deliver the food, the clothing, and the essentials of daily life. By 2020, the net addition of another seven million people[5], the equivalent of adding the current population of the state of Virginia,[6] creates additional challenges to meet the State's own goods movement needs.

To meet these challenges, billions of dollars of investment in California's ports, rail networks, and highways will be needed to add capacity and reduce congestion. Most of this investment will center on the State's four "port-to-border" goods movement corridors: Los Angeles-Long Beach/Inland Empire, Bay Area, San Diego/Border, and Central Valley. These corridors have built up over decades encompassing large complexes that facilitate ship to rail, ship to truck, and truck to rail exchanges to move millions of containers per year to their ultimate destinations.

The difficulties of keeping pace with demand were made evident by several failures of the State's goods movement network in the fall of 2004. A shortage of rail cars, port workers, and other factors led to delays in the unloading of ships in the ports of Los Angeles and Long Beach. For almost six months, as many as 90 ships per day were forced to anchor offshore waiting to unload their containers. In addition, 124 ships bound for Southern California were diverted to other west coast ports or through the Panama Canal.[7]

The economic disruption caused by these delays and the prospects of long-term congestion of the State's goods movement capabilities prompted the Schwarzenegger Administration to establish a Cabinet Work Group on goods movement. In January 2005, that group developed a policy position to frame State goals on goods movement:[8]

> It is the policy of this Administration to improve and expand California's goods movement industry and infrastructure in a manner that will:
>
> - Generate jobs.
> - Increase mobility and relieve traffic congestion.
> - Improve air quality and protect public health.
> - Enhance public and port safety.
> - Improve California's quality of life.

The Cabinet Work Group, co-chaired by the Secretary of the Business, Transportation and Housing Agency (BTH) and the Secretary of the California Environmental Protection Agency (CalEPA), decided to develop an Action Plan to achieve policy aims. A series of "listening

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[3] Public Policy Institute of California, "Just the Facts – California's Economy," October 2004.

[4] State of California, Department of Finance, *E-1 City/County Population Estimates, with Annual Percent Change, January 1, 2004 and 2005.* Sacramento, California, May 2005.

[5] State of California, Department of Finance, *Population Projections by Race/Ethnicity for California and Its Counties 2000–2050*, Sacramento, California, May 2004.

[6] U.S. Census Bureau, Population Division, "Interim State Population Projections, 2005," April 21, 2005.

[7] Marine Exchange of Southern California, Status Reports, January 4, 2005; January 12, 2005.

[8] Alan C. Lloyd, Ph.D., Sunne Wright McPeak, "Goods Movement in California," January 27, 2005.

sessions" throughout the State were convened between January 2005 and March 2005 to gather fact-based information and assumptions to shape the Action Plan. More than 300 individuals attended the sessions including stakeholders who are involved with or who are impacted by goods movement operations in California.[9]

Commenters at the listening sessions related many insights about the status and prospects of California's goods movement industry and infrastructure. From an economic perspective, it was confirmed that the goods movement industry is one of the biggest economic engines within the State. The industry supports one out of seven California jobs (including many high wage jobs in logistics, finance, and other professions), contributing more than $200 billion per year to the State's economy, and producing more than $16 billion in tax revenues to state and local government.[10]

Commenters also raised concerns about the environmental impacts from goods movement activities. It is essential that environmental protection be given a high priority in any goods movement strategy as the movement of goods in and through California may adversely affect many communities throughout the State. Air emissions, congestion, and other community impacts from goods movement operations affect residents living and working near the ports and goods movement corridors. Emissions from engine exhausts of ships, trucks, and trains have deteriorated air quality and are taking a toll on public health. Solutions must be implemented that improve existing conditions and accommodate future growth.

Mitigation of these impacts must be addressed in the larger context of California's overall air quality. The Governor, through his Environmental Action Plan, has committed to reduce air pollution by 50 percent. To accomplish this reduction in overall pollution, the current growth in goods movement-related emissions will need to be reversed; and subsequently, these emissions will need to be significantly reduced. However, the State's population growth will create additional goods movement demand even if the State's goods movement facilities only serviced California's requirements. Addressing both needs for existing mitigation and needs for infrastructure enhancement are necessary to reduce congestion and reduce current and future environmental impacts.

California's goods movement network is also an essential part of the national economy. Moreover, many of the pollution sources including ships and locomotives are primarily under federal jurisdiction. The federal government will have to be a partner in mitigating the environmental impacts created by goods movement activities.

Much work has already been completed to advance needed expansion and work is underway on strategies to mitigate environmental impacts. The inventory of infrastructure projects compiled for the Action Plan includes approximately $3.9 billion of improvement projects underway and $43.4 billion of planned or proposed projects—for a total $47.3 billion in infrastructure projects. The cumulative cost of air emission related mitigation is roughly estimated at between

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[9] Testimony, transcripts, and other submissions by stakeholders attending listening sessions is posted on both the BTH and CalEPA websites: www.bth.ca.gov or www.calepa.ca.gov.

[10] Southern California Association of Governments, "Southern California Regional Goods Movement: A Plan for Action," March 2005.

$2.0 billion and $5.0 billion. The cost of other community impact mitigation has not yet been quantified. While prospective public safety and homeland security measures have been identified, incremental costs are not yet available.

Although many goods movement issues are being addressed through local and regional efforts, State leadership can help stimulate the appropriate sense of urgency to gain quicker action. The Goods Movement Action Plan will be the vehicle to advance this critical agenda at a pace faster than an otherwise "business-as-usual" approach could achieve.

The Action Plan is a two-phase process. This document represents the Phase I report. It focuses on the "why" and the "what" of California's goods movement industry. Specifically, the listening sessions provided information and perspective to characterize: (1) the goods movement industry and its growth potential; (2) the four port-to-border transportation corridors that constitute the State's goods movement backbone and the associated inventory of infrastructure projects planned or underway; (3) the extent of environmental and community impacts as well as possible mitigation alternatives; and (4) key aspects of public safety and homeland security issues.

The Phase II Action Plan will develop a statewide implementation plan for goods movement capacity expansion, goods movement-related environmental and community mitigation, and goods movement-related homeland security and public safety enhancement. It will define the "how," "when," and "who" required to synchronize and to integrate efforts to achieve relief as quickly as possible.

The Phase II effort will be conducted with the assistance of a series of stakeholder-comprised work groups. The work groups will focus on environmental impact mitigation, infrastructure, innovative finance and alternative funding, homeland security and public safety, and community impact mitigation and workforce development, respectively. In addition, an integrating work group will be established to provide overall consistency, completeness, and connectivity among the various efforts. The Integrating Work Group will also be the liaison to the Cabinet Level Work Group within the Administration.

Collectively, "business plans," prioritized projects along with respective funding mechanisms, will be a key work product of the Infrastructure Work Group. Coupled with specific recommendations and suggestions from the other specialized work groups, the Integrating Work Group will oversee the preparation of Phase II's Implementation Plan. That overall plan will detail the strategy and mechanisms for a complete package including environmental impact mitigation; homeland security and public safety; along with community impact mitigation and workforce development.

The Implementation Plan will be completed by the end of December 2005. The work groups will focus their efforts over the September-October period to review and assess proposed actions and recommendations. During October and November, work will focus on integration and preparation of the Implementation Plan document.

Team leaders for each of the work groups will be designated by the Cabinet Work Group. Between six and eight individuals from a range of stakeholder groups will be solicited to participate in each of the work groups. Each of the team leaders will participate in weekly conference calls and all work group members will be convened in monthly sessions to review progress and exchange information. The Cabinet Work Group will be invited to attend and participate in the monthly sessions. Offers of assistance to provide interns for the working groups will be pursued with the University of California. Work group leaders for each task will refine the schedule for their respective tasks to assure that deliverables are produced on time. With all key elements addressed, implementation of the Action Plan can commence in early 2006.

The Environmental Impact Mitigation work group will coordinate with ARB's effort to develop a port and intermodal goods movement Comprehensive Emission Reduction Plan (Emission Reduction Plan). The Emission Reduction Plan will define the strategies needed to reduce public health impacts from port and related activities. Development of detailed mitigation measures to address environmental and community impacts will be conducted using a full public process that will ensure participation from all interested stakeholders.

The objective of the Emission Reduction Plan is to reduce emissions back to 2001 levels by no later than 2010 and then continue to reduce emissions until ambient air quality standards are met and community impacts are mitigated. For example, it is envisioned that the Plan's goal for diesel particulate matter (PM) will be to achieve an 85 percent reduction in risk by 2020. This is the same goal ARB has adopted in the State's overall diesel risk reduction plan.

Consistent with the overall Phase II Action Plan, the Emission Reduction Plan will be developed over the next four months. It will identify both near-term specific measures that are needed to reduce the air quality impacts from port and related operations as well as longer-term mitigation approaches that will need further work prior to adoption and implementation. The Emission Reduction Plan will include proposed measures to reduce emissions from marine vessels (commercial harbor craft and ocean-going vessels), locomotives, on-road trucks, and off-road equipment used at ports and rail yards. Each measure will be evaluated for technical feasibility, economic impacts, cost effectiveness, emission benefits, implementation approach (voluntary, cooperative agreement, regulation), and legal authority. Those that are most feasible and cost-effective will become a comprehensive strategy to reduce port-related emissions to the needed levels.

In developing the Emission Reduction Plan, CalEPA and ARB will work with goods movement stakeholders, local air districts, U.S. Environmental Protection Agency (U.S. EPA), environmental groups, and local communities throughout the state. A full public process will be undertaken to obtain input from all stakeholders during development of the Emission Reduction Plan. This plan will build upon the regulatory and incentive programs already mapped out by ARB and U.S. EPA and will address both the financial incentives and regulations that need to be developed. It will also build upon and be coordinated with the emission reduction efforts underway at the ports of Oakland, Long Beach, and Los Angeles.

The Infrastructure Work Group will review and evaluate the infrastructure project inventory identified in the Phase I Action Plan and the extensive efforts undertaken at the regional level. This work group will consider three key elements related to the effectiveness and expansion of goods movement infrastructure. These elements will include:

- **Operational Improvements**

  By its nature, the intermodal aspects of the goods movement system with its many interfaces between ship and truck, ship and train, and train and truck make it difficult to achieve efficiencies across modes due to jurisdictional, ownership, and other complicating factors. In addition, finding prospective improvements between and among California's four port to border corridors have been problematic. As detailed in Chapter V, a variety of innovative projects are proposed or are underway that can improve goods movement operations; improvements that can provide congestion relief and subsequent emission reductions. The work group will review the operational improvement projects to determine if State and/or Federal action can facilitate the implementation of those measures that improve system performance and increase utilization of existing assets.

- **Goods Movement Infrastructure Project Prioritization**

  The methods for prioritizing goods movement projects is an evolving discipline. However, much work has been done at the local and regional levels that provide a sense of relative importance to the overall objectives for system improvement, i.e., velocity enhancement, throughput capability, and predictability of transit time coupled with the key objectives of reducing overall traffic congestion and related air emissions. The Infrastructure Work Group will assess the project lists in terms of programmed funds, regional commitments and priorities, and statewide goods movement infrastructure improvement needs.

- **Project Delivery**

  Other aspects that can help advance overall completion of critical projects include innovative procurement methods such as public private partnerships, design-build, and design-sequencing. Such methods can result in quicker, less costly construction than when projects are developed using traditional methods. The Infrastructure Work Group will identify projects that would be good candidates for alternative procurement options and other actions to expedite project delivery.

In developing its recommendations, the Infrastructure Work Group will also review, evaluate, and recommend corridor-specific environmental and community impact mitigation strategies and consider homeland security and public safety enhancements. Their findings and conclusions will be summarized in corridor business plans.

The Innovative Financing and Alternative Funding Work Group will identify goods movement financing issues of projects with statewide concern. It will identify alternative financing options

and innovative financing mechanisms that should be considered and applied in the development of goods movement projects. Finally, the work group will identify legislative and regulatory actions required to implement new financing mechanisms along with recommendations for a funding plan, options and approach.

The communities adjacent to the State's goods movement corridors have endured a disproportionate share of the impacts from a system that provides statewide and nationwide benefits. During the Phase I effort, much was heard about the air quality, health effects, traffic, noise, and visual blight to those communities along the corridors. The Community Impact Mitigation and Workforce Development Work Group will conduct numerous community meetings with the affected areas to learn what residents suggest are corrective measures to reduce these impacts. In addition, the work group will make recommendations as to how best to provide job opportunities for area residents in short and long-term positions that afford opportunities for advancement within the goods movement industry.

Working with area high schools, community colleges, and four year educational institutions, the work group will identify outreach efforts needed to recruit area residents and others for growing employment opportunities within the industry. The work group will also work with industry representatives to determine how best to strengthen current and future workforce needs.

Another element of the Action Plan relates to homeland security and public safety. Public safety departments at the federal, state, and local levels will be kept apprised of plans as developed by the workgroups to make sure that neither homeland security nor public safety are compromised as a consequence of proposed actions. Similarly, it is expected that officials keep working groups informed of pending or anticipated actions that might affect goods movement infrastructure development or operations.

Phase II efforts regarding homeland security and public safety will focus on a means of increasing federal funding commensurate with the risks and vulnerabilities California's goods movement assets and operations face. In addition, efforts will be made to find opportunities to jointly address security and safety concerns to reduce disruption to the flow of goods.

In summary, maintaining an efficient, safe, and flexible goods movement system is of extraordinary importance to California's economy, its people, and its future. Failure to keep pace is not an option. Implementing the aggressive actions of the Action Plan are essential elements to serving the people, reducing environmental and community impacts, and improving the quality of life for all Californians.

II. INTRODUCTION

A. The Consumer Perspective

Whether standing at the checkout counter in the grocery store buying a 50¢ pack of chewing gum or ordering a $5,000 plasma television from an online catalogue retailer, consumers rely on an efficient, reliable, and economical goods movement system to fulfill their needs and wants. For the most part, the goods movement process is taken for granted by the public. Yet everyday, the food, clothing, and essentials of daily life must traverse a labyrinth of roads, railways, seaports, airports, and distribution centers in a synchronized dance for on-time arrival from farms and factories to stores, businesses, and homes.

The speed, accuracy, and efficiency of such operations are astonishing accomplishments, considering that there is no centralized control of "the system." Instead, retailers, shippers, terminal and rail operators, truckers, and others make independent decisions on how best to move millions of merchandized-packed containers thousands of miles across oceans, countries, states, towns, and neighborhoods to their final destinations.

Ultimately, consumers make the final judgment as to who has done the best job of providing the best products at the best prices at the right time and in the right place. To win customers, companies have adopted Gordon Moore's mantra of "better, cheaper, faster" as applied to computer chips[1] for all manner of merchandise, high tech or not. However, in an age of global competition, "better, cheaper, faster" is not enough. As more and more products become "commoditized," successful companies must add a timing dimension to the traditional "product," "price," "place," and "promotion" aspects of their marketing strategy. Specifically, Michael Porter's articulation of the "value chain" set the concept in motion that innovative execution of logistics can provide important differentiation that creates competitive advantage in the marketplace.[2]

Advances in logistics enable firms to pass on to their customers the benefits of low cost production from distant vendors and suppliers coupled with speed-to-market that was previously unobtainable. For example, "just-in-time" delivery through out the value chain provides major reductions in inventory costs that help offset the costs of increased transportation activity. These advances have transformed the traditional "supplier push" trading process ("What do you have?") into a "demand pull" ("Do you have what I want?") consumer focus.[3]

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[1] Gordon Moore is the co-founder of Intel and the creator of Moore's Law regarding the pace of technology advances for integrated circuits. See for example: John Kascht, "His Word is Law," FastCompany, Issue 51, October 2001.

[2] Porter defined the value chain as a series of integrated primary activities from product design to ultimate consumer use including inbound logistics, operations, outbound logistics, marketing and sales, and services; Michael Porter, "Competitive Advantage," The Free Press, 1985.

[3] A "push" process is defined as a system where products are manufactured or assembled in batches in anticipation of demand requiring numerous inventory buffers along the way. A "pull" process is where demand at the end of the pipeline "pulls" products towards the market. The ultimate push process is to defer manufacturing or assembly until

Just-in-time systems are one element in the application of logistics and the discipline known as supply chain management. These systems have transformed disparate transportation activities around the world into integrated, multi-modal transportation networks. Collectively, the sophisticated activities, systems, and infrastructure that underpin this capability are described by the shorthand moniker, "goods movement."

B. Benefits to California

These changes have had profound impacts on the worldwide goods movement system and California's role in the process. The State's strategic Pacific Rim location has long made California a key crossroad of global goods movement capability. However, the growing importance of supply chain management coupled with Chinese manufacturing prowess have transformed California into the entrepôt for the nation—the primary point of arrival and departure for goods entering and leaving the country.[4]

In spite of this distinction, only 50 percent of the cargo that enters California from foreign countries transits to other states.[5] Why so little? Because California is so big. Even if California was a landlocked state without seaports and did not provide goods movement services to the rest of the country, it would still require a complex and sophisticated goods movement infrastructure to serve its own residents. With the world's sixth largest economy[6] and the distinction of being the place where one out of eight persons in the United States calls home, California's 36.8 million people[7] would comprise the 34th largest country in the world, a country with a population greater than Canada.[8] By 2020, the net addition of another seven million people[9], the equivalent of adding the current population of the state of Virginia,[10] creates significant challenges to meet the State's own goods movement needs.

In addition to serving the domestic needs of Californians, the State's goods movement system must also accommodate the needs of the State's large agricultural, natural resources, and manufacturing sectors. Combined, these industries employ 2.7 million

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an order is placed. See for example, Martin Christopher, "Logistics and Supply Chain Management," Prentice Hall, 2004.

[4] Los Angeles Economic Development Corp., "International Trade: Trends and Impacts," May 2004.

[5] Southern California Association of Governments, "Southern California Regional Goods Movement: A Plan for Action," March 2005.

[6] Public Policy Institute of California, "Just the Facts – California's Economy", October 2004.

[7] State of California, Department of Finance, *E-1 City/County Population Estimates, with Annual Percent Change, January 1, 2004 and 2005*. Sacramento, California, May 2005.

[8] U.S. Census Bureau, "Countries Ranked by Population: 2005," http://www.census.gov/cgi-bin/ipc/idbrank.pl.

[9] State of California, Department of Finance, *Population Projections by Race/Ethnicity for California and Its Counties 2000–2050*, Sacramento, California, May 2004.

[10] U.S. Census Bureau, Population Division, "Interim State Population Projections, 2005," April 21, 2005.

Californians, providing more than one out of six civilian jobs within the State.[11] In 2004, these California industries exported more that $110 billion worth of goods and products, 13.5 percent of all U.S. exports.[12]

Taken together, servicing the goods movement needs of California's own population and industries coupled with directing the volume of trade that pass into and through the state has nurtured the growth of a high concentration of specialty firms within the State that service the flow of goods. These firms not only include transport and warehousing companies but banks, law firms, insurance providers, software developers, logistics specialists, merchandisers, and others that perform complex supply chain management functions.

The sophisticated services provided by these companies, in conjunction with highly automated warehouses and distribution centers along the State's goods movement corridors,[13] create high valued-added opportunities for diverse industries, such as apparel, agriculture, and high tech. The ability to reach vendors, suppliers, and customers on a worldwide basis with a speed and costs that are difficult to achieve from other U.S. locations provides a key source of comparative advantage to retain and attract industry in and to the State.

Because of its intrastate and national roles, California's goods movement industry is one of the State's biggest economic engines. The industry supports one out of seven California jobs, contributes more than $200 billion per year to the State's economy, and produces more than $16 billion in tax revenues to State and local government.[14]

As large as California's goods movement industry is, global trends are converging to propel substantial growth over the next two decades. Shipments of cargo containers are poised to double over the next 15 years; and perhaps, triple over the next 20 years to serve California's own needs and support activities for the rest of the nation.[15] As with all forecasts, it is impossible to assess the interaction of all the factors that will affect the level of demand that actually materializes. Experience to date has been that most forecasts of goods movement demand have proven conservative.[16] One factor that may have a significant impact on container demand growth is prospective increases in transportation costs that might result from efforts to recover costs associated with

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[11] California Employment Development Department, Labor Market Information Division, "Industry Employment & Labor Force," April 15, 2005.
[12] WiserTrade, "State Exports by HS Database," WISER, at http://www.wisertrade.org, from US Census Bureau, Foreign Trade Division, April 12, 2005.
[13] California has four "port-to-border" transportation corridors: Los Angeles/Inland Empire, Bay Area, San Diego/Border, and Central Valley. See Chapter V for descriptions.
[14] Southern California Association of Governments, "Southern California Regional Goods Movement: A Plan for Action," March 2005.
[15] Ibid.
[16] Ibid.

capacity expansion and environmental mitigation. Work underway by the Southern California Association of Governments is examining the elasticity of demand should such fees be applied.[17]

Nonetheless, California's own population growth will still drive added goods movement demand even if shippers seek alternatives to California's ports of entry for non-California bound cargo. Without adequate investment to expand California's ports, rail lines, and highways, performance will deteriorate, eroding service to the public, dampening the State's economic vitality, and dimming job prospects for a growing workforce. Failure to keep pace will also add to congestion, primarily from truck traffic, reducing Californians mobility while offsetting gains from efforts to mitigate environmental impacts of goods movement operations.

C. Challenges for Expansion

Expanding California's goods movement system to accommodate the needs of its people and businesses is a complex undertaking involving a wide array of technical, economic, environmental, financial, and public policy issues. The complexity stems from the fact that the goods movement "system" is not an integrated, self-contained operation. It is a collection of public and private entities and associated facilities that engage in complex handoffs from one to the other. Arriving and departing ships at California's ports load and unload cargo that is transferred to and from trains and trucks. Goods intended for delivery to local California customers are usually trucked to local warehouses or distribution centers. Goods with out of state destinations are carried by train or taken to distribution centers by truck where they are repacked for national distribution and carried by train or truck. In addition, each of the State's "port to border" corridors carries substantial intrastate and national point-to-point truck trips.

The overall "throughput" of each corridor is limited by the capacity of the most constrained segment. In years past, the primary constraint has been port capacity. To meet this challenge, California's major ports engaged in decades-long expansion programs to accommodate larger vessels and improve dockside facilities to load and unload cargo ships. However, by the mid-1980s, it became apparent that constraints to throughput in the future would increasingly come from infrastructure limits *outside* the ports. The constant streams of trucks and trains were literally dividing communities. Emissions from ships and port operations coupled with growing congestion outside port gates compounded air quality problems and public health concerns.

The Alameda Corridor, a $2.4 billion freight rail expressway between the neighboring Ports of Los Angeles and Long Beach and the rail yards near downtown Los Angeles, was one of the first infrastructure projects in the country specifically built to address

[17] Leachman and Associates, "Port and Modal Elasticity Study," in preparation.

congestion outside the ports. Completed in 2002, the Alameda Corridor has spawned related projects aimed at de-bottlenecking transportation corridors through dedicated, grade-separated lines.[18]

While the ports continue modernization programs to upgrade their facilities, the statewide inventory of goods movement projects compiled for this report shows that more than 80 percent of the $47 billion planned or programmed for goods movement projects is targeted for improvements outside the ports.[19]

D. The State's Interest

The shift in focus from inside the ports to outside the ports has critical implications for the involvement of the State in the goods movement supply chain. In the past, when most goods movement infrastructure was developed within the ports, the State's interest was secondary to the cities, which oversee operations of their respective ports. Because California's goods movement transportation corridors are mostly comprised of public roads and highways, the State has more direct interest in the expansion of these facilities or alternatives in public rights of way than of infrastructure improvements inside the ports. Similarly, even though most rail lines are private property, the State has an interest in mitigating congestion and air emissions from expanded goods movement train traffic throughout the length of the corridors.

Not only has there been a fundamental shift from an inside the port to an outside the port perspective in goods movement flow, there is a similar shift in the balance between goods movement and other transportation needs relative to transportation infrastructure. In years past, goods movement played a secondary role in the planning, design, and construction of public highways and facilities mostly developed to accommodate automobile traffic. Now, the volume of goods movement flow and its impact on congestion, mobility, and the environment requires greater attention. For many of the infrastructure projects delineated in this Action Plan, the emphasis on goods movement predominates other transportation uses.

Of equal concern to the State is the speedy deployment of effective environmental mitigation needed to address the burden on residents adjacent to the corridors who contend with degraded air quality, noise and vibration, traffic congestion, and blight contributed by goods movement operations. The problem is exacerbated by the wide range of impacts created from ships, port operations, trains, and trucks throughout the goods movement process. An effective means need to be found to reduce emissions and other community impacts in a comprehensive manner among a complex array of regulatory and jurisdictional issues.

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[18] Most notable is the $910 million Alameda Corridor East project that would extend the Alameda Corridor 35 miles east to Pomona on the eastern border of Los Angeles County. The project is part of the $3.0 billion Alameda Corridor East Plan, which would provide 125 grade separations and grade crossing improvements within Los Angeles County, Orange County, San Bernardino County, and Riverside County.

[19] See tables in Chapter V. Estimates for port-related emission reduction projects were unavailable and not included.

Finally, there are new sets of issues relative to safety and homeland security that must be addressed since 9-11. While much has been done, key questions remain involving coordination among federal, state, and local jurisdictions with a wide range of enforcement objectives. Physical security needs of the ports and the goods movement corridors at large are also of concern. In addition, determining the proper balance between increasing scrutiny of cargo and impeding the flow of goods remains an open issue.

E. The Goods Movement Action Plan

The Action Plan is a two-phase process. This document represents the Phase I report. It focuses on the "why" and the "what" of California's goods movement industry. Specifically, this document characterizes: (1) the goods movement industry and its growth potential; (2) the four port-to-border transportation corridors that constitute the State's goods movement backbone and the associated inventory of infrastructure projects planned or underway; (3) the extent of environmental and community impacts as well as possible mitigation alternatives; and (4) key aspects of public safety and homeland security issues.

The Phase II Action Plan will develop a statewide implementation plan for goods movement capacity expansion, goods movement-related environmental and community mitigation, and goods movement-related homeland security and public safety enhancement. It will define the "how," "when," and "who" required to synchronize and to integrate efforts to achieve relief as quickly as possible.

The Phase II effort will be conducted with the assistance of a series of stakeholder-comprised work groups. The work groups will focus on environmental impact mitigation, infrastructure, innovative finance and alternative funding, homeland security and public safety, and community impact mitigation and workforce development, respectively. In addition, an integrating work group will be established to provide overall consistency, completeness, and connectivity among the various efforts. The Integrating Work Group will also be the liaison to the Cabinet Level Work Group within the Administration.

Collectively, "business plans," prioritized projects along with respective funding mechanisms, will be a key work product of the Infrastructure Work Group. Coupled with specific recommendations and suggestions from the other specialized work groups, the Integrating Work Group will oversee the preparation of Phase II's Implementation Plan. That overall plan details the strategy and mechanisms for a complete package including environmental impact mitigation; homeland security and public safety; along with community impact mitigation and workforce development.

III. GUIDING PRINCIPLES

In January 2005, a Schwarzenegger Administration policy position was prepared that outlines the policy of the Administration on goods movement in California.[20] The policy states the following:

> It is the policy of this Administration to improve and expand California's goods movement industry and infrastructure, in a manner, which will:
>
> - Generate jobs.
> - Increase mobility and relieve traffic congestion.
> - Improve air quality and protect public health.
> - Enhance public and port safety.
> - Improve California's quality of life.

In response to this policy, an effort was launched to prepare a Goods Movement Action Plan. The Action Plan is a tool intended to bring focus to goods movement issues on a statewide basis following the tenets of the Administration's goods movement policy position. Its execution will help advance key actions that would be difficult to achieve under "business-as-usual" conditions.

As detailed elsewhere in this document, goods movement is a complex process involving a wide range of participants each operating under different jurisdictions, different objectives, and producing different community, environmental, and economic impacts. Without addressing growth and impact issues in a comprehensive way, meeting the goals of the policy statement could be unlikely.

The ultimate objective of The Action Plan is to create a "virtuous circle" in which the positive economic benefits produced from accommodating future growth generates good paying jobs and provides funding streams that will generate public and private revenues for environmental and community impact mitigation, infrastructure development, and homeland security-public safety improvements.

Finding the right balance will not be easy. While California is the "natural" entry point for many foreign goods entering the country, it is not the only alternative. Shippers will continue to explore prospects of other entry points into the United States and will direct the flow of goods elsewhere if California's congestion and costs increase relative to alternatives. Should traffic decline and goods movement jobs fall as a consequence, so will State and local revenues. This will stress public funds available for needed environmental mitigation. Reduced traffic would also deter private sector participants from accelerating investments in new trucks, engines, and equipment that are more efficient and less polluting.

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[20] Joint Statement of Secretary Sunne Wright McPeak, Secretary of Business, Transportation and Housing and Alan Lloyd, Secretary California Environmental Protection Agency, "Goods Movement in California," January 27, 2005 (see Preface).

Similarly, if infrastructure is expanded without appropriately addressing environmental and community impact mitigation, further erosion of quality of life issues adjacent to goods movement corridors is unacceptable.

A worse outcome occurs as a consequence of "no action." Without appropriate investment in infrastructure, shippers may elect other points of entry for cargo bound elsewhere in the U.S., but would still likely direct containers with a California destination to California ports. Even with lower volume, unmitigated congestion would contribute to additional emissions and would further erode productivity increasing the cost of goods for all Californians while failing to generate sufficient revenues to cover the costs of mitigation. A "worst case" scenario would result if substantial growth were still to materialize if other points of entry are similarly caught short. Increased growth without mitigation or congestion relief from infrastructure improvements would further clog neighborhoods along the corridors and cause emissions to increase more.

To establish the virtuous circle necessary for the Action Plan to succeed, it will be necessary to identify and implement projects and strategies that can yield near term benefits while providing a foundation for long-term value. Key steps in that process include establishing a broad and comprehensive framework to evaluate prospective projects, to build consensus, to maintain focus, to exercise clout, and to build synergies. More specifically, that process should:

- Consider all goods movement infrastructure and related operations throughout the State as part of one integrated, multi-modal system regardless of funding or ownership (i.e., public, private, or mixed public-private). Such a perspective highlights improvements that can maximize public benefit, leverage existing assets, encourage private investment, promote stability and diversity, and expand customer choices.

- Advance projects with highest rates of return. Because resources are always limited, ranking projects on a statewide basis relative to their contribution to performance improvement of the entire statewide goods movement system helps achieve faster improvements.

- Recognize project benefits within, between, and among goods movement corridors that are otherwise ignored or undervalued. When project merits are evaluated by traditional metrics, the value a project may have to the State at large may not be captured. Primary examples include goods movement projects that can open bottlenecks and increase throughput for an entire transportation corridor or projects that relieve congestion and reduce emissions. Properly identifying benefits helps prioritize projects and secure funding for the projects that can do the most good.

- Acknowledge the environmental impacts and identify needed resources and strategies to help mitigate those impacts. Air quality and community impact mitigation must be fully integrated into goods movement system improvements. Significant investment in emission reduction strategies such as fleet modernization, the use of cleaner fuels,

and retrofitting trucks, ships and trains with cleaner emission control technologies is necessary in order for California to accommodate the expected growth in goods movement and continue progress in protecting the environment.

- Secure statewide consensus on projects when pursuing federal support. A major factor that causes California to get less than its "fair share" of federal funding is intrastate jockeying for the same pot of federal dollars. Presenting a unified, statewide slate of projects (as most other states do) helps increase the likelihood that the State can approach its fair share allocation.

- Instill a sense of urgency to accelerate project delivery and environmental protection. By their nature, infrastructure projects are long lead-time endeavors that face many obstacles until they are placed into service. Relating the importance of goods movement projects and environmental improvement to the State's economic well-being will help keep projects on schedule and provide motivation for aggressive action to relieve local communities from unfavorable goods movement-related impacts.

- Spur private sector investment and public-private partnerships to leverage public investment. The goods movement system is a complex supply chain of activities and facilities under private, public, and mixed public-private ownership. Gaining consensus on a statewide basis for the major elements necessary to build out the State's goods movement system helps provide the confidence needed by the private sector to determine how best to make private and public-private investments that add value to the system.

- Provide a higher-level forum to engage cooperation outside state jurisdiction. California's goods movement system requires cooperation and support from stakeholders who are not subject to California control. These include adjacent states, the federal government, and foreign carriers. In addition, other stakeholders that operate in the State but have national or global operations (including retailers, railroads, and logistics companies) are critical participants in the process. Operating at the State level with these stakeholders improves the State's overall position as compared to merely allowing each region and locality to vie for attention separately.

- Expand awareness of the importance of the goods movement industry to Californians. Just as the goods movement industry is a critical element of the State's economy, having the support and confidence of the people of California is critical to expanding the infrastructure and mitigating the impacts of the industry's operation. The State can play an important role in the education process and can reinforce the efforts of local and regional entities to communicate the needs and benefits of improving the goods movement infrastructure to the public.

- Seek opportunities to promote synergies with other statewide policy initiatives. Active consideration of goods movement issues with statewide initiatives in areas such as housing, land use, agriculture, international trade, economic development, military base re-use, and energy resources promotes good public policy.[21]

Most of all, achieving the Administration's purpose will require flexibility, perseverance, and commitment. While it will be challenging to maintain a balance among the policy elements at any given moment, success will depend on sustaining the balance over time.

[21] Note that goods movement is itself a subset of the Administration's transportation initiative, "GoCalifornia."

IV. THE CALIFORNIA GOODS MOVEMENT INDUSTRY AND ITS GROWTH POTENTIAL

A. Overview

California goods movement industry issues are driven in large measure by both the rise in U.S. demand for foreign imports and the growing California marketplace. However, changes in the supply chain, as well as the relative advantages of different regions and seaports competing for international trade, are also driving these issues. This chapter presents a brief overview of these changes, the State's competitors, and the national and California-specific forecasts of overall freight movement and containerized, international, merchandise trade.

B. Changes Driving Goods Movement Industry Issues

1. Global Supply Chain

In the last 25 years, both California and the United States, driven by rising demand for inexpensive products and a desire to take advantage of lower production costs overseas, have assumed expanded roles in global trade, particularly as importers. The system comprised of product request, movement from producer, and delivery to customer is commonly referred to as the "supply chain." This supply chain essentially operates in a circle, influenced heavily by customer demand.

For example, visualize a shirt at a retail store in Chicago. When it is sold, a product request (in the form of a restock or production order) for a replacement shirt is electronically generated. This product request is sent to a producer in Shanghai, China. When the product request is filled, the replacement shirt is loaded into a shipping container, trucked to a port of embarkation, and sent to California by ship. Upon arrival in California, the container is transferred to a rail carrier and moved to a rail yard in Chicago. Once there, a local trucking firm moves the container, moves it to a distribution center where it is unloaded and the replacement shirt is finally delivered to the retail store that originally generated the product request.

Although increasingly dependent on inventory, financial information and management systems, brokers and customs agents, global trade could not function without the underlying goods movement transportation system, which permits products from far-away places to move and fill an ever-increasing demand in California and the nation. The more global the supply chain becomes, the greater the challenges for the State's goods movement transportation system of streets and highways, rail lines and yards, seaports, airports, and border crossings.

2. Emergence of China and Asia

For West-Coast international trade, the emergence of China and other countries of the Asian Pacific Rim as key producers of manufactured goods has affected significantly the

supply chain and, particularly, has increased the impact on goods movement.. Additional investment is needed in the State's infrastructure to keep pace as more Asian goods on U.S. shelves translate into more ships at California's ports, more cargo planes in California's airports, more trains on California's railways, and more trucks on California's highways.

China's continued economic growth is also affecting Mexico, California's largest trading partner. The statistics indicate that after more than 15 years of steady economic growth and high employment, Mexico lost a quarter of a million maquiladora[1] jobs in 2001. While there are no reliable statistics on how many of those jobs were lost directly to China, most estimates put the number at around 70 percent. In Tijuana, where maquiladora factories have flourished, both Sony and Philips recently closed factories and moved them to China.[2] The toy industry has been particularly hard hit. In 1989, Mexico had 600 companies manufacturing toys. This number declined to just 47 companies in 2001.[3]

3. WTO and International Trade Agreements

Changes in the rules governing world trade are also affecting the international trade picture. The World Trade Organization (WTO) is the only international organization dealing with the rules of trade among nations. The WTO has nearly 150 member nations, accounting for more than 97 percent of world trade. Approximately 30 other nations have applied and are being considered for membership. At the heart of the WTO are the WTO agreements negotiated and signed by a majority of its member nations. These agreements are the legal ground rules for international commerce. They are compacts, guaranteeing member nations important trade rights. These agreements also bind member governments to maintain their trade policies within agreed upon limits for the benefit of all. Their purpose is to help producers of goods and services, exporters, and importers conduct business. Their goal is to improve the welfare of member nations.

The Agreement on Textiles and Clothing (ATC) and all its restrictions terminated on January 1, 2005. The end of the ten-year ATC termination transition period means that trade in textile and clothing products is no longer subject to quotas outside normal WTO/GATT (General Agreement on Tariffs and Trade) rules but is, instead, now governed by the general rules embodied in the multilateral WTO trading system.

Notwithstanding the termination of ATC, the U.S. textile industry is determined to dampen Chinese textile and clothing exports. The industry has filed petitions with the U.S. government seeking the imposition of "safeguards," i.e., caps on imports that the United States and other governments may levy on Chinese textile or clothing items if those items are flooding their markets. China has agreed to such "safeguards" until 2008 under the terms of its entry into the WTO. Currently, China, Hong Kong and India

[1] Manufacturing and assembly plants located in Mexico, generally either owned by or producing goods for U.S. companies or markets.
[2] Scott Johnson, "Mexico's China Obsession", November 4, 2002, *Newsweek International*.
[3] Ibid.

provide 71 percent of all U.S. clothing imports. In 1994, prior to the beginning of the ATC termination transition period, those same three nations only combined for 29 percent of U.S. clothing imports according to WTO reports. As the "safeguards" expire, higher volumes of textile and clothing imports can be expected through the nation's seaports, including those here in the state.

4. Retail and Manufacturing Consolidation and E-Commerce

Facing increasing challenges to remain competitive, the retail and manufacturing industries are developing new global business and logistics models (focusing on core strengths and utilizing third parties to handle non-core functions) and techniques (investing in technology to streamline operations, developing closer relationships with supply chain partners, and leveraging the Internet to manage purchases, shipments, and sales). Partly as a result, more complex distribution networks have been developed. In search of greater distribution efficiency, inventory deployment and reduction strategies are being implemented and operations are being consolidated into more centralized and automated facilities.

The growth of e-commerce has enabled some of these changes by opening new windows of opportunity for merchandisers to reach a broader customer base. According to the U.S. Department of Commerce, retail e-commerce in the second quarter of 2004 was $15.7 billion, an increase of 23.1 percent over a year earlier. E-commerce has also stimulated the growth of package distribution companies, resulting in increased distribution truck movement on the nation's highways.

5. Distribution System Sophistication

a. Just-in-Time (JIT) Delivery

JIT delivery has been a significant factor in reducing logistics and warehousing costs. Under the JIT concept, sophisticated inventory control systems reduce warehouse inventory to a minimum thereby shortening the time delay between when a product is manufactured and when it is delivered. Thus, the transit of the product becomes part of the warehousing process. However, using the transportation infrastructure as rolling warehousing facilities can increase congestion and may have safety implications, as more truck trips are sometimes required to accommodate JIT operations. In order for JIT to succeed, the transportation infrastructure must be able to deliver reliable trip times to accommodate the tighter timing of shipments between producers and customers.

b. Cargo Consolidation/Deconsolidation (Transloading)

Cargo consolidation and deconsolidation, also known as transloading, has become an increasingly important strategy to enhance efficiency. There are at least two factors driving this trend. First, the per-unit cost advantages of full truck or container shipments has led companies to consolidate shipments. Consolidation has been successful also because, as noted above, in response to JIT, the overall number of distribution centers has

been reduced. Finally, the transload allows a value-added action (where the product is modified or combined with something else) to take place prior to shipment. Second, the vast majority of international containerized trade (75 percent in the case of Los Angeles and Long Beach) arrives in 40-foot "international" containers. However, a "domestic" 53 foot container, if not weight-limited, can handle up to 69 percent more product as the result of size and structural differences. This can provide a significant cost advantage for shippers to transload shipments from international to domestic containers. However, both JIT and transloading practices tend to work against rail shipments because of the smaller loads and tighter scheduling in JIT operations and the generally short trips to consolidation/deconsolidation terminals that are made by trucks.

c. Cargo Ship Size and Trends

Much attention has focused in recent months on the staggering number of new container ships on order. More than $26 billion of new container ships were ordered last year, according to shipbroker H. Clarkson's. According to Paris-based shipbroker BRS-Alphaliner, container ship capacity on order as of February 1, 2005 stands at 53 percent of the existing fleet, a historically high figure that includes 174 ships with capacities greater than 7,500 twenty-foot equivalent units (TEUs).[4] The container shipping industry is already moving toward ships of 10,000 TEU capacities, with 12,500 TEU ships possibly being considered by the end of this decade (see Table 1).

Table 1: Key Factors Driving Increased Maximum Vessel Size

Propulsion efficiency, cost and other economies of scale
The ability of container terminals to physically berth such ships
The capacity of terminals to load and discharge such vessels within an acceptable time frame
The capabilities of terminals to deliver and dispatch large consignments of containers
The effectiveness of hinterland linkages
Technical difficulties, *e.g.*, maximum stack height limitations

[4] The TEU is the international standard measure used to describe containers and container ship or terminal capacity. A 20-foot container = 1 TEU; a 40-foot container = 2 TEU. Thus a 7,500 TEU ship could accommodate as many as 3,750 standard 40-foot international containers.

6. Trade Routes

a. State System

A vast network of highway and rail corridors (see Figures 1 and 2) serves California. Five interstate corridors form the key highway backbone of this system. From north to south, these include Interstates 5, 80, 15, 40 and 10. The primary rail corridors includes the Union Pacific main lines to the Pacific Northwest, the Central Corridor across the Sierra Nevada, the Los Angeles-Salt Lake City line, the "Sunset Route" to Southern Texas (Houston) and the Burlington Northern lines from Los Angeles and the Bay Area through the Central Valley to Chicago.

Figure 1: National Truck Flows To/From California

Figure 2: National Rail Freight Flows To/From California

b. Existing and Alternative Paths To U.S. Markets

With record increases in cargo volume creating delays through the ports of Long Beach, Los Angeles, and Oakland, shippers have begun to diversify the ports of entry for their cargos. This diversification includes other West Coast ports as well as East and Gulf Coasts ports, which can be reached by ships going through the Panama and Suez Canals. Thus, instead of offering only the traditional land-bridge service (disembark at a California port and move by rail through California and across country), ocean shippers are beginning to offer all-water services with greater service frequency, speed and reliability. This section explores some of those other port options.

(i) West Coast Alternatives

(a) Seattle, Tacoma, Portland, and Vancouver, British Columbia (B.C.)

These seaports continue to receive cargos diverted and re-routed from California. They are responding by expanding their port terminal capacities. Part of their success is that these seaports are all closer to China and the Asian Pacific Rim than any of the California ports and have smaller highway- and rail-access infrastructure issues. From 2002 through 2004 volumes at these seaports rose from a low of 3.5 percent at Seattle to more than 18 percent at Tacoma. The Port of Tacoma recently completed a major terminal expansion project at its Evergreen terminal as well as several dredging and rail improvement projects. Because of its inland location and relatively small local market, the Port of Portland has been losing container services. Yet in January 2005, the Port of Portland announced plans for an $89 million container expansion project that will double its current TEU capacity to 800,000, primarily benefiting its lone container line Hanjin Shipping. Cargo volumes at the Port of Vancouver, B.C., have been rising rapidly, resulting in terminal and rail congestion as well as increased security concerns as the port increases its volume of U.S.-bound cargos. Nevertheless, the Port of Vancouver, B.C., is working to complete two major container facility expansion projects that will expand TEU capacity to 5 million by the year 2020.

(b) Mexico

Mexico's West Coast ports provide the Midwest with an alternative direct access to Asia (see Figure 3)—but not without limitations. Among the limitations imposed on westbound goods movement from Mexico's West Coast ports are: congestion at the U.S.–Mexico border crossing, duplicate cargo clearances, return of equipment, higher insurance costs, a lack of infrastructure and port services, as well as others. Nevertheless, these ports are actively pursuing business relationships with importers and exporters involved in the Pacific Rim trade, which, if successful, will have a measurable effect on California's competitiveness, albeit tempered by the above-noted limitations.

Manzanillo is the largest container seaport in Mexico and, currently, the only facility on the Pacific Coast of Mexico able to service the largest container vessels. When SSA Global won a 20-year concession in Manzanillo to operate a single berth container

terminal in 1995, the port's productivity improved substantially, increasing Manzanillo's share of Mexico's Pacific Coast container traffic from 51.4 percent in 1995 to more than 90 percent in 2003. Overall port container volume in 2003 was 1.2 million TEUs.

Hutchinson Port Holdings, part of the Hong Kong conglomerate Hutchinson Whampoa, has announced it will invest $1.2 billion in a new deep-water seaport at Punta Colonet, approximately 125 kilometers south of Ensenada. Anticipated port volume in the initial phase is estimated at between 1,000,000 and 1,500,000 TEUs per year. A new rail link, to be built by the Union Pacific, would connect Punta Colonet with the main line U.S. railroads at Eagle Pass, Texas. It is possible that new roadways may also be built linking Punta Colonet with Ensenada and Mexicali/Tecate.

Currently, the Port of Ensenada port receives about 50,000 TEUs per year. Dredging operations that began in December 2004 will allow larger vessels to dock at the port. Hutchinson Port Holdings controls the container port in Ensenada under a 20-year contract, the terms of which prohibit initiation of any new container operations without Hutchinson's express permission.

The other major port on Mexico's Pacific coast is the Port of Lazaro Cardenas. Lazaro Cardenas, which handles about 250,000 containers a year, is served by the Mexican railroad TFM, a party in a joint venture with Kansas City Southern Railroad.

Veracruz, on Mexico's Gulf coast, is Mexico's largest port and the first Mexican port to be privatized in the mid-1990s. It is the primary gateway to Mexico City. It is also a scheduled port for a number of transatlantic services from the Gulf of Mexico, which also call on U.S. Gulf ports like Houston and New Orleans. Veracruz handles more total volume than Manzanillo, but Manzanillo became Mexico's largest container seaport in 2002.

Figure 3: Key Current and Potential Mexican Container Seaports

(ii) Gulf Coast Alternative: Houston

The Port of Houston is a 25-mile-long complex of diversified public and private facilities located just a few hours sailing time from the Gulf of Mexico. The seaport is ranked first in the United States in foreign waterborne commerce, second in total tonnage, and sixth in the world (in large part due to petroleum products). Construction of the Bayport Container and Cruise Terminal is underway. This $1.2 billion project broke ground in early June 2004 and is on course for completion of the first phase in mid-2006. When completed the container expansion portion will bring capacity to 2.1 million TEUs and will add 60 acres to container terminal operations. The Port of Houston is the only Gulf Coast port that currently provides all water service to and from Asia. Wal-Mart, the world's largest retailer, is building a two million-square-foot distribution facility near the Port of Houston to avoid West Coast delays.[5]

[5] Hickey, Kathleen , "Capacity Crunch Will Likely Get Worse Before it Gets Better," *Global Logistics & Supply Chain* (February 2005).

(iii) Panama Canal Expansion

The Panama Canal expansion project has been projected to range in cost from $2 billion to upwards of $12 billion. With a population of three million and an annual gross domestic product (GDP) of approximately $12 billion, even a modest $6 billion expenditure amounts to almost half of Panama's entire GDP. Understandably, some observers have identified the economic feasibility of the project to be one of the most significant obstacles to its implementation. Already burdened by a public debt of more than $9 billion, Panama would find itself in the 10th worst position in the world for debt to GDP ratio if it spent another $8 to $10 billion on the Panama Canal expansion project.

Thus, plans for expansion of the Panama Canal have been scaled back. All indications are, however, that the expansion project will continue moving forward with construction possibly starting in 2005, even though financing remains an issue. Environmental impacts, population displacement, and other issues have also been cited as reasons for a de-scoped alternative plan. For example, an improved railroad tow track, scheduled to be completed in 2004, is still not operational. Other plans include construction of holding pools adjacent to each new lock for water reuse and adding a third canal channel to accommodate container ships carrying up to 10,500 TEUs. The Panama Canal Authority believes it can solve the financing problem through a combination of public investment and toll increases. It cites the fact that in 2003, it was able to raise tolls by 12 percent and still retain market share[6]

(iv) East Coast via Indian Ocean and Suez Canal

For goods moving from Southeast Asia, the Suez Canal route is a viable alternative, with rates being about the same as for shipments transiting the Panama Canal. Most all-water services from Asia, however, use the Panama Canal route because it offers faster transits from China. All-water services to Boston from southern China and Hong Kong take about 29 days, about five days longer than shipping through the West Coast. Shipments from Indonesia and Vietnam move through the Suez Canal and take 33 to 36 days to reach Boston. Key East Coast seaports that have taken advantage of California delays include the Ports of New York/New Jersey, Newport News, Charleston, and Savannah.

C. National Projections

Three different national forecasts of goods movement demand are available for comparison. The first is the Global Insights, Inc. (formerly DRI-WEFA) 2004 Long-Term Economic Forecast.[7] The second is an analysis by the Public Policy Institute of California (PPIC) entitled, *California Global Gateways, Trends and Issues* (2004)[8]—its conclusions are presented in Tables 2 and 3. The third is the forecast released in 2003 by

[6] Website, Global Insights, February 2005.
[7] Global Insights, Inc., United States GDP and Trade Outlook, Fourth Quarter, 2004 (February 2005).
[8] Jon Haveman, David Hummels, California's Global Gateways: Trends and Issues, Public Policy Institute of California, San Francisco, April 2004.

the Federal Highway Administration (FHWA) in its Freight Analysis Framework[9] (see Table 4). Both of these latter forecasts have both dollar value and tonnage projections. Currently, there are no readily available national forecasts of container volumes.

Table 2: Projected Growth in the Value of U.S. and California Trade Through 2020
(in billion dollars)

Exports	Air	Percent Increase over 2002	Vessel	Percent Increase over 2002	Other	Percent Increase over 2002	Total	Percent Increase over 2002	CA Share of U.S. Value
2002									
United States	$223	-	$190	-	$258	-	$671	-	-
California	58	-	39	-	14	-	111	-	16.5%
2010									
United States	384	72%	314	65%	381	48%	1,079	61%	-
California	106	83%	68	74%	22	57%	196	77%	18.2%
2020									
United States	591	165%	500	163%	574	122%	1,665	148%	-
California	167	188%	112	187%	37	164%	316	185%	19.0%

Imports	Air	Percent Increase over 2002	Vessel	Percent Increase over 2002	Other	Percent Increase over 2002	Total	Percent Increase over 2002	CA Share of U.S. Value
2002									
United States	254	-	536	-	325	-	1,115	-	-
California	53	-	196	-	18	-	267	-	23.9%
2010									
United States	306	20%	733	37%	411	26%	1,450	30%	-
California	63	19%	266	36%	25	39%	354	33%	24.4%
2020									
United States	397	56%	1,131	111%	561	73%	2,089	87%	-
California	74	40%	368	88%	39	117%	481	80%	23.0%

Source: PPIC, "California's Global Gateways: Trends and Issues," April 2004

Global Insights is forecasting a 78 percent growth in GDP, a 176 percent growth in U.S. imports, and a 248 percent growth in national exports between 2002 and 2020. According to this forecast, international trade in general and exports in particular should expand at a much faster pace than GDP. The PPIC analysis estimates a much smaller growth in international trade. According to PPIC, U.S. imports will increase by only 87 percent and exports by 148 percent during that same period. An economic analysis was performed by the California Department of Transportation (Caltrans) of the relationship

[9] Federal Highway Administration, Freight Analysis Framework, March 2003.

between GDP, imports, and exports and was used to estimate broad future trade projections. Caltrans' analysis indicates that, on average, a 10 percent growth in GDP would lead to a 1.6 percent increase in exports and a 2.2 percent increase in imports. This analysis concluded that U.S. imports would increase at a faster rate than the rate estimated by PPIC, but exports would increase at a slower rate than estimated by both Global Insights and PPIC.

Table 3: Projected Growth in the Volume of U.S. and California Trade Through 2020 (in billion tons)

Exports	Air	Percent Increase over 2002	Vessel	Percent Increase over 2002	Total	Percent Increase over 2002	CA Share of U.S. Volume
2002							
United States	2.3	-	317.2	-	319.5	-	-
California	0.4	-	35.4	-	35.8	-	11.2%
2010							
United States	3.7	61%	563.2	78%	566.9	77%	-
California	0.7	75%	64.6	82%	65.3	82%	11.5%
2020							
United States	5.8	152%	1,107.40	249%	1,113.20	248%	-
California	1.2	200%	124.7	252%	125.9	252%	11.3%

Imports	Air	Percent Increase over 2002	Vessel	Percent Increase over 2002	Total	Percent Increase over 2002	CA Share of U.S. Volume
2002							
United States	3.5	-	813.3	-	816.8	-	-
California	0.6	-	91.3	-	91.9	-	11.3%
2010							
United States	4.3	23%	1,495.2	84%	1,499.5	84%	-
California	0.8	33%	147.0	61%	147.8	61%	9.9%
2020							
United States	5.5	57%	3,149.7	287%	3,155.2	286%	-
California	1.1	83%	275.6	202%	276.7	201%	8.8%

Source: PPIC, "California's Global Gateways: Trends and Issues," April 2004

FHWA's forecasts have an earlier starting date (1998) and, thus, cover a slightly longer time period. On a national basis, the FHWA estimates the value of international trade would grow 309 percent. On a tonnage basis; however, they predict total volume would grow only 85 percent. PPIC estimates a much higher growth rate, a 248 percent increase in exports and a 286 percent increase in imports. This may be partly explained by the

relative weakness of the FHWA's forecast in addressing non-NAFTA based international trade.

Table 4: FHWA Freight Analysis Framework Value/Tonnage Estimates

		Value (millions of dollars)				Tonnage (millions of tons)	
Factor/Year	**1998**	**2010**	**2020**		**1998**	**2010**	**2020**
United States	$9,312	$18,339	$29,954		15,271	21,376	25,848
Percent Growth	—	49.2	221.7		—	28.6	69.3
California	$1,218	$2,564	$4,315		1,360	1,980	2,435
Percent Growth	—	52.5	254.3		—	31.3	79.0
California Share of U.S.	13.1	14.0	14.4		8.9	9.3	9.4

Source: Federal Highway Administration, Freight Analysis Framework, March 2003

D. Estimating California's Share

1. Accounting for Historical and Emerging Factors

California has historically received the dominant share of Asian, transpacific containerized trade. However, increasing regional congestion around the three major seaports of Los Angeles and Long Beach may be changing this position. As discussed above, shippers are diverting and reallocating shipments to other West Coast seaports and/or using all water services to Gulf Coast or East Coast seaports. California land-bridge delays caused by the ports' inability to handle increasing cargo volumes, labor strikes, and natural disasters have prompted shippers to modify logistics practices so that goods are not delayed. Some shippers have established warehousing and distribution facilities in close proximity to alternative seaports, ensuring easier access and distribution of their goods throughout the nation. Wal-Mart, for instance, now ships only approximately 43 percent of its goods through Southern California seaports; in 1994 it shipped 71 percent. The balance is shipped through Gulf Coast or East Coast seaports.

Recognizing the possibilities, seaports throughout the Gulf and East Coasts, as well as seaports in the Pacific Northwest, have become very accommodating and opportunistic with regard to shippers, causing California seaports to lose business. In this respect, California seaports will continue to be threatened. Solving the State's infrastructure and capacity problems may lessen that threat.

Nevertheless, international trade activity in the Los Angeles Customs District was projected to reach new record levels in 2004. The value of two-way trade at the Los Angeles Customs District was projected to increase by 11.6 percent to $262.3 billion, according to the Los Angeles Economic Development Corporation. Similarly,

international two-way trade activity in the San Francisco Customs District through August 2004 was already $80.8 billion—greater than the $79.6 billion in international two-way trade in the San Francisco Customs District for all of 2003. From a container standpoint, the Ports of Los Angeles and Long Beach volume growth between 2000 and 2004 averaged close to seven percent per year.

2. Separating In-State and National Demand

California seaports handle a significant share of U.S. containerized trade. In 2003, based on statistics provided by the American Association of Port Authorities and the Pacific Maritime Association, California seaports handled 43.4 percent of the nation's container volume (preliminary numbers suggests this increased to 44 percent in 2004). This share could drop, however, as shippers and shipping lines divert certain shipments and services to other ports of entry. Of this volume, 50 to 70 percent of Southern California container traffic went to regions outside California, whereas only 20 to 30 percent of Oakland's container traffic went to regions outside of California.

3. Estimates of Total California International Trade and Container Movement Demand

According to PPIC, between 2002 and 2020, the dollar value of imports through California is predicted to increase 80 percent; the dollar value of exports 187 percent.[10] By tonnage, however, imports are projected to increase 201 percent and exports 252 percent, reflecting what PPIC believes will be an increase in lower cost, heavier weight commodities moving through California as international trade. FHWA forecasts a much greater increase (352 percent) in the dollar value of international imports transiting California for the period 1998 to 2020. By tonnage, however, FHWA projects only a 153 percent increase in imports in the same period. Importantly, the FHWA analysis includes projections for overall freight movement, both international and domestic. Overall freight movement through California between 1998 and 2020 is projected to grow 254 percent (by dollar value) and 79 percent (by tonnage).

A Caltrans analysis utilizing California personal income to derive its estimates projected an almost identical growth rate for exports (187 percent), but a much higher growth rate (191 percent) for imports than the PPIC analysis. This discrepancy might be partly due to the fact that the Caltrans analysis (based as it was on California personal income) excludes imports that pass through California to other states. It should also be noted that the Caltrans analysis seems to suggest that the growth in international trade can be better explained by the growth in personal income than by the growth in population: during the period examined by the Caltrans analysis (1970 to 2003), the state's population grew by only 80 percent, whereas real personal income grew by 238 percent; during that period, imports grew by 1,098 percent whereas exports only by 535 percent, in constant dollars.

California seaport container volumes (actuals for 1995 and 2000 and projections for 2005, 2010, and 2020) are set forth in Table 5 and in the accompanying bar graph.

[10] On a modal basis, the maritime numbers are 88 percent and 187 percent, respectively, and the air cargo numbers 40 percent and 188 percent, respectively.

Between 1995 and 2000 there was a steady increase in container volume. The total number of TEUs for the three major ports (Los Angeles, Long Beach, and Oakland) combined increased by 4.5 million TEUs. The ports projected container volumes are projected to increase another 5.4 million TEUs between 2000 and 2005, to a total of 16.7 TEUs by the end of this year. Reinforcing the accuracy of these projections is that actual container volume in 2004 was 13.1 million TEUs at Los Angeles/Long Beach and 2.0 million TEUs at Oakland, for a total of 15.1 million TEUs. TEU volumes for the period 2005-2010 are projected to continue to increase at a continued strong pace, increasing 7.5 million to 24.2 million TEUs (a 45 percent increase). Long term (2005 to 2020) container volume is projected to increase 25.3 million TEUs—152 percent increase in that 15-year period. If the projections prove to be accurate, combined container volumes for the three California seaports between 1995 and 2020 would increase by 35.2 million TEUs—a 518 percent increase in the 25-year span shown in the table.

Table 5: California Port Container Volumes

Port	TEUs (millions)					Percentage (%) Increase		
	1995	**2000**	**2005**	**2010**	**2020**	**2000-2005**	**2005-2010**	**2005-2020**
San Pedro Bay Ports	5.3	9.5	14.5	19.7	36.0	52.6	35.9	148.3
- Los Angeles	2.5	4.9	-	-	-			
- Long Beach	2.8	4.6	-	-	-			
Oakland	1.5	1.8	2.2	4.5	6.0	22.2	104.5	172.7
Totals	**6.8**	**11.3**	**16.7**	**24.2**	**42.0**	**47.8**	**44.9**	**151.5**

Source: Ports of Los Angeles, Long Beach, Oakland

4. Distinction Between Demand and Actual Throughput Capability

Most of the forecasts issued by the ports are unconstrained, i.e., not limited by port terminal capacity, landside access, or environmental considerations, making it difficult to determine actual throughput capabilities. However, one such analysis estimates the actual existing throughput capacity of the Ports of Los Angeles and Long Beach to be between 28 and 30 million TEUs—slightly more than double the 2004 volume of 13.1 million TEUs. While that capacity estimate assumes no new landfill, it does assume: some minimal development of vacant land; minor redevelopment of several terminals; 24/7 operations; increased container stacking and stack heights; reduced container dwell time; upgraded information systems to assign, track, and stage containers; and enhanced on-dock rail operations. Even with the above-cited port enhancements and other transportation-element improvements, such as reduced empty container-truck trips, highway and rail infrastructure improvements will still need to be made. A recent unrelated analysis by the Ports of Los Angeles and Long Beach and the Alameda Corridor Transportation Authority shows that proposed improvements for the Interstate 710 corridor (which include both additional general purpose lanes and dedicated truck lanes) will still be required despite extended port hours and other improvements in goods movement efficiency.

E. Opportunity Cost to California/U.S. as a Consequence of Congestion and Capacity Limitations

The difficulties of keeping pace with demand were made evident by several failures of the State's goods movement network in the fall of 2004. A shortage of rail cars, port workers, and other factors led to delays in the unloading of ships in the ports of Los Angeles and Long Beach. For almost six months, as many as 90 ships per day were forced to anchor offshore waiting to unload their containers. In addition, 124 ships bound for Southern California were diverted to other west coast ports or through the Panama Canal.[11]

This experience illustrates future prospects of the opportunity cost of increasing congestion and inadequate goods movement infrastructure, California is not, however, alone. All states with large seaport facilities are experiencing similar issues related to access, infrastructure, environmental impacts, and channel depths. It is becoming increasingly clear that even if seaports had all of the capacity they wanted, the landside infrastructure in California and the rest of the nation is simply not adequate to keep up with rising container and freight volumes. Rail capacity is also becoming more constrained. In addition, there is a national shortage of truck drivers, which is particularly affecting in Southern California drayage operations, due to port congestion and delays, high insurance and fuel costs, and low rates. The consequences of these capacity limitations are that shippers will continue to seek the path of least resistance to reach their customers. Because their markets lie in large population centers, that is where their goods must go. With the United States being the primary consumer market destination for Asian goods, shippers will continue to optimize their supply chains in an effort to work around congestion and capacity limitations. Effective solutions can be developed and opportunity loss minimized only through governmental action in conjunction with the goods movement industry's shipper, receiver, carrier, and other stakeholders.

[11] Marine Exchange of Southern California, Status Reports, January 4, 2005; January 12, 2005.

V. CHARACTERIZATION OF CALIFORNIA'S "PORT TO BORDER" GOODS MOVEMENT CORRIDORS AND PROJECT INVENTORY

A. Overview of California's Four Goods Movement Corridors

A complex network of highways, rail lines, seaports, airports, and border crossings, which link the primary gateway regions to each other and to the rest of the nation, form California's goods movement system. The map of California on the following page illustrates the priority regions and corridors of this system.

As originally described in the 2002 Global Gateways Development Program (and updated for this report), the system includes four gateway regions: Los Angeles/Inland Empire, Bay Area, San Diego/Border, and the Central Valley. In addition, this Chapter also addresses the goods movement needs in other areas of the State as described in the State Gateways/Central Coast discussion.

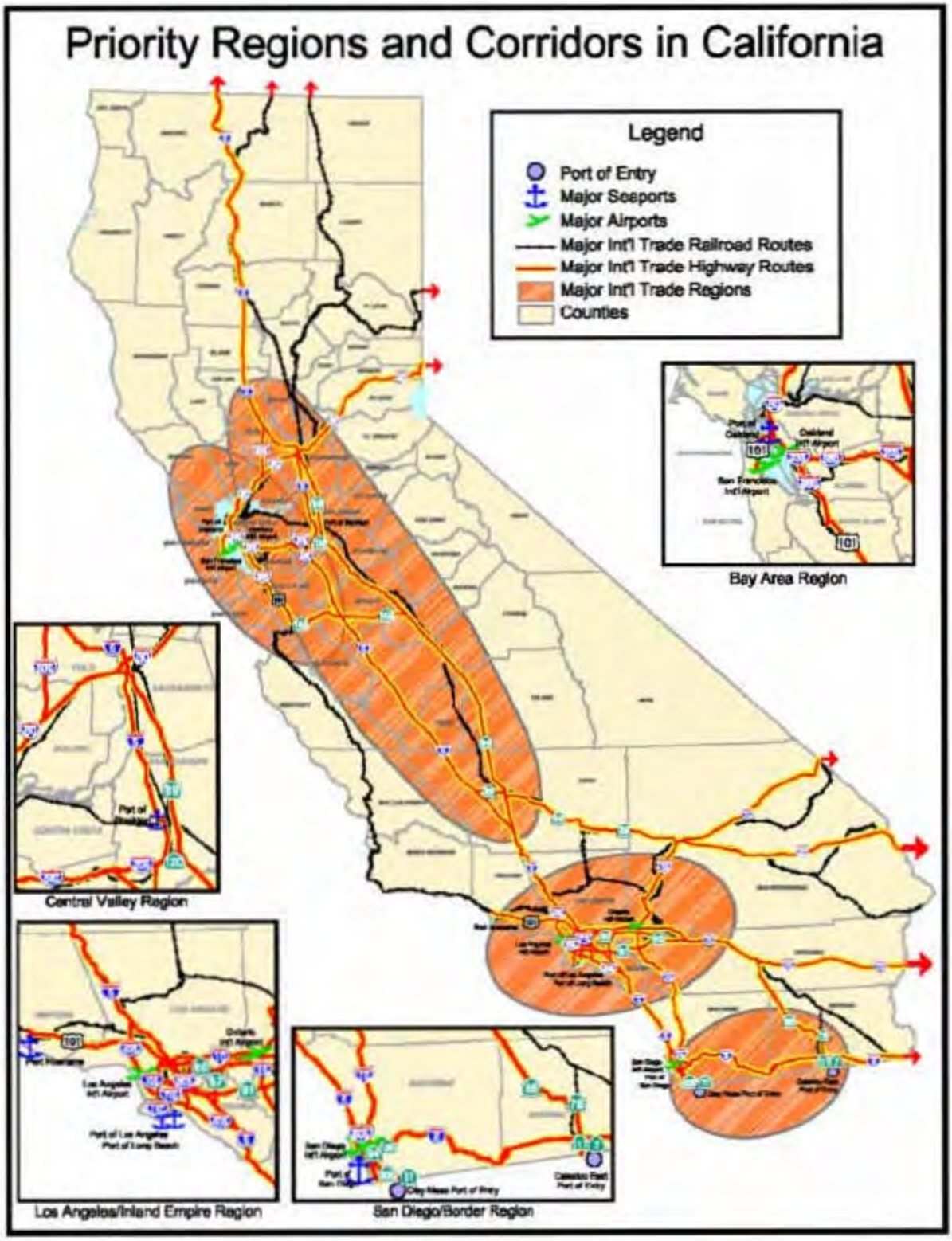
Among California's top priority global gateways are six ports (Los Angeles, Long Beach, Oakland, San Diego, Hueneme, and Stockton), five international airports (Los Angeles, Oakland, San Francisco, Ontario, and San Diego), and two border crossings (Otay Mesa and Calexico East). Key international trade corridors include twelve interstate highways[1] and substantial portions of five other interstate highways,[2] five U.S./State Routes[3] and sections of twelve others,[4] as well as the main rail corridors of the Burlington Northern Santa Fe and Union Pacific railroads. These transportation corridors support the key gateways in the origin and receipt of international and domestic trade.

Congestion and decreased reliability of travel times on California's highways are creating major challenges for shippers, truck drivers and commuters alike. Both Burlington Northern and Union Pacific face mainline and yard capacity constraints as they struggle to handle increases in freight and passenger train volumes. For the State's seaports, truck congestion and delay, particularly in Southern California, present the most serious landside transportation problems and all three major container ports are seeking to expand rail shipments in response. For the international airports, truck access is a critical problem, especially at Los Angeles, Oakland, and Ontario airports. San Diego airport also has operating constraints as well as runway and land-use limitations.

1. Los Angeles/Inland Empire Region

The Los Angeles/Inland Empire Region (Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties) is the nation's largest international trade attractor and consumer, rivaled only by the New York City/tri-state area. In the area covered by the Southern California Association of Governments (SCAG), there are more than 17 million

[1] Interstates 5, 15, 40, 80, 105, 110, 205, 238, 405, 505, 805, and 880.
[2] Interstates 8, 10, 580, 605, and 710.
[3] U.S. or State Routes 11, 57, 60, 91, and 905.
[4] U.S. or State Routes 7, 50, 58, 78, 86, 94, 99, 101, 111, 120, 125, and 152.


Priority Regions and Corridors in California
Legend
Port of Entry
Major Seaports
Major Airports
Major Int'l Trade Railroad Routes
Major Int'l Trade Highway Routes
Major Int'l Trade Regions
Counties
Bay Area Region
Central Valley Region
Los Angeles/Inland Empire Region
San Diego/Border Region

people with more than 6.9 million jobs, approximately 550,000 of which are directly related to handling goods through the region (including Imperial County). Thirty-seven percent of all U.S. containerized international trade moves through the region's seaports.

Southern California experiences the greatest impacts in the State of increased goods movement. According to SCAG's February 2005 report, *Southern California Regional Strategy for Goods Movement: A Plan for Action*, ensuring that goods movement activities continue to flourish will be a region-wide challenge. The report stated:

> ". . . the Fall 2004 slowdown at San Pedro Bay ports (due to a labor shortage) slowed the offloading of goods arriving for the holiday shopping season. Intermodal yards in Los Angeles and San Bernardino counties have nearly reached capacity to transfer containers from trucks to rail—and freight volumes are expected to at least double in the next two decades."

The report observes that public and private stakeholders are doing everything they can to address these issues. A total of $2 billion in rail and highway improvements related to goods movement are funded in the 2004 Regional Transportation Improvement Programs. These projects within the six counties that make up the region, are slated for implementation in the next six years.

2. Bay Area Region

The metropolitan area that surrounds San Francisco Bay in Northern California contains an estimated population of 7.1 million people and 2.1 million jobs. By 2030, these figures are projected to increase to 8.7 million and 2.9 million, according to the Association of Bay Area Governments.[5] The region is defined by nine counties that border either San Francisco Bay or San Pablo Bay: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma. Manufacturing, freight transportation, and warehouse and distribution businesses account for more than 37 percent of Bay Area economic output. Collectively, these businesses spend approximately $6.6 billion annually on transportation services.

3. San Diego/Border Region

The San Diego/Border Region is made up of two California counties (San Diego and Imperial), which interact with five Baja California municipalities (Tijuana, Playas de Rosarito, Ensenada, Tecate and Mexicali) along their joint 150-mile border. Together, San Diego and Imperial County have a population of 3.2 million people and an employment base of approximately 1.0 million jobs.

Since the passage of the North American Free Trade Agreement (NAFTA), trade across the California/Mexico border increased steadily in the 1990s with Mexico surpassing Japan to become California's top export trade market in 1999. Total California exports

[5] Association of Bay Area Governments testimony provided at the Goods Movement and Ports Hearing, Oakland, February 11, 2005.

into Mexico exceeded $12.5 billion in 2003. Total trade activity through the California/Mexico ports of entry exceeded $29.5 billion in 2003. It is estimated that trucks transport approximately 98 percent of this trade.

The growth in trade is in part due to the development of the maquiladora industry manufacturing/assembly plant operations along the California/Baja California border. Although some twin-plant operations have relocated to the Pacific Rim, the majority of the remaining 893 maquiladoras located within the municipalities of Tijuana, Tecate and Mexicali are continuing in operation, by producing goods of higher value, such as electronics, computers, and automobiles and their components.

Imperial County's agriculture production ranks eleventh in the State producing over $1 billion in goods annually. Several of these agricultural commodities, including Sudan grass, are exported from this region to Asia via the Ports of Los Angeles and Long Beach.

4. Central Valley Region

The Central Valley Region is experiencing rapid population growth with eight of the ten fastest growing counties in California (Department of Finance, Research Demographic Research Unit). In fact, all of the San Joaquin Valley counties exceeded the growth rate for California during the past ten years (1994 to 2004) and have a combined population of 3.6 million, or about 10 percent of the state's population.

The Central Valley Region provides half of all fruits and vegetables to America, generating $10 billion in annual revenue in the San Joaquin Valley alone. However, the region is also seeing significant growth of warehousing and distribution facilities that have moved from the Los Angeles and Bay Area regions. The rapid developmental growth and continued extensive agricultural production and processing creates conflicts between passenger and freight movement, particularly along access arteries into the Bay Area region and through the transportation system crossroads of Sacramento. The primary routes to and through the Central Valley Region are Interstates 5, 80, 205, and 505, State Routes 46, 58, 99, 152, and 190, and the main lines of the Burlington Northern and Union Pacific railroads.

5. State Gateways and Central Coast

The State's Northern Gateways, Nevada Gateway, and the Central Coast are critical links in the State's goods movement system, yet their importance can be overlooked when considered against goods movement needs in more urban areas.

The Northern and Nevada Gateways, which include Districts 1, 2 and 9 of the California Department of Transportation (Caltrans), have a combined population of approximately 565,000. The primary goods movement corridors for the Northern and Nevada Gateway regions are Interstate 5 and U.S. Routes 101 and 395. State Route 299 (from Redding to Eureka) and U.S. Route 199 (from north of Crescent City to the Oregon border) are also important east-west connectors that link these major corridors. The Central Coast region (which includes all of Caltrans District 5) has a total population of 1,379,000. The

primary goods movement corridors for this region are U.S. Route 101 and State Routes 46 and 152.

The majority of jobs in all these regions are in the service sector, retail, recreation, and government. Resource-based jobs are declining in the Northern Gateways; however, agriculture remains important in the Central Coast (although more and more formerly agricultural land is being converted to other uses).

B. Infrastructure Project Context and Identification

The following sections identify by region California's **major** goods movement projects, including improvements that are underway (i.e., that will be completed in the next three years) as well as additional improvements that are necessary—both those already programmed and those that are planned over the next 20 years. These projects were identified based on the following screening criteria:

1. Major projects, with a cost of $10 million or greater, that will directly benefit goods movement, including truck movement, rail freight operations, and/or access to or from the State's major seaports, airports, or border crossings.

2. System completion and capacity expansion projects in general. We have also included a few key, major system rehabilitation and operational projects that are key to goods movement transportation system operation. Note; however, that the universe of project types needs are much larger and includes several categories (as illustrated in the figure below).

SYSTEM PERFORMANCE IMPROVEMENT PYRAMID

Looking at the pyramid above, system performance improvement builds up from system monitoring and evaluation, system maintenance and preservation, demand management/value pricing strategies, and system operational improvements. From a goods movement perspective, these include intelligent transportation systems technologies, such as traveler information, traffic control and incident management. It includes locational and scheduling systems for tracking truck movements and the location of shipping containers.

Operational improvements includes such project types as auxiliary lanes, truck climbing lanes, new or revised turn pockets, ramp and curve corrections, new signals and signal timing, improved signing, lane striping and width changes, truck parking/roadside safety rest areas, etc. These are all critical components in the measuring, maintaining and improving goods movement transportation system mobility, accessibility and reliability. Smart land use strategies that address the connection between land use and transportation, and changes to institutional requirements, are also additional actions that are important in improving the long-term performance of the goods movement transportation system.

3. The projects are located on a previously identified Global Gateways Development Program route, having a minimum average daily five-axle truck volume of at least 3,000. Included also are some non-urbanized area projects on major through routes that have less than this critical volume but, nevertheless, are key to interregional truck movement and access and which address key freight movement bottlenecks or concerns.

Finally, please note that this is an order-of-magnitude analysis. In selecting projects to be included, there may be important projects that have been omitted. In some instances sufficient information could not be obtained to include them in the regional list. In other instances, they are still subject to ongoing regional discussions what those projects should be and their relative priority. Environmental mitigation projects are not discussed in this Chapter—see the discussion in Chapter VI.

C. Los Angeles/Inland Empire Region

1. Characterization of Existing "Port-to-Border" Operations

Freight movement within the Los Angeles/Inland Empire Region is highly impacted both by international trade being moved through its seaports and airports and by significant volumes of domestic trade on its transportation network. Key highway system routes include Interstates 5, 10, 15, 110, 605, and 710, and State Routes 57, 60, and 91. In total, 224 route miles of the region's highway system has five-axle truck volumes of 10,000 or greater. Between 50 and 60 percent of all shipments arriving at the region's ports are bound for points beyond the local area and, thus, must cross an already overloaded transportation network to reach their ultimate destination—at least initially by truck. These routes continue east through the Inland Empire and north and south of the Los Angeles basin. From San Bernardino traffic moves north and east on Interstate 15 to Nevada and on Interstates 10 and 40 to Arizona.

The Ports of Los Angeles and Long Beach depend on this local highway network. These two ports combined currently generate over 40,000 truck trips per day. By 2010, this volume could exceed 50,000 truck trips per day, and reach 92,000 by 2020. The most heavily impacted route of this access network is Interstate 710 (Long Beach Freeway); one report claims that 15 percent of all containers arriving in the United States travel on this freeway. This corridor has the highest truck accident rate in the State. The Port of Hueneme in Ventura County also serves the region.

The ports and the region are served by two Class I railroads, Burlington Northern and Union Pacific. Both railroads are experiencing congestion along their systems, as Amtrak intercity passenger rail, Metrolink commuter passenger rail, and rail freight train volumes continue to climb. The Burlington Northern yards are particularly impacted, as both their main intermodal yards in East Los Angeles and San Bernardino are currently operating at above original design capacity.

The 20 mile-long Alameda Corridor, which links the Ports of Los Angeles and Long Beach to the transcontinental rail yards in downtown Los Angeles, improved rail access to the ports. It was developed by the Alameda Corridor Transportation Authority (ACTA), in partnership with the ports and the Burlington Northern Santa Fe (BNSF) and the UP. It cut the transit time between the ports and rail yards in half, eliminated rail/highway conflicts at 200 at-grade rail crossings, and resulted in slashed emissions from idling cars, trucks, and locomotives. Almost exclusively it handles international cargos bound for or originating from markets outside of California. But its full potential cannot be realized until additional main line and yard capacity is developed and selected grade separations of the Alameda Corridor East are completed.

The region is also served by the first and fourth largest (by volume) air-cargo airports in the State, Los Angeles International and Ontario Airports. With Los Angeles International Airport congestion increasing, due to rising passenger volumes and restricted ground access, efforts are underway both to expand air cargo operations at Ontario Airport and, possibly, to develop air cargo operations at one or more of the deactivated U.S. Air Force bases in the Inland Empire, including the Southern California Logistics Airport (formerly George AFB), San Bernardino International Airport (formerly Norton AFB), and/or March Air Force Reserve Field (formerly March AFB).

2. Current vs. Future Estimates of Traffic

Caltrans projects annual truck vehicle miles of travel to grow in the Los Angeles/Inland Empire Region (including Imperial County in this case) from 6,676 billion miles to 10,403 billion miles, an increase of 64 percent, between 2005 and 2025. Average daily freight train volumes were 112 trains per day in 2000 and are projected to increase to 165 by 2010. By the year 2025, freight train volumes are projected to more than double to 250 trains per day.[6]

[6] Southern California Association of Governments, "LA – Inland Empire Railroad Mainline Advanced Planning Study," 2002.

3. Improvements Underway

County/ Route	Project Title/Description	Cost (in millions)	Estimated Completion Date	Primary Impact
LA 5	Santa Clarita-Hasley Canyon and I-5, reconfigure existing interchange	19	Jun 07	Improves operations
LA 5	I-10/US-101 junction to Providentia Ave., rehabilitate roadway (long-life pavement)	55	2007	Rehabilitates facility
SBD 10	Eastbound truck climbing lane/auxiliary lane (Redlands and Yucaipa)	18	Oct 07	Improves operations
SBD 15	Reconstruct interchange and widen to six lanes in Hesperia at Main St.	14	Oct 05	Improves operations
SBD 15	Add southbound and northbound mixed flow lanes from Victorville to Barstow	123	Jul 05	Increases capacity
SBD 15	Southbound truck climbing lane, roadway and bridge rehabilitation, Barstow/Yermo	34	Jul 07	Improves operations
LA 47/710	Terminal Island Freeway/Ocean Blvd. Interchange	64	2007	Improves operations
LA 91	In Carson and Long Beach, rehabilitate roadway (long-life pavement)	80	May 07	Rehabilitates facility
LA 710	I-405 to Firestone, rehabilitate roadway (long-life pavement)	123	2007	Rehabilitate facility
LA 710	Firestone Blvd. to I-10, rehabilitate roadway	37	2007	Rehabilitates facility
RIV 215	Widen I-215 in Riverside from six to eight lanes, add auxiliary lane, truck bypass and climbing lanes	399	Apr 07	Increases capacity
SBD BNSF	Add third main rail in the Cajon Pass	35	2005	Increases capacity
LA various locations	In Los Angeles and Pomona, along Union Pacific line from Redondo Junction to East End Ave., safety and traffic signal improvements, roadway widenings, and grade separations	910	Aug 07	Improves operations

4. Additional Improvements Necessary[7]

Highway Improvements

County/ Route	Project Title/Description	Cost (in millions)[8]	Short/Mid/ Long Term[9]	Primary Impact
LA 5	Orange Co. line to I-605, widen for HOV and mixed flow lanes	163	Mid	Increases capacity
LA 5	Carmenita interchange improvement	186	Short	Improves operations
LA 5	Truck lanes, SR 14 to Calgrove Blvd.	60	Mid	Increases capacity
LA 5	Truck lanes, additional truck climbing lanes, SR 14 to the Kern County line	529	Long	Increases capacity

[7] Based on Southern California Association of Governments, "Southern California Regional Strategy for Goods Movement, A Plan for Action," February 2005, and additional Caltrans inputs.
[8] Current dollars, not escalated.
[9] "Short" term is 5 years or less; "mid" term is 6 to 10 years; "long" term is 11 to 20 years.

County/ Route	Project Title/Description	Cost (in millions)[8]	Short/Mid/ Long Term[9]	Primary Impact
ORA 5	I-5/SR-57/SR-22 interchange to SR-91, add truck lanes in both directions	40	Mid	Improves operations
ORA 5	Reconstruct southbound Alton off-ramp	15	Long	Improves operations
SBD 10	Cherry Ave. interchange reconstruction	23	Mid	Improves operations
SBD 10	Reconstruct Tippecanoe Ave. interchange, construct auxiliary lanes and improve local street	77	Mid	Improves operations
RIV 10	Add eastbound truck climbing lane near Banning	75	Mid	Improves operations
SBD 15	Wheaton Springs, Bailey Rd. to Yates Well Rd., construct truck descending lane (northbound)	23	Short	Improves operations
SBD 15	Near Wheaton Springs, construct commercial vehicle enforcement facility	34	Short	Improves operations
SBD 15	I-15 truckway	10,100	Long	Increases capacity
SBD 40	Near Needles, construct vehicle enforcement facility	25	Short	Improves operations
LA 47	Alameda Corridor SR-47 expressway (includes Schuyler Heim Bridge replacement)	420	Short	Increases capacity
LA 47/ 110	Develop roadway and Vincent Thomas Bridge access enhancements	23	Short	Enhances access
ORA 57	Add auxiliary lane, northbound from Katella off-ramp to Lincoln	21	Long	Improves operations
ORA 57	Northbound Orangethorpe to Lambert Road, add auxiliary lane and 4th through lane through the SR-91 interchange	69	Mid	Improves operations
ORA 57	Truck climbing lane Lambert to Los Angeles Co. line	68	Long	Improves operations
SBD 58	Near Kramer Junction, widen to 4-lane expressway	156	Mid	Increases capacity
SBD 58	Near Hinkley-Realign and widen to 4-lane expressway	114	Mid	Increases capacity
RIV 60	Near Mira Loma, add 2 HOV lanes and 2 mixed flow lanes, widen 5 interchanges and one overhead	41	Short	Improves operations
RIV 86	At SR-195, construct new interchange	40	Mid	Improves operations
ORA 91	Relocate truck scale	20	Short	Improves operations
ORA 91	Westbound from SR-57 to I-5, add truck lane	20	Mid	Improves operations
ORA 91	Eastbound between SR-241 and SR-71 add auxiliary lanes	39	Short	Improves operations
ORA 91	Eastbound add auxiliary lane between Lakeview Ave. to SR-241	70	Long	Improves operations
ORA 91	Between SR-241 to SR-71, add truck bypass and auxiliary lanes	100	Long	Improves operations
RIV 91	Reconstruct the SR-71/91 interchange	25	Long	Improves operations
RIV 91	Add one mixed flow lane each direction from Riverside/Orange Co. line to Pierce St./Corona	161	Long	Increases capacity
LA 110	8th/9th St. interchange – add auxiliary lanes and modify/reconstruct ramps (two projects)	39	Short	Improves operations

County/ Route	Project Title/Description	Cost (in millions)[8]	Short/Mid/ Long Term[9]	Primary Impact
LA 110	Wilmington "C" Street Interchange Improvements	11	Short	Improves operations
LA 405	La Tijera Blvd. to Jefferson Blvd., add auxiliary lane	39	Short	Improves operations
LA 605	Reconstruct SR-91/I-605 Interchange	240	Short	Relieves bottleneck
LA 605	Reconstruct SR-60/I-605 Interchange	1,000	Mid	Relieves bottleneck
LA 605	Reconstruct I-10/I-605 Interchange	1,000	Mid	Relieves bottleneck
LA 605	Reconstruct I-105/I-605 Interchange	500	Long	Relieves bottleneck
LA 710	Replace Gerald Desmond Bridge	605	Mid	Increases capacity
LA 710	I-710 corridor improvements, including dedicated truck lanes	5,500	Long	Increases capacity
LA/SBD	East-West Corridor	4,300	Long	Increases capacity

Rail Improvements

Railroad/ Location	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
ACTA, Ports of LA/LB to SBD/RIV	Shuttle Train Intermodal Service to Inland Empire; Inland Terminal	60	Short	Enhances access
ACTA, port area	ACTA Port Area Corridor System Capacity Improvements	112	Mid	Increases capacity
BNSF, Port of Los Angeles	BNSF Port of Los Angeles/Long Beach Near Dock Facility	176	Short	Increases capacity
BNSF/UP-Ports of LA/LB	Expansion of BNSF and UP Near-Dock Facilities	158	Long	Increases capacity
BNSF/UP-LA/ORA/ RIV/SBD	Alameda Corridor East-Grade separations, grade crossing improvements	2,500	Short	Mitigates impact
BNSF/UP-LA/ORA/ RIV/ SBD	Rail capacity improvements, including mitigation measures[10] (e.g., completion of BNSF third main track, Fullerton to Los Angeles-$180 million)	3,400	Mid	Increases capacity
UP-BNSF/SBD	Colton Rail Grade Separation	90	Mid	Improves operations

[10] Costs associated with surface traffic and other mitigation measures may be greater than current cost estimates reflected in the Alameda Corridor East total. Accordingly, additional mitigation needs are included in the rail capacity improvement total for this project.

Seaport Access Improvements

Sponsor/ Location	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
Port of Long Beach	On-dock rail yards/operations expansion	379	Short/Mid	Increases capacity
Port of Long Beach	Other rail network enhancement projects	271	Mid	Increases capacity
Port of Long Beach/Los Angeles	Transportation Management, Information and Security System	10	Short	Improves operations
Port of Long Beach/Los Angeles	Other joint rail network enhancement projects	45	Mid	Increases capacity
Port of Los Angeles	Navy Way (Pier 400 Access Road) to Westbound Seaside (SR 47) Connector Ramp	20	Short	Improves operations
Port of Los Angeles	South Wilmington Grade Separations	50	Short	Enhances access
Port of Los Angeles	On-dock rail yards/operations expansion	170	Short/Mid	Increases capacity
Port of Los Angeles/UP /BNSF	Pier A Transfer Yard	50	Short	Increases capacity
Port of Los Angeles	Other rail network enhancement projects	165	Mid	Increases capacity
Port of Hueneme	Port/Rail Intermodal Access	18	Mid	Enhances access

D. Bay Area Region

1. Characterization of Existing "Port-to-Border" Operations

Goods movement drives the economy of the Bay Area and Northern California, which is heavily dependent on the transportation network for both internal circulation and the region's connection to the rest of California and the United States. But congestion on this network and the reliability of trip times has become major concerns for those who move freight within, into, and out of the Bay Area. Major elements of this transportation network include Interstates 80, 238, 580, and 880 and U.S. Route 101. Interstate 580 is the primary east-west connector to Interstate 5, and is the primary artery between the Bay Area region, the San Joaquin Valley and Southern California. It carries the highest truck volume in the region. Interstate 80 is a connector to the transcontinental truck network and carries the third-highest truck volumes in the region. U.S. Route 101 is a gateway corridor in the southern portion of the region. Interstates 238 and 880 provide critical highway links internally in the Bay Area in the movement of goods, with Interstate 880 carrying the second highest five-axle truck volume in the region.

Both the Burlington Northern and Union Pacific have major operations in the Bay Area, including Burlington Northern's Richmond yard and Union Pacific's Oakland yard. Burlington Northern also operates the Port of Oakland's Joint Intermodal Terminal as the

Oakland International Gateway. Union Pacific's main line accesses the region via Martinez from Sacramento. It also has one active secondary line through the Altamont Pass. Burlington Northern's main line accesses the region from Stockton also via Martinez.

Four commercial merchandise ports serve the Bay Area: Oakland, San Francisco, Redwood City, and Richmond. The Port of Oakland handles virtually all containerized cargos, although the Port of San Francisco still handles a limited number of container shipments. Unlike at the Ports of Los Angeles and Long Beach, export cargo volumes at Oakland exceed import cargo volumes. Redwood City handles primarily construction materials. The Port of Richmond, along with private port facilities at Benicia and along the Carquinez Strait, handle petroleum products, raw sugar, and auto imports. The region also has the second and third largest (by volume) air-cargo airports in the state, with San Francisco International Airport specializing in international freight and Oakland International Airport specializing in domestic freight. Air cargo is the fastest-growing segment of the Bay Area goods movement system. Air cargo volumes are forecast to triple between 1998 and 2020, generating a corresponding 125 percent increase in all-cargo flights.

2. Current vs. Future Estimates of Traffic

In the Bay Area, annual truck vehicle miles of travel is projected to grow from 1,738 billion miles to 2,368 billion miles, an increase of almost 74 percent, with the counties of Alameda and Santa Clara accounting for the most significant increases.

3. Improvements Underway

County/Route	Project Title/Description	Cost (in millions)	Estimated Completion Date	Primary Impact
SCL 880	Widen ramps on the I-880/Coleman Ave.	70	2006	Enhances access
Port of San Francisco	Illinois St., construct truck/rail bridge across Islais Creek	23	2006	Enhances access

4. Additional Improvements Necessary

Highway Improvements

County/ Route	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
SOL 80/ 680/12	Complete I-80/I-680/SR-12 interchange improvements	706	Long	Improves operations
SCL 152/156	SR-152/156 interchange	27	Short	Improves operations
SCL 152	SR-152 safety, intersection improvements	22	Mid	Improves operations
SCR 152	Upgrade SR-152 to a limited access 4-lane freeway	432	Long	Increases capacity

County/ Route	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
ALA 238	Widen I-238 from 4 to 6 lanes between I-880 and I-580	123	Short	Increases capacity
ALA 238/580	I-238/I-580 truck bypass lane	120	Long	Improves operations
ALA 580	I-580 eastbound truck climbing lane	65	Long	Improves operations
ALA 880	I-880/29th Ave. interchange safety and access improvements near Port of Oakland	105	Short	Enhances access
ALA 880	I-880/High St. interchange improvements	16	Mid	Improves operations
ALA 880	Davis St. overcrossing	10	Mid	Improves operations
ALA 880	29th/Fruitvale Area access improvements	25	Mid	Enhances access
ALA 880	I-880/29th Ave. interchange improvements	15	Mid	Improves operations
ALA 880	I-880 Broadway/Jackson interchange improvements	28	Mid	Improves operations
ALA 880	Reconstruct southbound I-880 on and off ramps	26	Mid	Improves operations
ALA 880	I-880/Hegenberger to I-980	20	Mid	Improves operations

Rail Improvements

Railroad/ Location	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
UP or BNSF - ALA/SJ/ STA/FRE/TUL/ KIN/KER	California Interregional Intermodal Service (CIRIS) Inland Rail Shuttle – Port of Oakland to and from Central Valley point(s) including Shafter, Fresno, Stockton Tracy and Sacramento	12	Short	Increases capacity
UP, ALA/CC	Railroad corridor improvements between the Port of Oakland and Martinez	100	Long	Improves operations
UP, CC/SJ	Reestablish service between Martinez and Tracy over the Mococco Line	29	Long	Increases capacity

Seaport Access Improvements

Sponsor/ Location	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
Port of Oakland	Port of Oakland Harbor Navigation Improvement Project – Dredging to 50 feet	302	Short	Enhances access
Port of Oakland	Access improvements to Joint Intermodal Terminal (JIT) and UP intermodal facility.	12	Short	Enhances access
Port of Oakland	JIT Expansion	88	Mid	Increases capacity
Port of Oakland	Reconstruction of the Adeline St Overpass	60	Long	Enhances access
Port of Oakland	Realignment of Maritime Street	31	Long	Improves operations

Sponsor/ Location	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
Port of Oakland	Reconstruction of 7th Street/UP Grade Separation	69	Short	Improves operations

Airport Access Improvements

Sponsor/ Location	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
Oakland International	North Airport Air Cargo Access Improvements	11	Short	Enhances access

Short Line Railroad Infrastructure

The overall solutions to improving railroad infrastructure should include consideration of short line railroad projects, specifically, the Richmond Rail Infrastructure Improvement. Increasing the flow of trains through Richmond by the construction of the Marina Bay overpass and the upgrading of trackage to Federal Railroad Administration (FRA) Class 2 standards (20 MPH) will greatly increase the fluidity of train traffic through Richmond, assist the Port of Oakland and enhance the overall Goods Movement infrastructure for the State.

E. San Diego/Border Region

1. Characterization of Existing "Port-to-Border" Operations

Transborder international trade dominates freight operations in San Diego and Imperial Counties. Of the current two million international border truck crossings (northbound and southbound), 78 percent of all trade is destined for locations outside of the San Diego/Border Region. Approximately 57 percent of truck trips have origins or destinations to other counties within California, while at least 21 percent have origins or destinations in other U.S. states or international locations.

Six ports of entry serve this region of which two, Otay Mesa and Calexico East, handle 97 percent (by value) of all border shipments. The Otay Mesa Port of Entry processes 70 percent of the trade between California and Mexico, which includes such major commodities as electrical machinery and equipment, machinery and mechanical appliances, and apparel/clothing accessories.

In 1993, California identified a NAFTA Network (NAFTA-Net) of critical transportation corridors serving trade and traffic through the land ports of entry between California and Mexico. These NAFTA-Net corridors, together with the main access routes north to Los Angeles, make up the predominant elements of the highway transportation network serving the region. This includes north-south routes Interstates 5, 15, and 805 and State Routes 7, 11, 86, and 905. Away from the border, Interstate 5 is the predominant interregional truck route, although Interstate 15 has seen considerable increases in truck volumes in recent years.

The Burlington Northern Santa Fe maintains a freight easement over 62 miles of coastal mainline owned by the North County Transit District. Burlington Northern carries imported automobiles (off-loaded at the Port of San Diego) and lumber and soda ash for export. Recently, the San Diego and Arizona Eastern Railway was refurbished and restored to functionality by Carrizo Gorge Railway, Inc. This railway opens a potential rail linkage eastward from San Diego to Imperial County and interstate points east.

Two marine terminals are operated by the Port of San Diego, the 10th Avenue Marine Terminal and the National City Marine Terminal at 24th Street. Combined, the terminals handle approximately 2.5 million tons of cargo annually, including automobiles, produce, and bulk commodities.

The San Diego International Airport (Lindbergh Field) is the primary site for air cargo, though some is also handled at smaller general aviation airports in the region. The San Diego Regional Airport Authority is in the midst of a state-mandated process to address the region's long-term air transportation needs, including identifying a potential site or sites for a new airport.

2. Current vs. Future Estimates of Traffic

Annual truck vehicle miles of travel are projected to increase from 1,089 billion to 1,745 billion miles in the San Diego/Border Region between 2005 and 2025, a 64 percent increase. In 2003, approximately 2 million trucks crossed the California/Mexico border. Caltrans projects this number will increase to 3.1 million trucks in 2010 and 5.6 million trucks by 2030.

3. Improvements Underway

County/ Route	Project Title/Description	Cost (in millions)	Estimated Completion Date	Primary Impact
SD 5	I-5/805 widening project	186	Nov 07	Increases capacity
SD 15	I-15 operational improvements from SR-52 to Lake Hodges overcrossing	83	Sep 06	Improves operations
SD 15	I-15 widening/managed lanes from SR-56 to Center City Parkway	375	Dec 07	Improves operations
IMP 7	Four-lane expressway from SR-98 to I-8	64	Apr 05	Increases capacity
IMP 78	Brawley Bypass Stage 1: four-lane expressway from SR-111 to SR-78	14	Sep 05	Improves operations
IMP 111	Four-lane expressway from I-8 to SR-78 (final stage, first two stages open)	125	Mar 05	Increases capacity
SD 125	Segment 1: SR-905 to SR-54, new six-lane freeway	400	Jun 06	Increases capacity
SD 125	Segment 2: widening to six-lanes from SR-54 to SR-94	138	Mar 05	Increases capacity
SD 905	Phase 1 of SR-905 freeway, Siempre Viva Interchange	29	Sep 05	Improves operations

4. Additional Improvements Necessary

Highway Improvements

County/ Route	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
SD 5	I-5 north coast widening, including HOV lanes and auxiliary lanes, from I-805 to Vandegrift	672	Mid	Increases capacity
SD 11	SR-11 four-lane freeway from Mexico Border (Otay Mesa) to SR-905	196	Mid	Enhances access
SD 15	I-15 operational improvements from SR-52 to SR-78	19	Short	Relieves bottleneck
SD 15	I-15 widening/Managed Lane – from SR-163 to SR-56	253	Mid	Improves operations
SD 15	I-15 widening from Center City Parkway to SR-78	140	Mid	Increases capacity
IMP 78	SR-78 Brawley Bypass four-lane expressway stages 2 and 3	97	Short	Improves operations
SD 94	SR-94 widening from I-5 to I-15	80	Long	Improves operations
SD 94	SR-94/SR-125 Interchange, add west to north and south to east ramps	85	Long	Improves operations
IMP 115	SR-115 four-lane expressway from I-8 to Evan Hewes Highway	76	Mid	Increases capacity
SD 805	I-805 widening from SR-905 to SR-54	150	Mid	Increases capacity
SD 805	I-805 widening from SR-54 to I-8	450	Long	Increases capacity
SD 805	I-805 widening – Mission Valley Viaduct	250	Long	Increases capacity
SD 805	I-805 widening from I-8 to I-5	380	Long	Increases capacity
SD 905	SR-905 six-lane freeway from Mexico border (Otay Mesa Port of Entry) to I-805	271	Short	Enhances access
SD 905 service roads	Otay Mesa Port of Entry truck route - operational improvements	17	Short	Relieves bottleneck

Rail Improvements

Railroad/ Location	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
San Diego & Arizona Eastern, San Diego/ Imperial	Upgrade, repair and replace track infrastructure	125	Short	Improves operations

Seaport Access Improvements

Sponsor/ Location	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
SD 5	I-5 Truck Viaduct to 10th Avenue Marine Terminal (Grade separated access from freeway to Port terminal)	123	Short	Enhances access
Port of San Diego	Elevate Harbor Drive/Caesar Chavez Parkway intersection to provide truck access over railroad/trolley	15	Short	Mitigates impact
Port of San Diego	Elevate 28th Street/Harbor Drive intersection to provide truck access over railroad/trolley	22	Short	Improves operations

F. Central Valley Region

1. Characterization of Existing "North-South" Operations

Interstate 5 is considered the backbone of California's highway system and serves as a vital gateway into the Central Valley for interstate and international transport of North American trade. Yet in terms of trade origins and destinations, State Route 99, from south of Bakersfield to Sacramento, actually may be more important. Many key corridors to the Central Valley partly derive their goods-movement importance through the connections they provide to other regions, including via Interstates 80 and 205 and State Route 58. Trucking is the dominant mode of transporting freight accounting for 87 percent of outbound tonnage and 81 percent of inbound tonnage in the San Joaquin Valley.[11] Two Class I railroads, Burlington Northern and Union Pacific, provide freight service in the region utilizing shared and parallel facilities. This includes Burlington Northern's shared use of the (currently) at-capacity Union Pacific line over Tehachapi Pass and Union Pacific lines north of Stockton through Sacramento to northeast of Oroville.

The region is served by two main, primarily bulk transportation, inland maritime ports, the Port of Sacramento and the Port of Stockton. Based on its acquisition from the U.S. Navy of the former Rough and Ready Island complex, the Port of Stockton has strong potential for growth, although highway access is a significant concern. The Port of Sacramento is smaller and significantly hampered by inadequate water channel depth, changing area economics, and encroaching urbanization. In the region, Sacramento International and Mather Airport are two of the State's top ten air-cargo airports, together emplaning over 138,000 tons of goods in 2004.

Air quality is also a major issue in the region. The San Joaquin Valley, for example, is non-attainment for a number of pollutants, including 1-hour ozone, 8-hour ozone, PM10, and PM2.5. Goods movement, particularly related to heavy-duty truck emissions, is considered a key source of pollution. These heavy-duty truck emissions represent approximately 50 percent of all on-road NOx and PM emissions in the Valley.

[11] San Joaquin Valley Goods Movement Study, September 27, 2000

2. Current vs. Future Estimates of Traffic

In the Central Valley Region, annual truck vehicle miles of travel are projected to increase from 4,677 billion miles to 7,758 billion miles, or 60 percent.

3. Improvements Underway

County/ Route	Project Title/Description	Cost (in millions)	Estimated Completion Date	Primary Impact
SJ 5	SR-99 widening & Hammer Lane construction.	90	Jan 07	Increases capacity
SJ 5	Arch Road interchange	45	Oct 07	Improves operations
TUL 99	Airport overcrossing/"K" St. off-ramp	11	Aug 06	Improves operations
FRE 99	Kingsburg to Selma, 6 lanes	72	Jul 07	Increases capacity
MER 99	Livingston Fwy Stage II	40	Sep 07	Increases capacity
SJ 99	Manteca SR-99/120E widening	11	Aug 06	Increases capacity
SJ 205	Tracy widening Stages II and III	103	Jul 07	Increases capacity
BNSF - CC/SJ	Port Chicago to Oakley, Phase I, 17.6 mile double-track	34	Jul 06	Increases capacity
BNSF - FRE	Calwa to Bowles, 8.5 mile double-track	27	Oct 05	Increases capacity
BNSF - KIN	Shirley to Hanford, 5.8 mile double-track	22	Jul 05	Increases capacity

4. Additional Improvements Necessary

Highway Improvements

County/ Route	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
SAC 5	Auxiliary lanes, Richards Blvd. to Garden Hwy.	15	Short	Improves operations
SAC 5/80	Revise interchange	35	Long	Improves operations
SAC 5/80	Reconstruct ramp eastbound to northbound	13	Long	Improves operations
SJ 5	Mossdale Wye, add northbound on-ramp and extend northbound lane	12	Short	Improves operations
YOL 5	Reconstruct interchange at County Road 102	14	Short	Improves operations
YOL 5/113	Construct northbound 1-5 to southbound SR-113 connection	39	Short	Improves operations
YOL 5/113	Construct northbound SR-113 to southbound I-5 connection	30	Mid	Improves operations
YOL 50	Widen Harbor Blvd. interchange, revise ramps and add auxiliary lanes	32	Short	Improves operations

County/ Route	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
KER 58	Dennison Road improvements	11	Short	Improves operations
KER 58	Heath Road to SR-99, widen 4 to 6 lanes	17	Mid	Increases capacity
PLA 80	Capacity improvements and carpool lanes Sacramento County line to east of SR-65	169	Short	Improves operations
KER 99	7th Standard Road widening	14	Short	Improves operations
TUL 99	Goshen to Kingsburg, widen 4 lanes to 6 lanes	134	Mid	Increases capacity
TUL 99	Prosperity Ave. to Goshen, widen 4 to 6 lanes	126	Mid	Increases capacity
FRE 99	Shaw Avenue Interchange Improvement	45	Long	Improves operations
MAD 99	Ave 21½ to SR-152/SR-99 interchange, widen from 4 to 6 lanes	49	Short	Increases capacity
MER 99	Mission Ave. interchange freeway conversion	71	Short	Improves operations
MER 99	Atwater Freeway	51	Mid	Improves operations
MER 99	Merced Freeway, Buchanon Hollow to Miles Creek	135	Short	Improves operations
MER 99	Merced Freeway, Madera Co. line to Buchanon Hollow Road	87	Short	Improves operations
STA 99	SR-99/Whitmore Ave. interchange	27	Mid	Improves operations
MER 152	Los Banos bypass	325	Long	Improves operations
SJ 205	Tracy, 11th Ave. to Route 5, widen 4 to 6 lanes	103	Short	Increases capacity
SJ 205/580	I-205/I-580 construct auto-truck separation lane	17	Short	Improves operations
SJ 205/580	I-580 westbound truck climbing lane	70	Long	Improves operations

Rail Improvements

Railroad/ Location	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
UP - PLA	Build over/undercrossing at Union Pacific crossing of Sierra College Blvd	30	Long	Relieves bottleneck
UP - KER	Tehachapi Pass double track	1,000	Long	Increases capacity
BNSF - SJ/ STA/FRE/ TUL/KIN/KER	Other track and signal improvements, Bakersfield to Stockton (e.g., double track, Shafter to Jastro)	36	Short	Increases capacity

Seaport Access Improvements

Sponsor/ Location	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
Port of Sacramento	Harbor Blvd., widen from 4 to 6 lanes, West Capitol Ave. to Industrial Blvd.	10	Short	Enhances access
Port of Stockton	Daggett Road access	15	Short	Enhances access

G. State Gateways and Central Coast

1. Characterization of Existing Operations

The highways and rail lines that make up the rural or urbanizing State gateways and the Central Coast provide many vital links for intra- and inter-state and international goods movement. The primary goods movement corridors in the region are Interstates 5 and 80; U.S. Routes 97, 101, 199, and 395; and State Routes 41, 46, 152, and 299. The main north/south and east/west lines of the Burlington Northern and Union Pacific and many short-line railroads also serve these regions.

These routes have particular problems. Truck size restrictions on U.S. Routes 101 and 199 and State Route 299 limit the length and types of commercial truck combinations. Bridge facilities on Interstate 5 north of Redding were built based on truck traffic forecasts far below the current level of 8,000 north/south trips per day, resulting in high rehabilitation needs and maintenance requirements. Increasing congestion in the Los Angeles/Inland Empire and the Central Valley Regions is already causing diversion of truck traffic onto U.S. Route 395. The single-track Union Pacific Donner Pass line, which still cannot fully handle all double-stack trains, hampers rail freight shipments to and from the Central Valley and the Bay Area Regions. Upgrades of Burlington Northern's line north of Keddie are also required. Reestablishing rail freight service to the North Coast (North Coast Railroad) and longer-term improvements to the Port of Humboldt Bay will provide critical non-highway alternatives to shippers to and through the North Coast. These issues must be addressed as part of any proposed action strategy.

2. Current vs. Future Estimates of Traffic

Between 2005-2020, annual truck vehicle miles of travel in the Northern Gateways and Central Coast regions is expected to increase from 1,410 billion miles to 1,873 billion miles, an increase of 33 percent with some counties experiencing significantly higher growth.

3. Improvements Underway

County/Route	Project Title/Description	Cost (in millions)	Estimated Completion Date	Project Impact
TEH 5	Truck climbing lanes	13	Aug 05	Improves operations

4. Additional Improvements Necessary

Highway Improvements

County/ Route	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
SHA 5	Antlers Bridge Reconstruction	145	Short	Rehabilitates facility
TEH 5	Red Bluff Bridges North (bridge replacement)	30	Mid	Rehabilitates facility
SLO 46	Corridor Improvements	29	Mid	Improves operations
SLO 46	Corridor Improvements	209	Long	Increases capacity
NEV 80	Soda Springs interchange to Truckee Agriculture Inspection Station, rehabilitate roadway (two projects)	120	Short	Rehabilitates facility
HUM 101	Confusion Hill bypass	65	Short	Relieves bottleneck
MEN 101	Willits bypass	139	Short	Relieves bottleneck
MON 101	Airport Road Interchange Improvement	30	Long	Improves operations
MON 101/156	Widen SR-156 and construct interchange at US-101/SR-156	222	Long	Improves operations
SHA/TRI 299	Buckhorn grade realignment	118	Long	Relieves bottleneck

Rail Improvements

Railroad/ Location	Project Title/Description	Cost (in millions)	Short/Mid/ Long Term	Primary Impact
UP, Nevada/Placer	Upgrade Donner Pass, double track, tunnel lowering for full double-stack operations	29	Short	Relieves bottleneck
North Coast Railroad	Reestablish rail freight service from south end to Eureka	40	Short	Increases capacity

H. Short-Term Relief Measures

As major capital-increasing and other types of projects are developed, it should be noted that several actions are being undertaken currently, particularly in Southern California, to address port congestion. Perhaps the most notable is PierPass. PierPass is a program, developed by the West Coast Marine Terminal Operators, in cooperation with the Ports of Los Angeles and Long Beach, the trucking industry, ocean shipping lines, and others,

to reduce port terminal and access route congestion. Sometimes referred to as an extended terminal gate hours program, it provides for the opening of the terminal gates in the evening hours four days a week, plus Saturday, to provide for the movement of containerized cargos during off-peak hours. A key feature of the program is a traffic mitigation fee surcharge, initially set at $40 dollars per TEU, for container pickup or delivery during daytime hours (8 to 5), as an incentive to encourage off-peak pickup and delivery of shipping containers. The revenues raised from the mitigation fee would be used to offset the labor and other cost of operating the terminal gates during off-peak hours. The goal of the program is to eventually shift 40 percent of container movements (i.e., truck trips) to off-peak hours by the end of the third year of program operations. The Pier Pass program opened at the end of July 2005.

Other operational enhancements that have been suggested to improve the efficiency of goods movement activities include:

- **Port-wide Terminal Appointment Systems for Truckers -** Truckers should have an appointment system to avoid lengthy idling and increase the utilization of on-dock space.

- **Better Trade and Transportation Forecasting -** Carriers, terminal operators and railroads should be encouraged to communicate regarding trade flow forecasting to avoid labor and equipment shortages.

- **Use of On-Dock Rail Yards –** Increasing the use of on-dock yards can reduce pressure on the freeway system, because containers that are loaded on-dock do not have to be trucked to more distant rail yards. To ensure port customers use on-dock intermodal rail to the fullest extent, the following operational improvements should be pursued:

  - ✓ work with the railroads to assure timely arrival of empty intermodal equipment and the availability of rail crews.
  - ✓ work to improve the productivity of loading and unloading of rail cars.
  - ✓ promote the use of "block swap" operations to maximize the number of rail cars loaded on dock.
  - ✓ alter terminal operator business practices to prevent storage of containers on rail lines at on-dock terminals.

- **Ocean Carrier Container Loading on Ships by Ultimate Destination -** Steamship lines need to be encouraged to modify their stowage plans so that cargo is loaded aboard ships in blocks by destination. This will facilitate unloading and removal and reduce handling time.

- **Incentives to Reduce Marine Terminal Dwell Time for Containers -** Reducing marine terminal dwell time for containers by 50 percent will double on-dock capacity. Current marine terminal dwell time is typically six to eight days. Options for addressing this situation include encouraging marine terminal

operators to limit "free time" during which containers can be stored on dock, extending hours of port operation, and adopting operating efficiencies such as block stowage plans.

- **Addition of Labor at the Region's Ports** – In the summer of 2004, the Pacific Maritime Association reached agreement with the International Longshore and Warehouse Union to hire 3,000 additional "casual" (non-registered) workers to alleviate a labor shortage at the two **San Pedro Bay** ports. Since September over 3,000 new casuals have been trained and certified. An additional 2,000 existing "casual" workers have also been promoted into the registered ranks of the union. This brings the total number of regular and casual workers up to over 12,000 members, with the plan to increase the membership to close to15,000 within a year. Additional labor is also being sought at Port Hueneme.

- **Virtual Container Yard –** A "virtual" container yard (VCY) would be an Internet-based matching service for empty containers. A local import container load is transported by truck to a warehouse or distribution center. Once that container is unloaded it is typically hauled back empty to the port terminal. But, what if that empty container could meet the needs of an exporter in the region? The container could be transported to the export location and then sent back loaded to the port. This would also avoid the necessity of dispatching an empty container from the port to pick up an export load. The intent of the VCY is to reduce the vehicle miles of travel associated with the movement of empty containers.

- **Increased Use of On-Dock Rail Yards –** Approximately 18 percent of all containers moving through the Ports of Los Angeles and Long Beach are transferred to and from trains at "on-dock" rail yards; i.e., yards that are located on or very near the marine terminal. This is distinguished from yards that are "near-dock", such as the Intermodal Container Transfer Facility (ICTF), which is about 4.5 miles north of the ports, and "off-dock" rail yards located about 20 miles north of the ports near downtown Los Angeles.

- **Shuttle Train Pilot Project –** About 82 percent of the containers using the Ports of Los Angeles and Long Beach are trucked. Those containers that are trucked to warehouses in the Inland Empire could conceivably be hauled by rail from cargo terminals to an inland rail yard, where they could be transferred to truck for a shorter dray to the warehouse. ACTA is actively promoting a "demonstration project" for this concept and hopes to have a system in operation by the end of 2005. The principal obstacle to short-haul rail is that it is more expensive than trucking, and would require a public subsidy at least for the short-term.

- **Short-Sea Shipping –** Short-sea shipping can provide an alternative freight traffic route via coastal waterways, and can be more fuel-efficient and cost-effective than highway or rail transportation. The Port of Hueneme is seeking to create a short-

sea shipping or fastship terminal to facilitate this type of domestic waterborne shipping along the West Coast.

I. Performance Estimates

The transportation system improvements identified in this chapter will improve goods movement mobility and access, sustain the economy, and reduce the impacts on communities and the environment. Highway capacity and operational improvements will reduce congestion, reduce delay, reduce accidents, increase reliability, reduce exposure to harmful pollutants, and allow freight to move more efficiently.

Heavy-duty diesel trucks move goods primarily on highways. These vehicles are major emitters of diesel particulate matter (PM) and in many areas they are the primary source of nitrogen oxides (NOx). Both the ARB and the U.S. Environmental Protection Agency have issued regulations that will, over time, greatly reduce toxic and other emissions from the heavy-duty diesel truck fleet. However, emissions regulations for heavy-duty diesel trucks did not begin to apply until the mid-1990s, unlike emissions regulations for light-duty vehicles that have applied since the early-1970s. It will, therefore, be 10 to 20 years before emissions regulations on heavy-duty diesel trucks have substantial impact. In the interim, traffic flow improvements can minimize health impacts due to diesel exhaust because, perhaps to an even greater extent than with light duty vehicles, heavy-duty diesel truck emissions are increased during vehicle acceleration. Maximum emissions occur under stop-and-go conditions, while emissions for many trucks also increase at higher highway speeds. Emissions are minimized under moderate-speed, smooth-flowing conditions. Thus, smoother traffic flows will reduce emissions if speed limits are not exceeded and traffic volumes do not increase significantly.

Increased rail capacity and operational improvements will allow railroads to compete more effectively with trucks on long-haul freight, reducing the number of trucks on highways. A reduction of trucks on highways will lead to a reduction in highway maintenance costs. The identified rail projects will also allow railroads to load more freight near seaports, cutting down on the number of truck movements to and from the seaports. Also, by allowing more trains to go directly to the docks for loading and unloading, the need to dray containers by truck between ports and railheads will be reduced. Rail shuttle trains have the ability to move containers to inland "ports" (i.e., distribution sites) 24/7, allowing seaports to significantly expand their throughput without having to build expensive new infrastructure.

In terms of air quality, fuel efficiency and manpower, railroads are also the most efficient means of transporting freight. The U.S. Environmental Protection Agency estimates that for every ton-mile, the average truck emits three times more nitrogen oxide and diesel particulates than a locomotive. Locomotives are three times more fuel-efficient than trucks. Railroads are also a key to reducing highway congestion. One intermodal train can take up to 280 trucks off the highway.

The identified seaport projects will improve both truck and rail access to ports and will facilitate freight to be moved off site more efficiently, thereby improving port throughput.

These improvements will cut down on the amount of time trucks and trains idle in neighborhoods outside seaports waiting to get in. All of these projects will help the freight movement industry move goods more efficiently, creating more jobs and reducing pollution.

J. Energy Fuels and Products Infrastructure

The preceding sections focus on the infrastructure needs relative to containerized cargo. However, of equal importance to the people of California is the necessity of maintaining adequate infrastructure capable of receiving, storing and distributing energy fuels, including crude oil and refined products such as gasoline. In addition, other liquid and gaseous products including industrial chemicals and food stuffs, such as corn syrup, also require specialized infrastructure.

The loading and unloading of energy fuels at the ports requires facilities that compete for valuable real estate that can otherwise be used for the loading and unloading of containerized cargo. The State's interest in maintaining a reliable energy supply for its people and its economy requires that the specialized needs of delivering energy stocks be considered in land use decisions at the State's ports. While the ports may search for means to increase containerized cargo handling facilities that might displace existing fuel handling operations, the feasibility of developing alternative energy fuel handling sites must be considered. The California State Lands Commission has the exclusive power to certify all sites and related facilities in the state, whether a new site and related facility or a change or addition to an existing facility at the State's ports.[12]

In addition, the California Energy Commission (CEC) has a proceeding underway regarding its Order Instituting Informational (OII) to examine the State's petroleum infrastructure. The purpose of the OII is to evaluate constraints on the state's petroleum refining, importing, storage, and pipeline systems, and determine the extent to which improvements in permitting would facilitate infrastructure expansion and increase the state's supply of transportation fuels.[13]

[12]California Codes Public Resources Code, Section 25500-25550.5.
[13]California Energy Commission, "Petroleum Infrastructure Development Constraints OII", Order Instituting Informational Proceeding, Docket # 04-SIT.

VI. ENVIRONMENTAL IMPACTS OF GOODS MOVEMENT AND MITIGATION ALTERNATIVES

A. Overview of the Environmental Challenge

While goods movement is an essential activity required to serve the people and businesses of California, it presents challenges to state, regional, and local efforts to protect the environment and public health. The ships, locomotives, trucks, and heavy equipment that move goods are significant sources of emissions and air pollution. Many local communities, particularly those located around ports and rail yards, are voicing concerns about the adverse public health impacts, noise, congestion and visual blight that result from goods movement operations.

Living in any area impacted by air pollution is harmful, particularly for children, the elderly, and those with compromised health. The communities closest to goods movement facilities face even greater impacts and have a greater localized risk. Specific examples of such communities include San Pedro, Wilmington, Commerce, West Oakland, and Roseville. Throughout California, several million people live in communities impacted by emissions from goods movement-related facilities. In many cases, the affected populations are economically disadvantaged and are less able to obtain quality health care to address air pollution-related illnesses.

The impacts of air pollution not only damage health and interfere with quality of life, but also result in substantial societal costs including the monetary value of lost workdays, school absences, asthma attacks, hospitalizations, premature death, and other health-related costs. For all these reasons, public health protection must be a key element in decisions involving goods movement.

Based on current information, goods movement-related emissions are expected to increase as trade grows over the next 15 to 20 years unless aggressive steps are taken to counter that trend. The Goods Movement Action Plan will develop a comprehensive strategy to ensure that emissions from goods movement-related sources are brought under control and reduced to health protective levels. Investment in strategies, such as fleet modernization, cleaner fuels, and retrofitting trucks, ships, and trains with cleaner emission control technologies, can provide substantial air quality benefits. In order for California to accommodate the forecasted growth in goods movement and protect public health, significant penetration of the above-described strategies into the California goods movement industry must occur. Implementation of the Action Plan can reverse the trend in all categories and enable emissions to be reduced to manageable, health protective levels.

In addition to air emissions, ocean-going vessels delivering goods to California ports can, if not properly managed, also result in adverse impacts on California's marine and onshore environments. Non-indigenous species are often introduced by ballast water discharges occurring along California’s coastline. Bays and estuaries where port facilities are located are particularly vulnerable to this problem. (State Water Board

2002) Due to increased vessel traffic and the associated development of berthing facilities and access channels, the volume of California port maintenance dredging could also increase. Potential environmental impacts resulting from dredging operations include localized turbidity and re-suspension of toxic constituents into the marine environment, pollution of ambient water at the dredge location, impacts to marine dredge spoil disposal areas, and pollution of groundwater resulting from upland disposal of polluted dredge spoils. Increased ship traffic could also potentially result in an increase of the number of accidental spills and discharges due to normal waste management procedures, and increased problems with anti-fouling paints on ship hulls.

To protect the marine environment, the State Water Resources Control Board is coordinating with the State Lands Commission on an approach for developing appropriate performance standards for treating ballast water from ships. The Water Board is also looking for ways to fund on-board evaluations of promising ballast water treatment technologies. Work is also underway on requirements to prohibit releases of sewage, sewage sludge, and oily bilge water from cruise ships into State waters. In addition, the State Water Board is participating with the Department of Pesticide Regulation to review technical information on water quality problems created by anti-fouling paints. CalEPA is monitoring all of these efforts and, with BTH, is committed to ensuring that proper water quality management is an integral part of the Goods Movement Action Plan.

B. Air Pollutants of Concern

Ships, diesel trucks, locomotives, and cargo handling equipment that move goods to and through California emit large amounts of nitrogen oxides (NOx) and diesel particulate matter (PM). NOx is important because it contributes to the atmospheric formation of ozone and fine particulate matter (PM_{10} and $PM_{2.5}$). State and federal ambient air quality standards for ozone and PM are exceeded throughout California, particularly in urban areas. Diesel PM is of concern because it is part of the overall ambient PM problem and because it has been designated by the ARB as a toxic air contaminant. Diesel PM from all sources (not just goods movement related) accounts for approximately 70 percent of the ambient air toxics risk in California. (ARB, 2000)

Current emissions from goods movement activities are a significant contributor to regional air pollution. In the Los Angeles region, the emissions resulting from trade through the Ports of Los Angeles and Long Beach accounted for about 10 percent of the regional NOx emissions and about 25 percent of the diesel PM in 2001. The contribution of port-related sources in the Bay Area region, while smaller as a percentage of that region's total emissions, is still significant. For example, trade through the Port of Oakland accounted for about 5 percent of the regional NOx emissions and about 10 percent of regional diesel PM emissions in 2001.[1] Goods movement-related truck and

[1] Estimates of the Port of Oakland emissions were estimated by taking the ratio of the cargo throughput at Oakland to the cargo throughput at Los Angeles and multiplying that ratio by the Port of Los Angeles emissions estimate for 2001. Currently, the Port of Oakland is developing an updated port-wide emission inventory and expects to have that effort completed later in 2005.

locomotive emissions in the Central Valley are an important and growing concern in that region, which has some of the State's worst air pollution.

Future emissions from goods movement are expected to increase unless aggressive actions are taken to turn that trend around. Some stakeholders have forecasted a one-for-one increase in port-related emissions as international trade expands. However, such estimates do not account for innovations in ship building already underway that will improve engine efficiency, reduce fuel consumption, and expand container capacity. Nor do they reflect the beneficial impact of adopted and pending state and federal regulations that will trim emissions growth from port-related categories. Under a business-as-usual forecast, port-related emissions will significantly increase but by lower amounts than the worst-case scenarios described above. For example, ARB estimates that a tripling in trade at the Ports of Los Angeles and Long Beach by 2020 would result in about a 40 percent increase in NOx emissions and a 50 percent increase in diesel PM from current (2005) levels, unless additional pollution-control efforts are instituted.[2] If such emission increases were to occur, port-related pollution could increase to as much as 30 percent of the regional NOx emissions and 65 percent of the diesel PM emissions by 2020. Similar estimates could be calculated for other trade growth rates, again using business-as-usual assumptions.

However, it must be emphasized that "business-as-usual" forecasts are clearly unacceptable. The public health impacts from port-related emissions are high and should be abated as quickly as possible. Likewise, the State needs to plan for port and trade expansion in a manner that ensures that the public health and environmental resources will be protected. That is the primary focus of this portion of the Goods Movement Action Plan and of the Phase II environmental mitigation plan to follow (see below).

The federal government must play a role in these mitigation efforts. The polluting sources involved in goods movement are under the legal or practical control of a mix of international, state, federal, or local agencies. There are national and international components to the control of emissions from ships, locomotives, and trucks. International agreements, national regulations, incentive programs, and other mechanisms will be needed to fully address these important emission sources. California must rely on the federal government to take a leadership role where state and local agencies lack authority or where emission sources travel nationally or internationally. For example, California's success in securing the proposed sulfur emissions control area (SECA) relies in part on actions by the U.S. government, neighboring countries, and the International

[2] This analysis considers the effect of adopted regulatory measures, existing incentive programs, and normal turnover as older vehicles and pieces of equipment are retired. New engines, such as those that are mandated for use in trucks and heavy equipment between 2007 and 2013, will employ highly effective exhaust aftertreatment controls. Similarly, cleaner locomotives are being introduced this year (2005), though the standards for those engines are much less stringent than the standards for new trucks. A second set of proposed federal standards for locomotives and marine vessels is pending, with implementation anticipated to begin around 2012. At the state level, ARB is pursuing regulations for cargo handling equipment, the quality of diesel fuel used in marine auxiliary engines, and accelerated turnover of existing harbor craft. The only category for which significant improvements are <u>not</u> expected are ocean-going vessels, which currently use very highly polluting engines, very high sulfur fuel and are not required to employ additional emission control technologies.

Maritime Organization. In terms of locomotives, only the U.S. EPA can adopt engine emission standards

Failure to address port-related pollution and to help bring it under control would have severe air pollution and public health consequences, including a delay in attaining health-protective air quality standards, higher rates of premature death and serious diseases such as cancer, as well as additional asthma attacks from particle pollution. Failure to bring port-related pollution under control would also have significant adverse economic impacts, including increased health-care and lost-productivity costs and possible loss of billions of dollars in federal transportation project funds. These impacts are discussed more fully in the next section.

C. Health and Economic Impacts from Goods Movement Emissions

1. Health Impacts

Particulate Matter. Diesel PM is the greatest concern in communities with significant goods movement activity. This pollutant poses a lung cancer hazard for humans and causes non-cancer respiratory and cardiovascular effects, that increase risk of premature death. (ARB, 1998a) Small diesel particles are readily inhaled and reach the lowest airways of the lung with other adsorbed compounds, many of which are known or suspected mutagens and carcinogens. (ARB, 2002) Health risks are highest in areas with large amounts of emissions, such as next to ports, rail yards, major freeways, and warehouse distribution centers.

For diesel PM, the regional "background" risk in urban areas is 500-800 potential cancers per million people over a 70-year period.[3] For areas in close proximity to major diesel sources, the increase in potential cancer risk can exceed 500 potential cancers per million people over a 70-year exposure period, effectively doubling the risks of those exposed. Since the concentration of diesel PM in the air declines with distance from the source, risks decrease the farther one moves away from goods movement activity centers. However, even several miles away, the elevated cancer risk can still exceed 10 expected cancers per million people exposed. To put these risk numbers into perspective, new stationary sources of air pollution, such as power plants and other industrial facilities are currently required to be designed to ensure that cancer risk from an individual source do not exceed 10 potential cancers per million persons exposed.

Ambient particulate matter also causes serious adverse health effects including premature death due to stresses on the heart and lungs, aggravation of respiratory and cardiovascular disease, aggravated asthma, acute respiratory symptoms, chronic bronchitis, and decreased lung function. (US EPA, 2000 and 2003). These effects are calculated on an

[3]The cancer risk from known carcinogens is expressed as the incremental number of potential cancers that could develop per million people assuming the affected population is exposed to the carcinogen at a defined concentration over a presumed 70-year lifetime. The ratio of potential number of cancers per million people can also be interpreted as the incremental likelihood of an individual exposed to the carcinogen developing cancer from continuous exposure over a lifetime.

annual basis since they result from acute exposure. The statewide mortality impact from all diesel PM sources was estimated to be approximately 2,900 premature deaths per year in 2000(59 percent from direct diesel PM emissions and 31 percent from indirect PM formed in the atmosphere from diesel NOx). (Lloyd and Cackette, 2001). In the South Coast Air Basin, ARB estimates the adverse health impact from diesel PM exposures accounts for more than one-half of the statewide total with an estimated 1,700 premature deaths per year, 45,000 asthma exacerbations, 390,000 lost work days, and 3.8 million restricted activity days for children.

To put these mortality numbers into perspective, the annual death rate in California from all causes and sources is approximately 230,000. For the year 2000, vehicle accidents accounted for 3,200 of those deaths and homicides accounted for 2,000. The California death rate from second hand smoke is in the range of 4,200-7,400 fatalities per year.

Various stakeholders have used the statewide and regional health impact estimates to calculate the effect of port-related diesel sources in isolation, including the Union of Concerned Scientists, the Natural Resources Defense Council, and the South Coast Air Quality Management District, to name just a few. Some parties have also conducted partial health risk assessments using the same general information.

The ARB is currently evaluating all of these analyses for accuracy and completeness based on the most updated activity data for port-related emissions. The ARB is also endeavoring to define the most accurate future year forecasts of goods movement activity including source-by-source emissions, duty cycles, fuel use, etc. In addition, ARB staff are conducting air toxic health risk assessments of the major ports and rail yards in California, in cooperation with the owners and operators of those facilities, and using appropriate meteorological information and modeling techniques. Additional review may be needed as many of the port-related analyses done previously may have lacked careful attention to the dispersion effects over the ocean as marine vessels traverse California waters. That technical issue will be addressed as part of the Phase II effort, along with all other critical aspects of the emissions and risk analyses. A complete analysis is crucial to maximizing the health benefits of investments in pollution control and in setting priorities for emission control efforts. Wherever possible, CalEPA and ARB intend to focus on the highest exposure and risk sources first, so that public health impacts may be abated as quickly as possible.

Based on ARB's preliminary work, cargo-handling equipment and ship hotelling activities are anticipated to be the largest contributors of toxic pollutants to neighboring communities. While ocean-going vessel transiting emissions contribute a substantial portion of the total port-related diesel PM, they do not produce a comparable cancer risk because those emissions are distributed over a very wide area. Most of the diesel PM emissions (90 percent) are emitted during transit in California Coastal Waters. In addition, the emission plume from ocean-going vessels has a much higher dispersion release height due to a higher physical stack height (about 50 meters) of the vessel. Cargo handling equipment and ship hotelling activities, on the other hand, occur in closer proximity to the affected communities and cargo handling equipment has a much lower

dispersion release because of a relatively lower physical stack height (about 4-5 meters). ARB staff plans to have more detailed exposure assessments available later in 2005.

Ozone. Ambient ozone levels frequently exceed federal and state health protective standards, especially in Central and Southern California. Ports and related goods movement are major sources of the NOx emissions that react in the atmosphere on warm, sunny days to form ozone. Ozone is a powerful oxidant that can damage the respiratory tract, cause lung inflammation, and irritation, which can lead to breathing difficulties. Short-term exposure to high ambient ozone concentrations has been linked to increased hospital admissions and emergency visits for respiratory problems. (Peters, 2001) Exposure to ozone may also make people more susceptible to respiratory infection and lung inflammation and can aggravate preexisting respiratory diseases, such as asthma. Prolonged, repeated exposure to ozone can cause irreversible changes in lung structure, which over time could lead to premature aging of the lungs and/or chronic respiratory illnesses such as emphysema and chronic bronchitis. The most susceptible groups are outdoor workers and individuals and children who are active outdoors.

Statewide, it is estimated that ozone exposure, above the proposed California eight-hour ozone standard, contributed to approximately 600 premature deaths. These statewide numbers can be broken down by air basin to estimate the contribution of various sources to ozone health effects. For example, in the South Coast Air Basin ozone air pollution contributed to approximately 300 additional instances of premature death. ARB will examine these and other air basin estimates in its Phase II mitigation plan.

Contribution of Port-Related Emissions to Combined Health Impact and Risk. Collectively, the ozone and diesel pollution from all sources in the Los Angeles air basin were estimated to contribute to approximately 2,000 premature deaths per year in 2000. While aggregate port-related emissions produce approximately 20 percent of emissions to overall pollution loading in the air basin, a refined estimate of the contribution to health risks requires air dispersion and exposure modeling analysis as described above. The port-related contribution to other health impacts (cancer risk, asthma attacks, lost work and school days, etc.) requires similar analysis. ARB will quantify these effects in greater detail in its Phase II mitigation plan.

2. Economic Impacts

The U.S. EPA estimates the cost of various health effects based on “willingness to pay” (the amount individuals are willing to pay to avoid a specific health effect). Using this methodology, the value of preventing a premature death in 2005 is about $8 million in 2004 dollars. (EPA 1999) ARB uses virtually identical methodology to calculate the value of lives saved from various emission controls. The underlying dose-response relationships in the premature death models were separately peer reviewed and approved by medical and epidemiological experts at both the State and federal level.

The federal Office of Management & Budget has approved this valuation method for use in national cost-benefit analyses. Similarly, the California Office of Administrative Law has approved several ARB regulations reliant upon such health benefit calculations.

Using the U.S. EPA/ARB methodology, the valuation of premature deaths due to statewide diesel PM exposure (2900 per year in 2000) and statewide ozone exposures (600 on average for 2001-2003) is estimated to be about $28 billion. These estimates can be ratioed to arrive at area-specific or source-specific estimates. For example, the share of those costs within the Los Angeles air basin for the same time frame is estimated to be about $16 billion, and the port-related fraction of these impacts (within the Los Angeles air basin only) is approximately 20 percent of that subtotal. As discussed above, the influence of meteorology and ocean based dispersion needs to be considered to get the proper result for port-related emission sources, particularly ocean-going vessels. ARB will refine these estimates further in the Phase II mitigation plan.

D. Other Community and Environmental Impacts

Communities situated along port-related goods movement areas and/or near port sites are subjected to other adverse conditions including traffic congestion, noise and light pollution, and visual blight. For example, trucks transporting containers to local distribution centers create traffic problems near the port. In many areas, the physical capacity of local streets and freeways is exceeded as increased container truck traffic shares the road with the public, resulting in congestion and unnecessary idling. Noise pollution, according to a National Resources Defense Council report, has been linked to hearing impairment, high blood pressure, sleep deprivation, reduced performance, and even aggressive behavior. Light pollution can also affect nearby residents causing stress and annoyance.[4] In many areas of California, residents are increasingly complaining about increases in noise and odors that are directly associated with locomotive activities at rail yards, inter-modal facilities and along the rail lines used by line-haul trains. Rail yard activities of particular concern to nearby residents include prolonged idling and increases in noise resulting from testing locomotives during service and maintenance. Visual blight from locomotives producing smoke is also a concern.

E. Contribution of Specific Port-Related Sources to Air Pollution Problems

This section examines four major sources of port-related, goods movement emissions: ships, railroads, diesel trucks, and cargo handling equipment. For context, this section compares port-related emission sources in the South Coast Air Basin to other categories that affect regional air quality,[5] first for 2005 and then for 2020. Although this assessment focuses on Southern California, the same source categories affect other areas of the State that have significant port activities.

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[4] NRDC, Harboring Pollution, Aug. 2004

[5] These categories are on-road diesel trucks, on-road gasoline vehicles, off-road diesel equipment and industrial sources, such as power plants and refineries. Collectively these source categories contribute almost 90 percent of the basin's NOx and diesel PM emissions.

1. Major Sources of Regional Emissions Today and in 2020

Figure 1 shows the 2005 NOx emissions in the Los Angeles area air basin for five major emission categories.[6] This figure indicates that existing port-related emissions are significant but smaller than the emissions from on-road diesel trucks, gasoline vehicles, and off-road equipment. It also shows the relatively small role played by major industrial emission sources.

Figure 1: Estimated 2005 NOx Emissions in the South Coast Air Basin (Tons/Day)

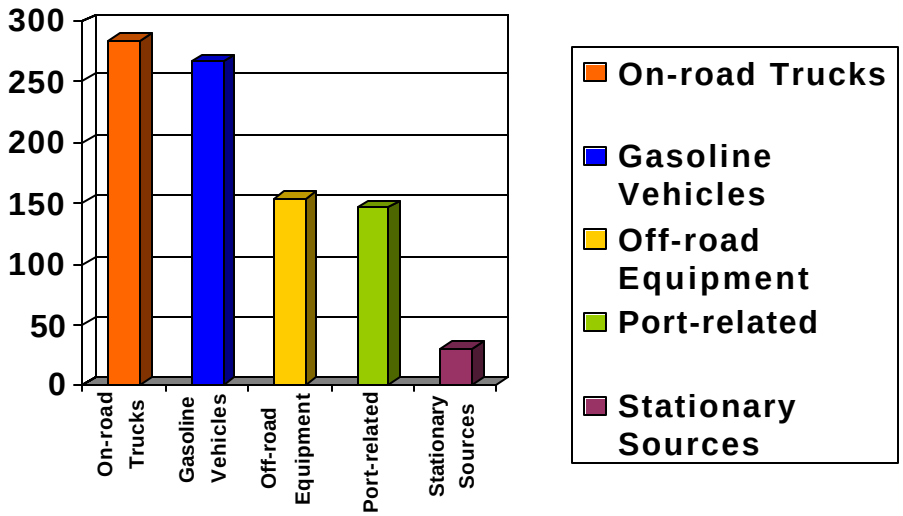
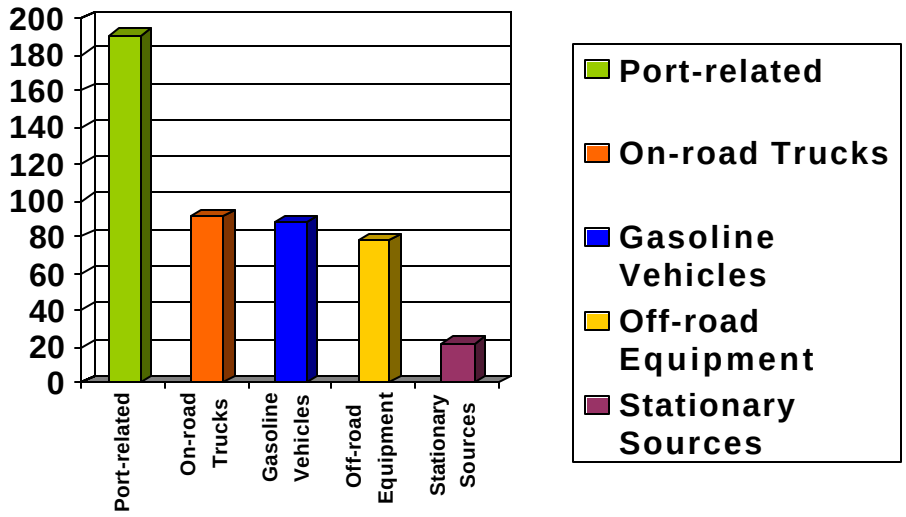


Figure 2 shows that port-related emissions could grow significantly in importance[7] unless much more is done to control emissions. By 2020, port-related NOx emissions could account for 20 percent of the region's NOx emissions. Figure 2 includes future emission reductions resulting from adopted measures. However, it does not include the effect of voluntary mitigation measures currently underway at the Port of Los Angeles and Port of Long Beach, such as the installation of diesel oxidation catalysts on yard trucks. Due to many uncertainties with forecasting 15 to 20 years out, future estimates will need to be refined as new data becomes available. Nevertheless, extensive actions are needed to ensure that emissions from port-related sources are brought under control if they are to avoid becoming the region's single largest emission sector.

[6] The South Coast Air Basin emission estimates are from ARB's California Emission Inventory Development and Reporting System (CEIDARS). CEIDARS contains the State's official emission estimates for all source categories. The port-related emission estimates are based on the Port of Los Angeles' 2001 port-wide emission inventory. That inventory was doubled to represent the Port of Long Beach emissions in the total. The forecasts of future port-related emissions were developed by ARB staff during the Port of Los Angeles's No Net Increase project and are based on port-developed growth projections.

[7] Estimates for port related emissions are based on the current emissions inventory for the Ports of Los Angeles and Long Beach and the preliminary growth and control estimates (for currently adopted measure) prepared for the No Net Increase Project of the Port of Los Angeles. Estimates for the other categories are taken from the California Emissions Inventory Data Reporting System.

Figure 2: Estimated 2020 NOx Emissions in the South Coast Air Basin (Tons/Day)



Figures 3 and 4 illustrate a similar trend for diesel PM emissions.

Figure 3: Estimated 2005 Diesel PM Emissions in the South Coast Air Basin (Tons/Day)

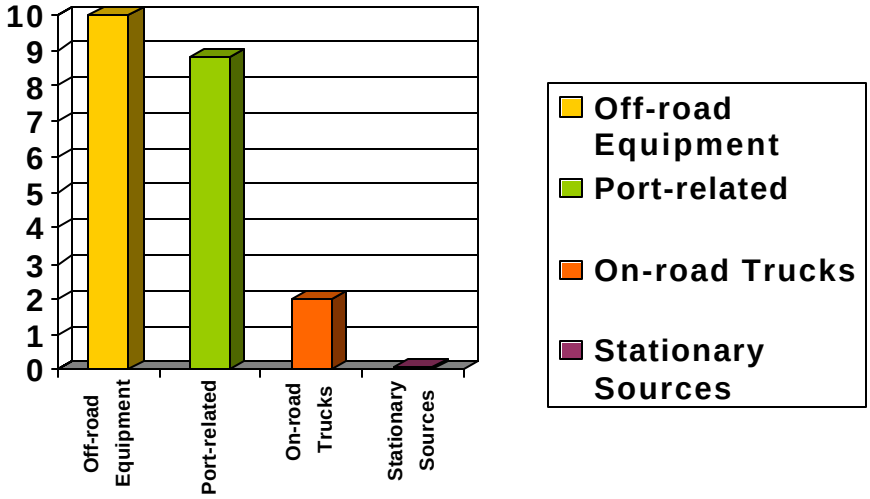
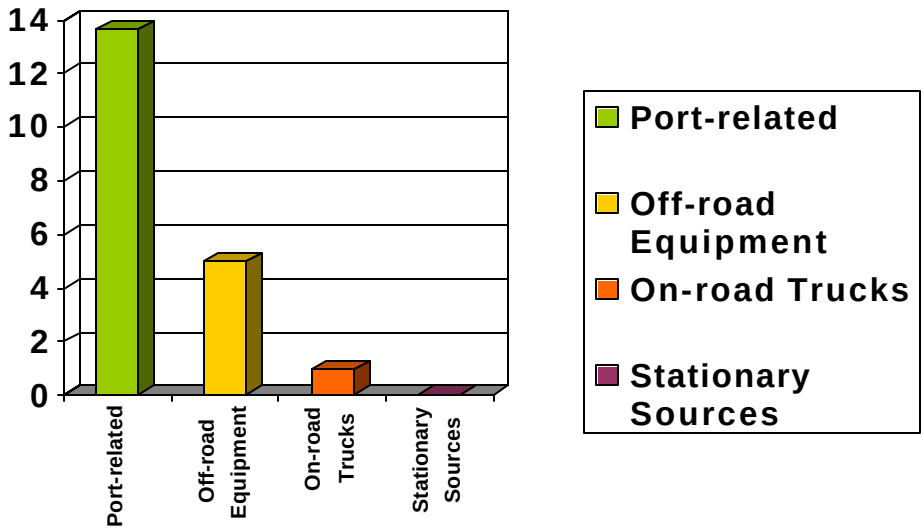


Figure 4: Estimated 2020 Diesel PM Emissions in the South Coast Air Basin (Tons/Day)



2. Emissions and Trends from Port-related Sources

This section provides additional detail on NOx and diesel PM trends for port-related emission sources. As Figure 5 shows, ship emissions are growing and will contribute most of the port-related emissions in the future. This is the primary reason for an upward trend and the primary challenge California must overcome. Locomotive NOx emissions will decrease through 2010, but may trend upward again unless new engine emission technologies are in place and locomotives meeting those standards are deployed. NOx emissions in the other categories are expected to decrease somewhat from current levels, largely because many trucks and most off-road equipment will be using cleaner engines by 2020. Efforts to accelerate the introduction of cleaner engines would provide significant benefits in the near-term.[8] Similar benefits could be obtained from operating changes such as moving more containers by rail than truck, highway projects that reduce congestion, and regulatory measures to require cleaner equipment and fuels.

[8] The forecasted growth and control estimates (for currently adopted measures) are based on the preliminary information from the Port of Los Angeles "No Net Increase" Project. These values may change as new information becomes available; however, the relative relationships between the different emission sources are not expected to change.

Figure 5: Emission Trends for Various Port-Related Sources in the South Coast Air Basin (NOx) (Tons/Day)

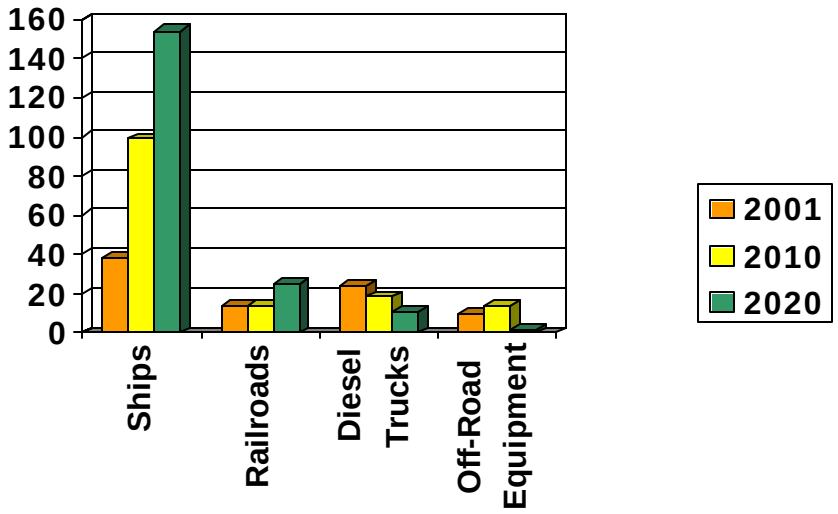
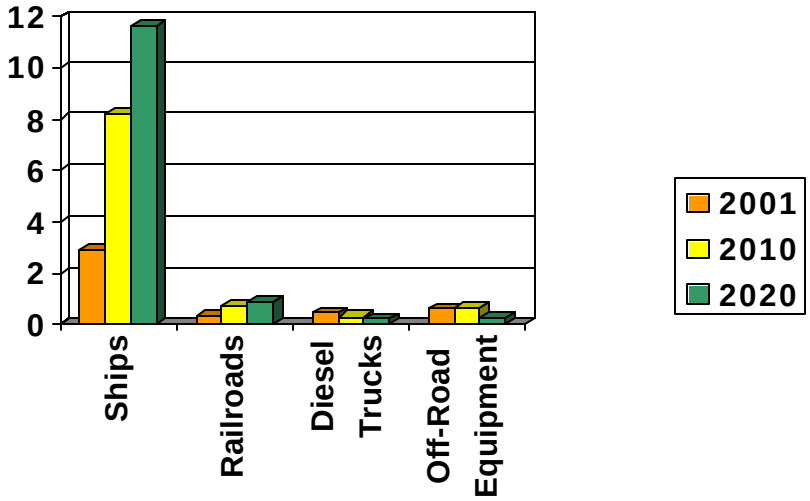


Figure 6 presents emission trends for diesel PM. Again, ship emissions are dominant and grow and are predicted to grow substantially over time, without further intervention. However, in terms of risk resulting from exposure to diesel PM, sources that operate within the ports or in neighborhoods have more impact than vessel emissions at sea. To properly analyze the risk presented by these sources, the magnitude, location, and timing of emissions must all be considered.

Figure 6: Emission Trends for Various Port-Related Sources in the South Coast Air Basin (PM) (Tons/Day)



F. Current Efforts

It would be a mistake to think that nothing is being done to abate goods movement pollution. Numerous stakeholders are hard at work on mitigation strategies and have collectively invested tens of millions of dollars on clean-up strategies and new technologies.

The ARB and U.S. EPA have adopted and are implementing several regulations to reduce goods movement emissions in the nearer and longer term. These include clean fuel specifications, on- and off-road truck standards, and various locomotive measures. Many additional efforts are underway. For example, several measures in the State Implementation Plan are under development, including proposed in-use controls for heavy-duty trucks, harbor craft retrofits, and cleaner fuels for ship auxiliary engines. Implementation of specific provisions in ARB's Diesel Risk Reduction Plan will also significantly reduce diesel PM emissions in and around ports. On the incentive side, ARB and local districts are collaborating on targeted uses of Carl Moyer funds to speed reductions from port-related and rail-related emission sources. Separately, ARB provided a grant of $1,000,000 to the Ports of Los Angeles and Long Beach to implement an emulsified diesel fuel program for yard hostlers and other equipment types. The U.S. EPA has provided small grants thus far, but is hoping to increase its funding capacity through the West Coast Clean Diesel Initiative, and has placed particular emphasis on cleaning up port related pollution along the entire Pacific Coast.

Individual ports have undertaken air quality improvement programs aimed at "greening" their fleets of equipment and vessels. These include the Gateway Cities program in Southern California and the clean ferry program in Northern California, just to cite a few. In addition, many transportation system and operational improvements have been undertaken that have helped minimize health impacts due to diesel exhaust when these improvements have resulted in reduced idling and smoother traffic flows at posted speed limits. For example, the opening of the Alameda Corridor in April 2002 has resulted in a more efficient movement of rail between the Ports of Los Angeles and Long Beach and the transcontinental rail yards located near downtown Los Angeles. According to the Alameda Corridor Transportation Authority, separating the trains from the street traffic has reduced congestion and idling of cars and trucks resulting in emission reductions of up to 54 percent from idling trucks and cars.

Finally, CalEPA's children's health and environmental justice activities are helping to identify disproportionately affected communities, at prompting the development of new mechanisms to address those issues.

Appendix A outlines all of these efforts.

G. Mitigation Alternatives

Despite all the good work underway, the expected growth in the California goods movement industry requires a comprehensive strategy to reduce emissions. Accordingly, by December of 2005, ARB staff will develop a comprehensive plan to reduce emissions from port and intermodal goods movement operations in California. This comprehensive plan, a key element of the Goods Movement Action Plan, will be developed in conjunction with a broad array of stakeholders including U.S. EPA, California ports, local transportation agencies, and air districts, environmental and community groups, shipping lines, terminal operators, truck operators, and the railroads.

It is already apparent that there will be significant hurdles to overcome including the cost of new control measures, the availability of low emission technologies, the desire to accelerate implementation, and the need for action at the national and international levels. Additional details on this effort are provided in Chapter VIII, "Next Steps." Below is a general description of some of the strategies that will be evaluated as the comprehensive plan is developed. The category-by-category discussion is followed by an overall summary of the implementation mechanisms that might be employed.

1. Ocean Going Vessels

Ocean going vessels are the largest and most challenging emissions source. They employ engines and fuels that have not been subjected to rigorous pollution control requirements. Ocean going vessels are predominately owned and operated by foreign entities and are difficult to regulate at the state or even national level. Ultimately, what are needed are international fuel and engine standards that apply cost-effective emission controls on new ships. Ideally, these standards should be promulgated by the International Maritime Organization (IMO). While, the IMO promulgated new NOx emission standards for ocean going vessels in 1997, these standards were only recently ratified and are scheduled to take effect in May 2005. U. S. EPA should continue to work towards the IMO's adoption of yet more stringent standards. However, new engine emission standards help clean the air only as shipping lines replace their existing fleets with the newer, cleaner vessels, so the reductions from future standards are not likely to occur quickly enough to address the rapid growth of trade in California. As a result, other strategies will be needed to substantially reduce vessel emissions such as:

a. Use of Lower Polluting Engines on New Ships Destined for West Coast Service

The IMO has adopted modest NOx emission standards that have been implemented on vessels built since 2000. However, ship engine manufacturers could produce vessels with significantly lower emissions if there were a demand for these cleaner engines. Further, there are numerous emission reducing technologies that could be incorporated into vessel design including selective catalytic reduction (SCR), electrical system modifications to allow for shore power connections, fuel system modifications to allow the use of water emulsified fuels, intake air humidification, water injection, lower emission fuel injectors, oxidation catalysts for auxiliary

engines using lower sulfur fuel, and cylinder lube oil control technologies on main engines. Many of these technologies are best designed and installed on new vessels. For example, SCR can be very difficult to install as a retrofit due to size constraints and other factors, which do not exist if SCR is incorporated during new vessel construction. In addition, there may be other opportunities selectively to deploy new cleaner vessels to California's major ports.

b. Emission Retrofits on Ships in Frequent West Coast Service

Many of the same technologies available for new vessels are also available as retrofits on existing vessels. These technologies include SCR, electrical system modifications to allow for shore power connections, fuel system modifications to allow for the use of water emulsified fuels, intake air humidification, water injection, retrofit "slide-valve" fuel injectors, oxidation catalysts for auxiliary engines using lower sulfur fuel, and cylinder lube oil control technologies on main engines. The emission reduction potential of these technologies can be substantial. For example, SCR can reduce NOx emissions by 90 percent. Retrofit controls are most cost effective on ships that make frequent visits to West Coast ports.

c. Cleaner Fuels in Main and Auxiliary Engines when in or near California Ports

Cleaner marine fuels could significantly reduce emissions from marine vessels. The heavy fuel oils currently used in main engines (and many auxiliary engines) are some of the least expensive fuels available but also the most polluting, containing high levels of sulfur, ash, aromatic compounds, nitrogen and other contaminants. For ship main engines, ARB is working, in cooperation with U.S. EPA, to investigate the feasibility of creating a "Sulfur Emission Control Area" or SECA for North America through the International Maritime Organization. A SECA limiting the sulfur content of heavy fuel oils to 1.5 percent would reduce particulate matter by about 20 percent and sulfur oxides by over 40 percent. For auxiliary engines, ARB is currently developing a regulation that would require the use of lower sulfur marine distillate fuel referred to as "marine gas oil." It is estimated that the use of this fuel would reduce particulate matter by more than 60 percent, sulfur oxides by approximately 90 percent, and nitrogen oxides by almost 10 percent, compared to the emissions produced by typical heavy fuel oil. Some of the issues associated with the use of cleaner marine fuels are the cost differential between these fuels and heavy fuel oils and the availability of the cleaner fuel on a worldwide basis.

d. Use of Shore Power

The use of shore power (often called "cold ironing") is the connection of landside electrical power to a vessel, allowing the vessel's onboard diesel generators to shut down. Shore power can result in dramatic reductions in emissions, even considering the power plant emissions associated with electricity generating utility plants. For example, emissions reductions of NOx and diesel PM would be reduced by more than 95 percent. Shore power requires significant infrastructure investments both at the

dock and on the vessel. In addition, the landside power can be more expensive than the power generated by the ships onboard generators. Nevertheless, several existing and planned installations of shore power demonstrate that this strategy is feasible in certain situations. For example, the Port of Los Angeles has entered into partnerships with several of their tenants and is currently supplying shore-side power to a limited number of vessels. The Port of Long Beach has also entered into a partnership with a tenant and is in the process of establishing the necessary infrastructure to support shore-side power. Generally, shore-power projects are most cost-effective for vessels that visit the same port relatively frequently, require large electrical loads at the dock, and stay at the dock for longer periods of time. The Port of Long Beach commissioned a report examining the feasibility and cost-effectiveness of shore power at their facility; ARB is developing a report examining similar issues on a statewide basis.

e. More Efficient Ships and Improved Efficiency of Container Loading and Unloading

Improvements in the design and operation of ships and cargo-handling equipment can reduce emissions of all pollutants. For example, larger container ships generally result in fewer emissions per container transported compared to the transport of the same number of containers with a greater number of smaller vessels. Improvements in container ship design also allow vessels to carry more containers for a given vessel size. Strategies to load or unload a vessel more quickly can also reduce emissions by limiting the time the vessel is at the dock running diesel auxiliary engines. Strategies to load or unload vessels more quickly can include increasing the number of cranes servicing each vessel, installation of faster cranes, use of straddle or shuttle carriers to supplement yard trucks, use of dockside rail systems, and 24-hour loading or unloading operations.

2. Cargo-Handling Equipment

Cargo-handling equipment is probably the most significant category of emissions contributing to regional and community pollution. Strategies that could reduce emissions from this cargo-handling equipment include:

a. Use of Less Polluting On-Road Engines in Yard Trucks

One opportunity for reducing both diesel PM and NOx emissions is to replace yard trucks powered by off-road engines with those powered by on-road engines. The on-road yard trucks are fully capable of performing in an off-road environment, and the emissions benefits are significant. The NOx and diesel PM emission limits for new on-road engines are, respectively, approximately 50 percent and 35 percent lower than those for new off-road engines. With the 2007 model year, the diesel PM benefits would be even greater, up to 90 percent lower as compared to a new off-road engine. (ARB 2000)

b. Diesel PM Emission Retrofits on All Eligible Equipment

For the off-road, diesel-fueled mobile cargo-handling equipment that does not have the capability of being replaced with on-road equipment, ARB has verified several retrofit control devices that may be applicable to control diesel PM emissions, and in some cases, NOx emissions. Currently, there are three Level 1 (at least 25 percent diesel PM reduction), one Level 2 (at least 50 percent diesel PM reduction), and one Level 3 (at least 85 percent diesel PM reduction) devices that are approved for off-road cargo handling equipment—and two of these also achieve 20 percent to 80 percent reduction in NOx emissions.

c. Modernization of Fleets

Accelerating the turnover of older equipment to equipment meeting new certified off-road Tier 4 engine standards is another option for reducing diesel PM and NOx emissions. Depending on the size of the engine, Tier 4 standards are 67 percent to 89 percent lower than current Tier 2 standards for NOx and 50 percent to 95 percent lower than current Tier 2 standards for diesel PM. Tier 4 off-road engine standards will become effective for most engines with the 2011 model year.

d. Greater Use of Cleaner Alternative Fuels and Electricity

Increasing the use of cleaner alternative fuels, such as compressed natural gas, liquefied natural gas, and liquefied petroleum gas (propane) as well as alternative diesel fuels, such as emulsified diesel and ethanol diesel, are another option for achieving diesel PM and NOx emission reductions. In addition, most railed cranes located at ports have been electrified, and while no other applications of electric cargo-handling equipment are known, it remains an option for some equipment.

3. Port Trucks

Truck operations, the moving of cargo in and out of California ports and transporting cargo to its ultimate destination, can be a significant contributor to the overall port-related NOx and diesel PM emissions. Emissions from this source category may increase in the near future, once the trucking provisions of the North American Free Trade Agreement (NAFTA) are fully implemented. U. S. EPA will need to work with the Mexican and Canadian governments to ensure that newer trucks using clean fuels are used to transport goods from the international borders to the ports. Several other approaches will also be needed to reduce emissions associated with truck activity at ports and rail facilities.

a. Fleet Modernization

California has between 20,000 and 40,000 trucks at ports engaged in moving containers, with the largest concentration operating in the South Coast Air Basin from the Ports of Long Beach and Los Angeles. Preliminary 2002 data indicates that the

average age of a port truck is 12 years (corresponding to a 1992 model year) and that approximately 28 percent of the total fleet is more than 16 years old (model year 1988 or older). Programs that accelerate the turnover of the older on-road trucks with newer, cleaner trucks will significantly reduce both diesel PM and NOx emissions. Currently available, new trucks generate 80 percent less diesel PM than a 1988 model year truck. Beginning in 2007, engine manufacturers will offer on-road trucks that will generate 90 percent less diesel PM than the 2004 model year trucks.

b. Diesel PM Retrofit Controls

Another option to reduce emission from port trucks is to retrofit existing trucks with emission control systems. Several systems for reducing diesel PM emissions from on-road trucks have been verified by ARB. While not every make and model of truck can be retrofitted, this option is less expensive than purchasing a new truck and can reduce diesel PM emission to near new-truck levels.

c. Improved Efficiencies and Reduced Idling

A third option to reduce diesel PM and NOx emissions at ports is to improve the efficiency of the process of transferring containers to trucks. Efficiency improvements that speed up the loading and unloading process will reduce emissions associated with equipment idling. Also, improvements that speed up the processing of documents will reduce delays and the associated idling emissions.

4. Locomotives

Locomotive activity in and near ports and inter-modal rail facilities are a significant source of diesel PM and NOx emissions, but ARB is precluded from adopting emission standards for locomotives. Strategies to reduce these locomotive emissions include:

a. Adoption of Highly Effective "Tier 3" Engine Standards by U.S. EPA

The U.S. EPA has proposed the adoption of new locomotive emission standards, commonly referred to as "Tier 3," which would apply to new locomotives manufactured in 2011 and beyond. The application of exhaust after treatment technologies in new locomotives could reduce both NOx and PM locomotive exhaust engine emissions by as much as 90 percent. These emission standards would leverage on already adopted federal requirements for using low sulfur diesel fuel by all locomotives beginning in 2012. The U.S. EPA plans to publish the proposed "Tier 3" locomotive emission standards in mid-2005 and issue a final rulemaking in mid-2006.

b. Accelerated Use of Locomotives That Employ Tier 3 or Equivalent Technologies

The useful life of a locomotive can exceed 30 years. As a result, strategies that would accelerate the use of locomotives that employ Tier 3 or equivalent technologies in California would provide significant diesel PM and NOx reductions. The current Rail MOU uses an "accelerated introduction" approach for locomotives in the South Coast Air Basin; the proposed MOU that ARB will be considering in September would extend this approach to the remainder of the State.

c. Application of Diesel PM Retrofit Controls and Other Measures to Reduce Emissions from Switching Operations

Because switcher locomotives typically operate in and around rail yards, the health impacts associated with their operation at rail yards near densely populated urban areas can pose significant air toxics risks. Retrofitting switcher locomotives with diesel PM filters or diesel oxidation catalysts, where possible, will significantly reduce emissions from these locomotives. Other options to reduce emissions from switcher locomotives are greater use of innovative technologies like the hybrid switcher, the multi-engine switcher, and alternative fuels.

d. Accelerate Efforts to Reduce Locomotive Idling Emissions

A recent risk assessment of the Union Pacific rail yard in Roseville concluded that 45 percent of the cumulative risk from this facility was due to diesel PM emissions from locomotive idling. While some idling is necessary, emissions can be reduced by eliminating unnecessary idling. Installation of anti-idling devices will eliminate unnecessary idling by automatically shutting down the locomotive when not in use. All new locomotives could install anti-idling devices as standard equipment. For locomotives which cannot be equipped with automated anti-idling devices, operational changes at rail yards could minimize the length of time idling is needed for operational or safety concerns.

5. Commercial Harbor Craft

Commercial harbor craft include tugboats, commercial fishing vessels, commercial passenger fishing vessels, workboats, crew boats, ferries, and some U.S. Coast Guard and military vessels. These vessels generally stay within California coastal waters and often leave and return to the same port. Most harbor craft use diesel-powered propulsion and auxiliary engines. In addition, the port facilities where these marine vessel emissions are concentrated are often located near population centers. Listed below are several emission reduction strategies to reduce emissions from commercial harbor craft.

a. Adoption of Standards for New Engines

New engine standards can provide significant toxic pollutant reductions over time. The International Maritime Organization established NOx standards in Annex VI to the International Convention for the Prevention of Pollution from Ships in 1997. The

NOx standards range from 9.8 to 17 g/kWh, depending on the engine speed. In addition, the U.S. EPA promulgated final exhaust emission standards for new diesel engines over 37 kW (50 hp) on December 29, 1999, with implementation dates ranging from 2004 to 2007, depending on engine size. Emission reductions from the international and federal rules are expected to be modest. The NOx standards may not achieve significant reductions until after 2010, because the standards apply only to new engines introduced beginning in 2004-2007. In addition, the diesel PM and CO standards are effectively caps in many cases, designed primarily to prevent increases rather than achieve reductions in existing levels. More stringent new engine standards based on after treatment technology, similar to that being required of land-based equipment, could result in significant reductions of NOx and diesel PM emissions.

b. Engine Emission Retrofits, Rebuilds, and Replacement

There is a variety of options for reducing the emissions from existing vessels. The use of add-on control equipment, such as diesel oxidation catalysts, diesel particulate filters, selective catalytic reduction, and lean-NOx catalyst can provide substantial emissions benefits. However, like ocean-going ships, not many harbor craft have installed retrofit controls and the feasibility of adapting controls is generally vessel specific. Re-powering of existing vessels with cleaner new engines can result in significant emission benefits. Under the Carl Moyer program, over 300 vessels have been re-powered with cleaner new engines resulting in significant NOx and diesel PM emission reductions.

c. Use of Cleaner Fuels

Commercial harbor craft in California generally use either U.S. EPA or California on-road diesel fuel except ferries carrying more than 75 passengers, which have been required to use California on-road diesel fuel since January 1, 2003. Recently ARB passed a regulation requiring all commercial harbor craft to use California on-road diesel fuel. California on-road diesel fuel would be required in the South Coast Air Basin starting in January 2006 and the rest of the state in January 2007. Using California on-road diesel fuel will reduce NOx and diesel PM emissions and enable the use of exhaust treatment devices. Other fuels may also provide benefits such as use emulsified diesel fuel or bio-diesel.

d. Use of Shore Power

Like ocean-going vessels, harbor craft typically run on-board diesel generators when at rest in port (hotelling) to generate electrical power for lights and equipment on-board. Use of landside electrical power instead of on-board diesel generators can result in reductions of both NOx and diesel PM emissions. Currently at the Port of Los Angeles, one tugboat company is connecting to shore power while their vessels are at the dock.

6. Transportation System Efficiencies

Moving cargo more efficiently from vessel to rail or truck or vice versa, can reduce emissions and related air quality impacts. Effective goods movement is essential to both the State and National economy. The federal government therefore has both an interest and a responsibility to help ensure the availability of federal highway funds to help improve the State transportation system's ability to handle the increased flow of goods efficiently. Transportation system efficiencies include:

a. Improved Port Operations

Some of the strategies being evaluated to improve port operations include greater reliance on advanced information technologies, expanding off-hour operations at ports and related warehouse distribution centers, and the use of incentive programs. Advanced information systems increase the efficiency of goods moving through the port and beyond. An example of this is the ports of Long Beach/Los Angeles Advanced Transportation Management, Information and Security System. While the system is designed to reduce costs through greater cargo handling efficiencies, it will also serve to improve traffic flow, thereby reducing idling.

Another strategy for improving port operations is expanding operating hours to off-peak periods. This must be a collaborative effort among the ports, importers, exporters, and warehouse and distribution center operators to expand hours so that terminal truck traffic can operate at night and on weekends. With a 24-hour coordinated operation of goods movement, truck flow can be better managed to reduce congestion on access roads.

Incentive programs are also being developed to promote operations at ports during off-hours through the use of fees. PierPass is an example of such a program was launched in late July 2005 at the ports of Los Angeles and Long Beach. With PierPass, a "traffic mitigation fee" is charged based on container size. If the container is moved during off-peak hours, the fee is refunded.

b. Greater Use of Rail

Increasing the use of rail is essential to reducing traffic congestion, reducing and improving emissions and provides more efficiency in the flow of goods in California. The challenge will be increasing the capacity while reducing congestion. Solutions include increased use of on-dock rail, more efficient use of containers, improved rail crossings, double and triple track where needed and rail shuttles between ports and intermodal facilities.

At the port, on-dock rail or near-dock rail will allow cargo to be transferred directly from ship to train. This will eliminate truck traffic in and around ports and on freeways. More efficient use of containers being shipped to and from ports will also reduce congestion. Fifty percent of the time, international marine containers on the

highway are empty. An example of more efficient use of containers is the Port of Oakland alliance with Northwest Container Services to re-use in-bound and out-bound containers at in-land intermodal facilities.

Improved at-grade railroad crossings, especially in dense urban areas, need to be addressed. Unseparated rail/highway crossings doubly reduce efficiency because of lower rail operating speeds and blockages of truck traffic. Freight rail expressways, such as the Alameda Corridor, eliminate many street/railroad crossings.

Another strategy being proposed to enhance the use of railroads and to reduce truck traffic is shuttle trains between ports and intermodal facilities. The California Inter-Regional Intermodal System (CIRIS) is an example. CIRIS is a demonstration project for a container shuttle train between the Port of Oakland and Port of Stockton, which will reduce traffic between the Bay Area and Central Valley.

c. Reduction of Congestion from Port-related Goods Movement

Certain segments of streets and highways have a higher percentage of truck traffic due to the movement of goods. Recent studies show that high truck volumes increase in-vehicle personal exposure to pollutants. Dedicated truck lanes, by-pass routes, and climbing lanes on key goods-movement corridors may help alleviate street and highway congestion and reduce truck volumes in lanes used by passenger vehicles, thereby reducing air pollution impacts in these areas. (Rodes et al., 1998; Fruin et al., 2004' Westerdahl et al, 2004)

Improving both truck and rail port access is also necessary to reduce congestion. One strategy is a truck appointment system. With a truck appointment system, truck traffic could be spread more evenly throughout operating hours. To allow more efficient use of the Alameda Corridor, a new intermodal transfer facility is being planned near the Port of Los Angeles. This will allow trucks to travel shorter distances before transferring containers to railcars.

H. Implementation Approaches

Mitigating the environmental impacts of the rapidly growing goods movement industry requires a comprehensive effort employing traditional and innovative approaches. The diversity of emission sources and the international nature of the industry preclude a single entity having jurisdiction over environmental matters. In some cases (e.g., when authority is clear), environmental protection can best be achieved through a traditional regulatory approach. More often, however, either non-traditional or innovative approaches will likely be needed. For many mitigation efforts, a combination of approaches is likely to yield the best results. Each general implementation approach is described below, along with examples of how the approach might be used.

1. Regulations: Traditional rules and regulations are being developed for sources where there is clear regulatory authority. This approach may be pursued on the local, state,

federal, or even international level. ARB is pursuing regulations that are designed to reduce port emissions, including proposals to reduce emissions from existing diesel engines through cleaner fuels or retrofits as well as encouraging further action at the federal and international levels.

2. Cooperative Agreements: Cooperative agreements with the affected industries provide an alternative approach where regulatory authority may be in doubt. An example of such a cooperative agreement is the memorandum of understanding among the shipping industry, ARB, U.S. EPA, and the South Coast Air Quality Management District pursuant to which ships voluntarily slow down near the Ports of Los Angeles and Long Beach. Slowing down reduces engine loads and associated NOx emissions by about one ton per day.

3. Incentives: Incentive programs encourage owners or operators of port equipment associated with goods movement to voluntarily reduce their emissions. One example is ARB's Carl Moyer Program, which subsidizes the increased cost of cleaner new engines or retrofit control equipment. U. S. EPA provided small diesel emission reduction grants through the West Coast Diesel Emissions Reductions Collaborative. Some California ports also subsidize emission reduction projects and provide incentives for cleaner vessels and terminal equipment by considering emission levels when evaluating candidates for new leases at port terminals. Additionally, California recently increased the funding available through the Carl Moyer Program and expects that U. S. EPA will similarly increase the incentive funding available to reduce diesel emissions from port-related sources under national and international control. Another incentive could be modeled after a program implemented at certain Baltic Sea ports where they charge a differential port fee where cleaner vessels pay lower fees.

4. Efficiencies: Improving the efficiency of the systems and equipment designed to move cargo at ports reduce both emissions and the cost of goods delivery. Efficiencies may include port and terminal design improvements, grade separations at intersections, and expanding highway and rail capacity.

5. Charges could be imposed to encourage less polluting choices. Issues such as legal authority, collection and distribution mechanisms, and impact on the competitive position of California ports would require extensive review before such action could be considered.

I. Costs and Impacts of Controlling Emissions

Precise estimates of the overall cost of environmental mitigation cannot be generated at this time. However, a preliminary estimate of the potential range of costs can be generated based on the emission reductions needed and the cost-effectiveness of other measures designed to control diesel PM and NOx. For example, bringing the projected 2010 port related emissions in the South Coast Air Basin back to 2001 emission levels will require about 20,000 tons per year reductions in NOx emissions and 1,900 tons per

year reductions in diesel PM emissions. These reductions are estimated to cost from $100 million to $200 million in the year 2010[9]. This cost effectiveness range takes into consideration the cost of simultaneously reducing NOx and diesel PM emissions.

The estimated cost of reducing the projected 2025 port-related NOx and PM emissions in the SCAB (about 36,000 tons per year of NOx) back to 2001 levels is from $230 million to $470 million in the year 2025. Greater reductions will be needed to reduce emissions statewide, and to reduce emissions below 2001 levels. It is uncertain at this time the magnitude of emission reductions below the 2001 levels that will be needed to achieve ambient air quality standards and mitigate community impacts. However, to provide some perspective, if one assumes a 50 percent reduction below the 2001 level is needed, then the cumulative total costs of mitigation in 2005 dollars is estimated to be between $2 - $5 billion.

The monetary value of the benefit of reducing emissions at the Port of Los Angeles and Port of Long Beach to below the 2001 level (by 2010) is estimated to be greater then 10 times the estimated cost associated with reducing the emissions. This estimate reflects the valuation associated with reduced premature death between 2010 and 2025 due to reductions in PM emissions.

J. Other Efforts

While ARB is taking action to reduce the community health impacts associated with existing goods movement activity today, it is crucial to minimize future impacts as well. As the connection between proximity and health risks becomes clear, land use decision-makers need to consider the impacts from goods movement activity when approving applications for sensitive land uses, such as residences, schools, day-care centers, playgrounds, and medical facilities. As part of its environmental justice program, ARB has published the "Air Quality and Land Use Handbook: A Community Health Perspective." This Handbook provides information on key health findings and suggested recommendations to land-use agencies on several toxic pollution source categories, including high volume freeways, ports, rail yards, and distribution centers. The handbook recommends distance parameters within which sensitive land uses should be avoided and consideration of resulting traffic patterns.

[9] A cost effectiveness ranges of $6,500 to $13,000 per ton of NOx reduced was used based on existing cost effectiveness data from the Carl Moyer Program, the cost effectiveness estimates for control measures in the State Implementation Plan, and potential control strategies for ocean-going ships.

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VII. THE SAFETY AND HOMELAND SECURITY DIMENSION

A. Overview

The Maritime Transportation Security Act of 2002[1] (MTSA) provided prescriptive direction to governmental agencies, working in conjunction with local authorities and private entities, pertaining to security of the nation's ports. The MTSA requires a layering security system, preparation of a maritime transportation security plan, formation of maritime security advisory committees, establishment of maritime safety and security teams, and establishment of national transportation identification systems. The MTSA authorized specified grant funding for security.

Since its inception, the U.S. Department of Homeland Security (DHS) administers security procedures at American ports and rail yards, employing the resources of the Transportation Security Administration (TSA), the U.S. Coast Guard, U.S. Customs and Border Protection (Customs), and the U.S. Citizenship and Immigration Service (Immigration) in conjunction with the Department of Transportation's Maritime Administration and Federal Railroad Administration. State and local law enforcement agencies retain their historical authority in ports. Railroad police officers, as authorized by Section 830.33 of the California Penal Code, enforce statutes and regulations on railroad property. Local harbor patrols and the California Department of Fish and Game assist the Coast Guard with enforcement of statutes and regulations and security within each California port, as appropriate. All interstate and foreign commerce is regulated by the appropriate federal agency.

Joint harbor operations or command centers, which include the U.S. Coast Guard, U.S. Navy, TSA, Customs, Federal Bureau of Investigation (FBI), port and/or harbor police, local law enforcement, California Department of Transportation, and California Highway Patrol personnel, oversee security in and around the ports. Each agency has defined roles and responsibilities. Port security includes various types of radar, sensors, and cameras. These centers possess the capability of electronically accessing driver history records, the Cal-Photo database,[2] wanted persons, probation, district attorney, and booking and court information databases. The U.S. Navy also employs swimmer detection sensors located near restricted areas.

Jurisdictional responsibilities within the ports are divided among multiple federal, state and local agencies as well as the private sector. Each port has a security strategy in which all agencies participate. These strategies may not always consider the impact on goods movement or the efficient movement of traffic. Enhancement of security strategies to consider the efficient movement of goods, while safeguarding California has, and will continue to require, a coordinated approach. There are a number of ongoing efforts to enhance port security and ensure a unified and standard approach to port security within

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[1] Public Law 107-295.

[2] Operated by the California Department of Justice, Cal-Photo permits law enforcement to use a Web-based solution to search and retrieve facial images from a statewide database that includes driver's license and police booking photos, as well as those of registered sex offenders.

California. The Office of Homeland Security is also utilizing federal homeland security funds to augment port security.

B. Ongoing Efforts

State Maritime Security Plan

The California Office of Homeland Security (OHS) is collaborating with the U.S. Coast Guard to develop a State Maritime Security Plan. Stakeholders include DHS, TSA, FBI, Customs, Coast Guard and U.S. Secret Service. Potential state government stakeholders include CHP, Office of Homeland Security, the Office of Emergency Services, the Department of Fish and Game, and the California National Guard. Other stakeholders include railroad police, port associations and unions, local law enforcement and fire departments, local transportation authorities and steam ship companies.

The State Maritime Security Plan will build upon the work of the three Area Maritime Security Committees. The AMS Committees are chaired by U.S. Coast Guard and include representatives from federal, state, and local public safety agencies as well associations representing public and private sector entities. The AMS Committees have conducted comprehensive Area Maritime Security Assessments and Area Maritime Security Plans. The AMS assessments have identified threats, vulnerabilities, and consequences associated with each port in the state. The AMS plans outline security procedures to mitigate the identified threats and vulnerabilities and to minimize the consequences of a security incident.

The State Maritime Security Plan will include:

- A comprehensive assessment that details the threats, vulnerabilities, and consequences associated with each port. These assessments should integrate or amend existing security assessments.

- The development of information sharing procedures for threat warnings, response, intelligence gathering and threat assessment among public safety agencies and the public.

- Effective security measures that maintain or enhance operational efficiencies and minimize the impact on legitimate trade.

- The identification of applicable security technologies to mitigate identified vulnerabilities at the ports.

- An Intelligence Sharing Procedures Team to identify existing intelligence providers and determine protocols for sharing information.

Training and Exercise Program at California Maritime Academy

In FY 2004, the OHS allocated $300,000 to the California Maritime Academy to establish standards for port and related maritime security training and exercises required to be conducted under Maritime Transportation Security Act of 2002. Standardized training modules will coincide with NIMS emphasis on a unified Incident Command System and will strongly support the DHS's National Preparedness Goal.

Augmenting Federal Port Security Grants

Although California ports are eligible to apply for port security grants administered by Office for Domestic Preparedness, congressional appropriations have been limited. For this reason, OHS has dedicated a portion of funds from homeland security grant program to augment port security grants.

OHS will consult with the U.S. Coast Guard and other stakeholders to prioritize funding needs based on security assessments that have determined threats and vulnerability.

Enhancing Information Sharing

Information sharing is critical to preventing acts of terrorism. Joint harbor operations or command centers, the California State Terrorism Threat Assessment Center (STTAC), Joint Terrorism Task Forces (JTTF), Regional Terrorism Threat Assessment Centers (RTTAC), and Terrorism Early Warning Groups (TEWG) should be freely sharing intelligence concerning security or possible importation of weapons of mass destruction through the ports. OHS will allocate federal homeland security grants to enhance information sharing among these entities.

VIII. NEXT STEPS

A. Overview of Phase II Effort

The Phase I effort has focused on the "why" and the "what" of the economic importance of California's goods movement system and industry, the in-place infrastructure, and the extraordinary potential for growth. Similarly, the challenges facing the State to upgrade expensive equipment and infrastructure, to provide substantial mitigation for current and future environmental and community impacts, and to address threats to homeland security and public safety have also been detailed.

Collectively, $48 billion of proposed goods movement-related infrastructure projects have been identified as well as an estimated $2 to $5 billion associated with mitigating environmental and community impacts. The costs associated with enhancing public security and safety still require additional effort to discern.

It is clear that California's own population and inevitable growth over the next 15 to 20 years require that corridor infrastructure be improved, active environmental and community mitigation be initiated, and homeland security and public safety be enhanced. While residents in corridor-adjacent zones have endured disproportionate environmental impacts and community disruption, the resources needed to improve their circumstances depend in large measure on an economically healthy goods movement industry. Without the jobs, taxes, and other financial resources derived from the industry, making needed progress in a timely manner will be difficult to achieve.

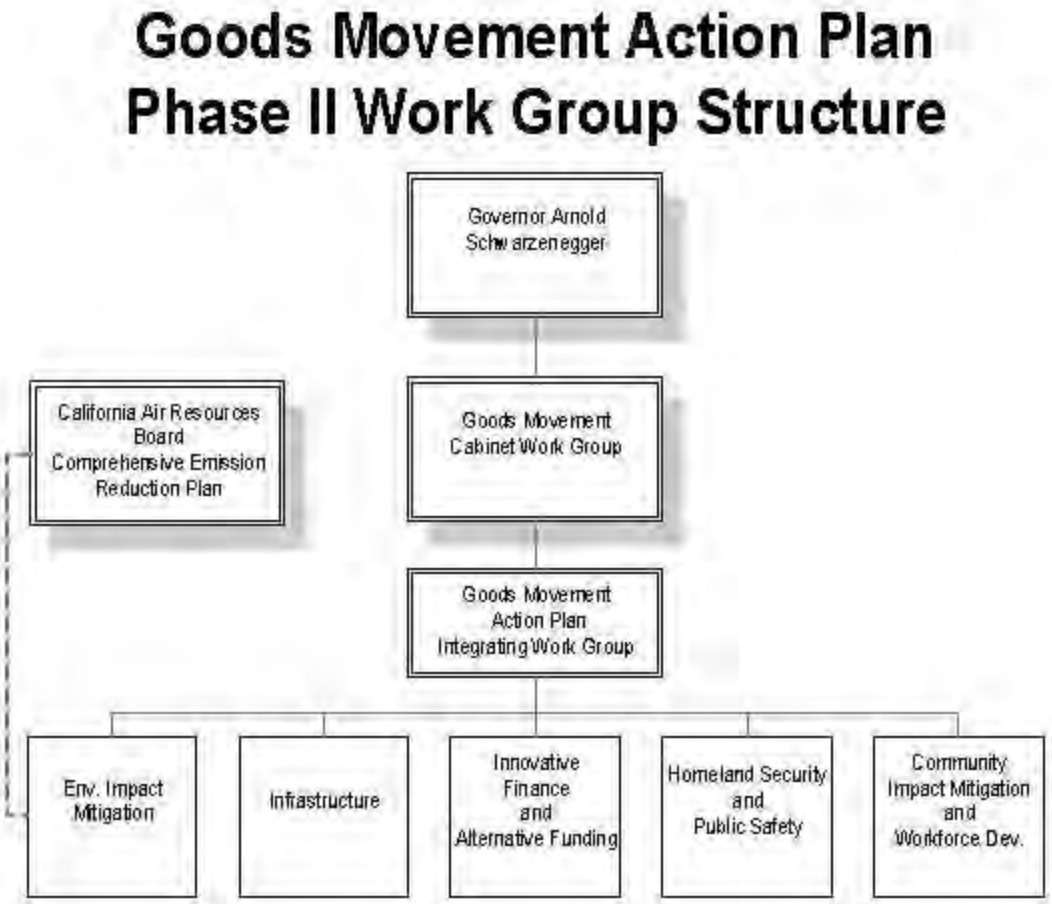
The Phase II Goods Movement Action Plan is intended to define the "how," "when," and "who" required to synchronize and to integrate efforts to achieve relief as quickly as possible. To accomplish this goal, a series of six stakeholder-based work groups will be established. As depicted in Figure 1, the work groups will focus on environmental impact mitigation, infrastructure, innovative finance and alternative funding, homeland security and public safety, and community impact mitigation and workforce development, respectively. In addition, an integrating work group will be established to provide overall consistency, completeness, and connectivity among the various efforts. The Integrating Work Group will also be the liaison to the Cabinet Level Work Group within the Administration.

B. Work Group Overview

1. Environmental Impact Mitigation Work Group

   As depicted in Figure 1, the Environmental Impact Mitigation Work Group will work very closely with ARB's efforts to develop the Port and Intermodal Goods Movement Comprehensive Emission Reduction Plan ("The Emission Reduction Plan"). The Emission Reduction Plan will define the strategies needed to reduce public health impacts from port and related activities.

FIGURE 1


Goods Movement Action Plan
Phase II Work Group Structure
Governor Arnold Schwarzenegger
California Air Resources Board Comprehensive Emission Reduction Plan
Goods Movement Cabinet Work Group
Goods Movement Action Plan Integrating Work Group
Env. Impact Mitigation
Infrastructure
Innovative Finance and Alternative Funding
Homeland Security and Public Safety
Community Impact Mitigation and Workforce Dev.

The Environmental Impact Mitigation Work Group will act as the primary interface between the Phase II Action Plan effort and Emission Reduction Plan formation activities. The work group will coordinate information sharing with the ARB on the proposed corridor projects, prospective revenue streams, and emission reductions achieved through operational changes, congestion relief, and intermodal shift from truck to rail.

The goals for the Emission Reduction Plan are to reduce emissions levels back to 2001 levels by no later than 2010 and then continue to reduce emissions until ambient air quality standards are met and community impacts are mitigated. For example, it is envisioned that the Plan's goal for diesel PM will be to achieve an 85 percent reduction in risk by 2020. This is the same goal that ARB has adopted in the State's overall diesel risk reduction plan.

The Emission Reduction Plan will be developed over the next four months. It will identify both near-term specific measures that are needed to reduce the air quality impacts from port and related operations as well as longer-term mitigation approaches that will need further work prior to adoption and implementation. The Plan will include proposed measures to reduce emissions from marine vessels (commercial harbor craft and ocean-going vessels), locomotives, on-road trucks, and off-road equipment used at ports and rail yards. Each measure will be evaluated for technical feasibility, economic impacts, cost effectiveness, emission benefits, implementation approach (voluntary, cooperative agreement, regulation) and legal authority. Those that are most feasible and cost-effective will become a comprehensive strategy to reduce port-related emissions to the needed levels.

In developing the Emission Reduction Plan, CalEPA and ARB will work with the ports, the railroads, other goods movement stakeholders, local air districts, U.S. EPA, environmental groups, and local communities throughout the State. A full public process will be undertaken to obtain input from all stakeholders during the development of the Plan. This Plan will build upon the regulatory and incentive programs already mapped out by ARB and U.S. EPA and will address both the financial incentives and regulations that need to be developed. It will also build upon and be coordinated with the emission reduction efforts underway at the ports of Oakland, Long Beach, and Los Angeles.

As estimated in Chapter V, the cost of mitigating the impacts from goods movement activities in California will range from $2-$5 billion. Incentive programs, such as the Carl Moyer Program, have demonstrated that critical emission reduction benefits can be obtained by providing grants to public and private entities for the incremental capital cost of cleaner-than-required engines or equipment. Under this objective, additional sources of funding will be investigated such as securing federal funds for environmental mitigation, augmentation of the Carl Moyer Program, and evaluation of fee-based mechanisms.

2. **Infrastructure Work Group**

The Infrastructure Work Group will review and evaluate the infrastructure project inventory identified in the Phase I Action Plan and the extensive efforts undertaken at the regional level. This work group will consider three key elements related to the effectiveness and expansion of goods movement infrastructure. These include:

- **Operational Improvements**

  By its nature, the intermodal aspects of the goods movement system with its many interfaces between ship and truck, ship and train, and train and truck make it difficult to achieve efficiencies across modes due to jurisdictional, ownership, and other complicating factors. In addition, finding prospective improvements between and among California's four port to border corridors have been problematic. As detailed in Chapter V, a variety of innovative projects are proposed or are underway that can improve goods movement operations; improvements that can provide congestion relief and subsequent emission reductions. The work group will review the operational improvement projects to determine if State and/or federal action can facilitate the implementation of those measures that improve system performance and increase utilization of existing assets.

- **Goods Movement Infrastructure Project Prioritization**

  The methods for prioritizing goods movement projects is an evolving discipline. However, much work has been done at the local and regional levels that provide a sense of relative importance to the overall objectives for system improvement, i.e., velocity enhancement, throughput capability, and predictability of transit time coupled with the key objectives of reducing overall traffic congestion and related air emissions. The Infrastructure Work Group will assess the project lists in terms of programmed funds, regional commitments and priorities, and statewide goods movement infrastructure improvement needs.

- **Project Delivery**

  Another aspect that can help advance overall completion of critical projects is the prospects for innovative procurement methods such as public private partnerships, design-build, and design-sequencing. Such methods can result in quicker, less costly construction than when projects are developed using traditional methods. The Infrastructure Work Group will identify projects that would be good candidates for alternative procurement options and other actions to expedite project delivery.

  In developing its recommendations, the Infrastructure Work Group will also review, evaluate, and recommend corridor-specific environmental and community impact mitigation strategies and consider homeland security and public safety enhancements. Their findings and conclusions will be summarized in corridor business plans.

3. **Innovative Finance and Alternative Funding Work Group**

A major factor that must be considered in the execution of infrastructure, environmental mitigation or homeland security projects is how the projects will be funded. Projects are currently funded from a large variety of sources among public and private entities. At the same time, significant restrictions exist that hamper or prohibit the State from investing funds appropriately to support a full range of statewide goods movement system improvement projects.

Most assessments point to a large gap between funding sources and funding needs. If this gap is to be overcome, these restrictions must be addressed. In addition, private, public-private, and other innovative finance vehicles must be identified and made available to augment limited governmental funding. Finally, alternative funding sources must be explored, including both those that are new, and those that are available from federal sources outside the U.S. Department of Transportation, including the Department of Energy, the Department of Commerce, and Department of Agriculture, the Department of Education, the U.S. Environmental Protection Agency, and the Department of Homeland Security.

This work group will identify goods movement financing issues of statewide concern. It will also identify alternative financing options and innovative financing mechanisms that should be considered and applied in the development of goods movement projects. It will also identify legislative and regulatory actions that would be required to implement them, and will recommend a funding plan, options and approach.

4. **Homeland Security and Public Safety Work Group**

Phase II homeland security and public safety action will be integrated into the overall program based on a review of existing needs assessment. Public safety departments at the federal, state and local levels will be kept apprised of plans as developed by the work groups to make sure that neither homeland security nor public safety is compromised as a consequence of proposed actions. Similarly, it is expected that officials keep work groups informed of pending or anticipated actions that might impact goods movement infrastructure development or operations. It is expected that this work group will also work closely with the Innovative Finance and Alternative Funding Work Group to identify federal sources of homeland security funding that could be applied to support goods movement projects or mitigation efforts.

5. **Community Impact Mitigation and Workforce Development Work Group**

The communities adjacent to the State's goods movement corridors have endured a disproportionate share of the impacts from a system that provides statewide and nationwide benefits. During the Phase I effort, much was heard about the air quality, health effects, traffic, noise, and visual blight those communities along the corridors. The Community Impact Mitigation and Workforce Development Work Group will

conduct numerous community meetings with the affected areas to learn what residents suggest are corrective measures to reduce these impacts. In addition, the work group will make recommendations as on how to provide job opportunities for area residents in short and long-term positions that afford opportunities for advancement within the goods movement industry.

Working with area high schools, community colleges, and four year educational institutions, the work group will identify outreach efforts needed to recruit area residents and others for growing employment opportunities within the industry. The work group will also coordinate with industry representatives to determine how best to strengthen current and future workforce needs.

6. **Integrating Work Group**

The complexity of developing a comprehensive action plan that maintains consistency of assumptions, reasonable costs, and credible outcomes requires a high degree of coordination among the constituent efforts. This task falls to the Integrating Work Group. In addition to its coordinating responsibilities, the Integrating Work Group will also provide the interface to the Cabinet Work Group. The Integrating Work Group will also compile and review prospective policy actions on the international, national, and state levels that can lead to improved operations, to improved funding, to faster project delivery, to improved safety and security, and to reduced environmental and community impact. The Integrating Work Group will bear the responsibility to provide the completed Phase II Action Plan recommendation to the Administration within the time available.

C. Process and Schedule

The creation of the Phase II Action Plan is an ambitious undertaking that will require a high degree of cooperation and coordination. The Administration is committed to providing ample opportunities for public input into the process throughout its formulation. In addition to maintaining stakeholder diversity among each of the work groups, each of the work groups will solicit additional comment from stakeholder interests and the public for specific recommendations and suggestions.

The schedule for the preparation of the Phase II Action Plan is outlined in Figure 2. As seen in the schedule, the work groups will convene on September 2005. The preparation of the plan will be concluded by December 2005.

FIGURE 2
TIMELINE
GOODS MOVEMENT PHASE II ACTION PLAN

ID	Task Name
1	1 OVERALL PHASE II MILESTONES
2	1.1 Release of Phase I Report
3	1.2 Identify Phase II Work Group Members
4	1.3 Submit Interim Progress Report
5	1.4 Submit Draft Plan to Cabinet Work Group
6	1.5 Review by Cabinet Work Group
7	1.6 Submit Draft Plan to Governor's Office
8	2 INTEGRATING WORK GROUP
9	2.1 Conduct Chair & Co-Chair Pre-Briefing
10	2.2 Prepare for Initial Meeting of Integrating Work Group
11	2.3 Convene Integrating Work Group
12	2.4 Prepare Draft of Consensus Principles & Common Working Assumptions
13	2.5 Resolve Conflicts Among Work Group Recommendations
14	2.6 Develop Policy Recommendations
15	2.7 Prepare Progress Report
16	2.8 Develop Integrated Business Plan
17	2.9 Prepare Draft Plan
18	**2.10 Weekly Update Meetings**
29	3 ENV. IMPACT MITIGATION WORK GROUP
30	3.1 Convene Env. Impact Mitigation Work Group
31	3.2 Develop Work Group Principles
32	3.3 Review ARB Emission Reduction Plan Elements
33	3.4 Identify Linkages between Action Plan & Emission Reduction Plan
34	3.5 Facilate Information Flow between Efforts
35	3.6 Make Recommendations on Assumptions & Strategies
36	4 INFRASTRUCTURE WORK GROUP
37	4.1 Convene Infrastructure Work Group
38	4.2 Develop Work Group Principles
39	**4.3 Identify Operational Improvements**
40	**4.3.1 Review Intra-model Improvements**
45	**4.3.2 Review inter-modal improvements**
46	4.3.2.1 Ship-Port (inc. short sea shipping)
47	4.3.2.2 Port-Rail (inc. shuttle train)
48	4.3.2.3 Port-Truck (inc. offpeak op)
49	4.3.2.4 Rail-Truck
50	4.3.3 Recommend High Return Operational Improvements
51	**4.4 Prioritize High Value G.M. Infrastructure Projects**
52	4.4.1 Identify Criteria for Project Ranking
53	4.4.2 Review Project Inventory by Corridor
54	4.4.3 Rank Projects within Corridors
55	4.4.4 Rank Projects among Corridors
56	**4.5 Resolve Project Delivery Conflicts**
57	**4.5.1 Identify Obstacles to Advancing Program Delivery**
58	4.5.1.1 Project Status in State or Regional Transportation Plans
59	4.5.1.2 Project Development Stage
60	**4.5.2 Identify Prospects & Means to Advance Priority Projects**
61	4.5.2.1 Deisign Build verses Sequencing
62	4.5.2.2 Construction Management Plan
63	4.5.2.3 Dedicated Team Analysis
64	4.6 Develop Project Priorities Considering Alternative Constraint Assumptions

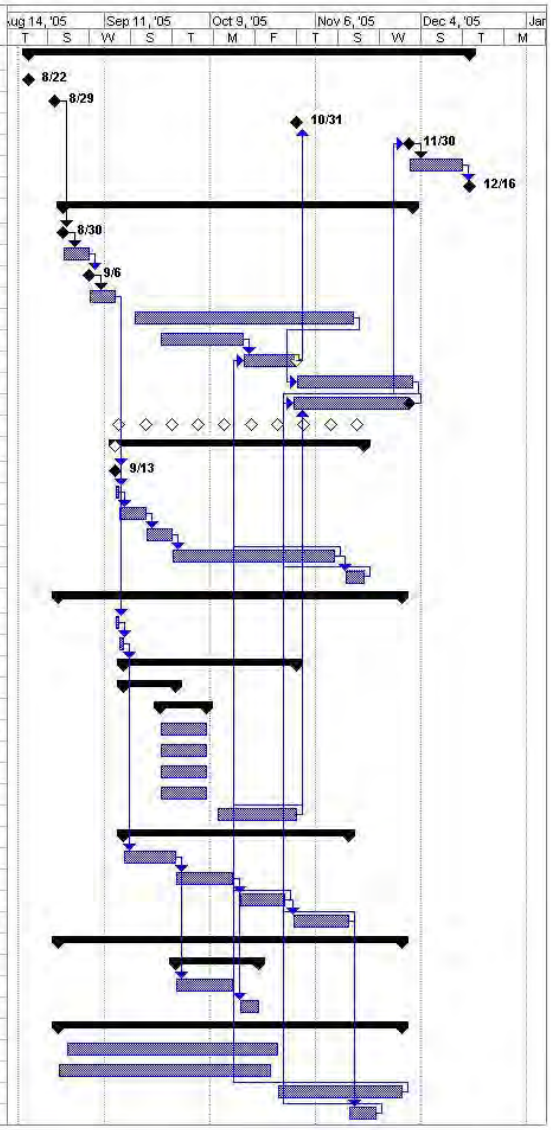
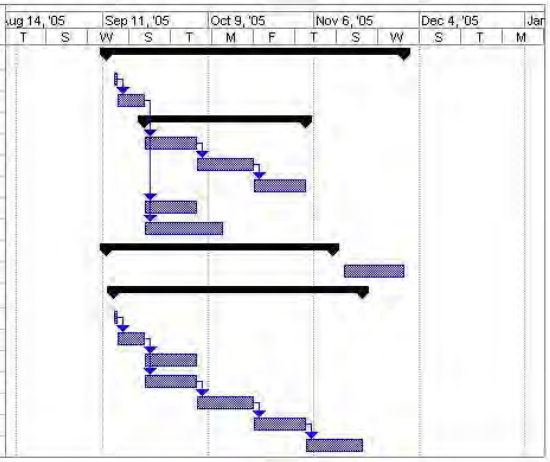


FIGURE 2
(CONTINUED)
PHASE II
GOODS MOVEMENT ACTION PLAN

ID	Task Name
65	**4 INNOVATIVE FINANCE & ALT. FINANCE WORKING GROUP**
66	4.1 Convenve Innov. Finance & Alt. Finance Work Group
67	4.2 Develop Work Group Principles
68	**4.3 Identify Sources of Incremental Federal Funding**
69	4.3.1 Identify Existing Federal Programs by Agency
70	4.3.2 Identify Federal Sources Requiring Policy or Legislative Action
71	4.3.3 Recommend Priorities for Securing New Federal Funding
72	4.4 Identify Sources for Incremental State & Local Funding
73	4.5 Identify Public-Private Partnership Alternatives
74	**4.6 Examine Suitablity of Financing Vehicles to Project Types**
82	4.7 Recommend Finance Mix for Identified Corridor Projects
83	**5 HOMELAND SECURITY & PUBLIC SAFETY WORKING GROUP**
84	5.1 Convene Work Group
85	5.2 Identify Work Group Principles
86	5.3 Identify Planned and Pending Federal Actions
87	**5.4 Examine Related Public Safety Needs**
88	5.5 Review Prospective Interference w/GM Flow
89	5.6 Recommend Solutions Consistent w/Expansion Projects
90	5.7 Identify Additional Sources of Federal or Other Funding



IX. APPENDICES

A. ARB LIST OF EMISSION REDUCTION ACTIVITIES CURRENTLY UNDERWAY

I. STATE LEVEL ACTIONS AND ACTIVITIES

II. PORT AND LOCAL ACTIONS

B. GLOSSARY/ABBREVIATIONS

APPENDIX A

ARB LIST OF EMISSION REDUCTION ACTIVITIES CURRENTLY UNDERWAY

I. STATE LEVEL ACTIONS AND ACTIVITIES

A. Regulatory Efforts

Recent actions by the California Air Resources Board (ARB) that will result in near-term (pre-2010) benefits in and around ports, include cleaner fuel requirements for harbor craft and intrastate locomotives, the South Coast Locomotive memorandum of understanding, requirements to clean up transportation refrigeration units, and chip re-flash. Regulations under development and scheduled for ARB consideration in 2005 and 2006 that will further reduce emissions from goods movement, include:

1. In-Use Cargo Handling Equipment at Ports and Inter-Modal Rail Yards

Preliminary concepts for these regulations would require port equipment to accelerate turn over to 0.01 g/bhp-hr PM engines (for the yard trucks) or install best available control technology (i.e., highest level of emission control equipment verified). As currently envisioned, these regulations could realize about a 50 percent reduction in NOx and diesel PM emissions from the in-use fleet by 2010.

2. In-Use Harbor Craft

Preliminary concepts for these regulations would require the in-use fleet to meet U.S. EPA 2004 marine engine standards through the use of retrofits, engine re-powering or rebuild kits. Compliance dates would be based on the age of the engine and the hours of operation with the older engines, with high annual operating hour engines needing to come into compliance first. As currently envisioned, these regulations are targeting about a 25 percent reduction in diesel particulate matter and nitrogen oxide (NOx) emissions.

3. Requirement for Ocean Going Ships to use Cleaner Fuels in Auxiliary Engines while in California Coastal Waters and at Dock

This proposal, first released in February 2004, would require the use of distillate marine fuels (i.e., low sulfur marine gas oil) in ship auxiliary engines while operating in California coastal waters and at dock. These fuels would result in an estimated six to ten percent reduction in NOx and 80 percent diesel PM reduction compared to heavy fuel oils, which are increasingly used in these engines.

4. In-Use Emission Controls for On-Road Heavy-Duty Trucks

This measure would require public and private on-road truck operators to reduce emissions from their truck fleets. The strategies that operators select must have ARB-verified emission reductions or involve the use of ARB-certified engines.

B. Other Control Efforts

1. Use of Lower Sulfur Bunker Fuels

ARB staff is evaluating the feasibility of requiring the use of cleaner bunker fuels in ship engines. One avenue is to encourage the U.S. Environmental Protection Agency (U.S. EPA) to request the establishment of a Sulfur Emission Control Area (SECA) wherein ships would be required to use lower sulfur (1.5 percent) fuel. ARB staff estimates the use of lower sulfur bunker fuel will provide about an 18 percent reduction in diesel PM emissions. MARPOL Annex VI is the international treaty that sets forth legally binding international standards concerning air emissions from ships. Annex VI enters into force in May 2005. Annex VI contains a provision that allows one or more countries to propose an area as a SECA. In the United States, the treaty was submitted to the Senate Foreign Relations Committee on May 15, 2003. However, the U.S. Senate has not yet ratified the treaty. U.S. EPA staff is beginning to explore the feasibility of requesting a SECA designation for the United States. ARB staff is working closely with U.S. EPA staff on this effort as well as with other sister agencies in Oregon, Washington, and Canada to begin compiling the necessary documentation to request designation. ARB staff is also evaluating other options to pursue in the event the SECA is not approved.

2. Ship Emission Reductions

Another possible strategy being considered as a mechanism to reduce emissions from ships is to develop an emission reduction agreement with the major shipping lines, ports, or other affected parties. Such an agreement could specify emission reduction measures to achieve desired reductions yet give individual carriers flexibility in how they are achieved. Examples of possible measures are: using lower sulfur bunker fuel or distillate fuels in main engines while in California coastal waters, routing the cleanest ships to California, and building new ships with cleaner engines.

3. Rail Memorandum of Understanding

ARB staff recently entered into a pollution reduction agreement (MOU) with Union Pacific Railroad and BNSF Railway. The near-term elements of the agreement are expected to achieve a 20 percent reduction in locomotive diesel PM emissions near rail yards. These elements include: use of ARB diesel, idling restrictions, smoke inspections for locomotives, cleaner engines for the captive fleet, and installation of automatic idling shut off devices. In addition, the MOU requires health risk assessments to be prepared for all major rail yards. Upon completion of each health risk assessment, the railroads will hold public meetings to discuss the findings, hear the concerns of the community, and to identify mitigation measures. On September 22, 2005, the Air Resources Board will hear testimony to determine if the MOU should be approved, modified, or rescinded.

4. Incentive Funding

Under the FY2004-2005 funding for the Carl Moyer Program, ten percent has been set aside for multi-district projects having statewide priority. Solicitation for projects targets goods movement activities, including maritime port and rail yard applications, such as marine vessels, locomotives, off-road equipment, and on-road vehicles.

C. Investigative Efforts

1. Shore Power Feasibility Study

In December 2004, ARB staff initiated a shore power (i.e., cold-ironing) feasibility study. The purpose of the study was to assess the technical feasibility of the use of shore power at California ports for ocean-going ship hotelling needs and to determine at which ports shore power is feasible and cost effective. The study will also provide a recommendation on the viability of using shore power as an emission control strategy when developing statewide regulations to reduce air toxic and criteria pollutant emissions.

2. Southern California Children's Environmental Risk Reduction Plan

The focus of the plan is to reduce diesel PM emissions and other toxics from mobile and stationary sources at the neighborhood level in areas such as Wilmington, Mira Loma, and Commerce. Projects will be conducted in all three communities. Proposals include programs to identify and remedy excessive smoke from trucks and locomotives, pollution prevention programs, a pilot inter-modal rail emission reduction program, and exploring new technologies in emission control equipment for stainless steel welding and chrome plating.

3. Rail Yard Risk Evaluations

In October 2004, ARB staff released the Roseville Rail Yard Study. In this study, ARB conducted a health-risk assessment of diesel PM emissions from diesel locomotives at the Union Pacific J.R. Davis Yard located in Roseville, California. The results of the exposure study show elevated concentrations of diesel PM and associated cancer risk impact a large area. Risk levels between 100 and 500 in a million occur over about 700 to 1,600 acres. Under the recent MOU with Union Pacific and BNSF Railway, health risk assessments will be developed for rail yards throughout California including, but not limited to, those at Barstow, Colton, Stockton, Richmond and Commerce.

II. PORT AND LOCAL ACTIONS

A. Emission Reduction Programs Undertaken by Ports

1. Port of Los Angeles

In response to Mayor James Hahn's directives, the Port of Los Angeles Board of Harbor Commissioners, on October 10, 2001, announced a new environmental policy "that there will be no net increase in air emissions or traffic impact from future port operations." The port also formed a Port Community Advisory Committee that began meeting on January 17, 2002. The purpose of committee is to assess the impact of port development on harbor-area communities and to recommend suitable mitigation measures to the Board of Harbor Commissioners, to review past, present, and future environmental impact reports, and to provide a public forum to assist the port in taking a leadership role in creating balanced communities in the harbor area.

Over the past five years, the Port of Los Angeles has undertaken several initiatives to reduce air pollutant emissions, including the installation of diesel oxidation catalysts on yard tractors and the use of emulsified fuel, accelerated turn-over of yard equipment, cold-ironing of ships while at dock, use of cleaner fuels in port equipment, investment in inter-modal rail facilities to allow for the direct transfer of containers to and from ships and trains, and plugging tugs into electrical power as they idle at the docks prior to the next assist. Recently, Mayor Hahn convened a "No Net Increase Taskforce" that is charged with identifying measures that need to be implemented to demonstrate no net increase of emissions from the 2001 emissions baseline. On June 21, 2005 the NNI Taskforce concluded its work towards the development of a Plan and forwarded its findings in a report to the Mayor. The report identifies 70 possible emission reduction measures that can be pursued to bring emission levels at the POLA back to the 2001 emission levels.

2. Port of Oakland

In 2000, the Port of Oakland released the Vision 2000 Maritime Development Program comprising the expansion plan for the port including new marine terminals, roadways, a rail yard park, and associated facilities. An Air Quality Mitigation Program was also put in place to mitigate potential air quality impacts of the expansion. The program calls for emission reductions from many terminal air pollution sources such as aqueous diesel fuels for transport trucks, tugboat re-powering, local transit bus re-powering, truck/cargo equipment re-powering and retrofits.

3. Port of Long Beach

The Port of Long Beach has taken the initiative to install new technology in port-owned vehicles, terminal equipment, and locomotives. Other Port of Long Beach projects

include evaluating the feasibility of liquefied natural gas or liquefied petroleum gas in heavy-duty terminal equipment, completing a "Cold Ironing Feasibility Study" (in 2006 BP hopes to have Berth T121 converted to cold-iron two tankers), enclosing petroleum coke dust piles, supporting the Gateway Cities Clean Air Program, and assisting tenants in the use of alternative diesel fuel and the installation of pollution control devices on yard trucks.

B. Gateway Cities

The Gateway Cities Clean Air Program provides financial incentives to reduce diesel pollution in Southern California. The Gateway Cities program includes funding from ARB, U.S. EPA, Mobile Source Air Pollution Reduction Review Committee, and the Port of Los Angeles. As of December 2004, the Gateway Cities Clean Air Program has spent approximately $6.2 million to decrease emissions in 245 commercial trucks.

APPENDIX B

GLOSSARY/ABBREVIATIONS

ARAM	Adaptable radiation area monitors
ARB	California Air Resources Board
BNSF	Burlington Northern Santa Fe Railroad
CalEPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CHP	California Highway Patrol
CIRIS	California Inter-Regional Intermodal System
CSWC	California State Warning Center
CTIP	Cargo Theft Interdiction Program
DHS	U.S. Department of Homeland Security
FBI	Federal Bureau of Investigation
FEAR	Foreign Export and Recovery program
JTTF	Joint Terrorism Task Force
HOV	High Occupancy Vehicle
MTSA	Maritime Transportation Security Act of 2002
NAFTA	North American Free Trade Agreement
NOx	Nitrogen oxides
PM	Particulate matter
POE	Port of entry
SCR	Selective catalytic reduction
SR	State Route
TEU	Twenty-foot equivalent unit
TSA	Transportation Security Administration
TWIC	Transportation worker identification credential
SCAG	Southern California Association of Governments
SECA	Sulfur Emission Control Area
Throughput	Total amount of freight imported or exported through a port as measured in tons or TEUs
UP	Union Pacific Railroad
U.S. EPA	U.S. Environmental Protection Agency

County Designations:

ALA	Alameda
CC	Contra Costa
FRE	Fresno
HUM	Humboldt
IMP	Imperial
KER	Kern
KIN	King
LA	Los Angeles
MAD	Madera
MEN	Mendocino
MER	Merced

MON	Monterey
NEV	Nevada
ORA	Orange
PLA	Placer
RIV	Riverside
SAC	Sacramento
SBD	San Bernardino
SCL	Santa Clara
SCR	Santa Cruz
SD	San Diego
SJ	San Joaquin
SHA	Shasta
SLO	San Luis Obispo
STA	Stanislaus
SOL	Solano
TEH	Tehama
TRI	Trinity
TUL	Tulare
YOL	Yolo