Regulation and Response at the San Pedro Bay Ports

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Abstract

This report presents a case study of the Clean Air Action Plan. The CAAP was launched in 2006 by the Ports of Los Angeles and Long Beach. It was an unprecedented effort to significantly reduce port-related emissions. We describe events leading up to the CAAP, test hypotheses regarding motivations of the ports, examine the CAAP development process, and analyze outcomes of CAAP. We find 1) the CAAP was a response to social and political pressures that had built up over the previous decade; 2) the process used to develop and implement CAAP restructured both longstanding alliances among ports, shipping lines and terminal operators as well as relationships with regulatory agencies; 3) CAAP provisions reflect regulatory constraints and market power within the supply chain; 4) CAAP has contributed to a landscape of continuous improvement related to air quality. CAAP was successful in reducing port-related emissions more rapidly than would have happened without it, leading to substantial societal benefits. CAAP's impact on the ports' ability to expand capacity has yet to be determined, and its impact on future competitiveness is uncertain.

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CHAPTER 1: INTRODUCTION

1.1 Overview and Research Purpose

In the fall of 2006 the Ports of Long Beach and Los Angeles announced the establishment of the Clean Air Action Plan (CAAP). The CAAP was unprecedented in several ways: it was a voluntary agreement between two competing ports; it was achieved with the cooperation of local, state and federal agencies; it promised large particulate emissions reductions along with continued port growth, and it had an expected price tag of $2.1 billion. An environmental mitigation plan of this magnitude merits study. Does it provide a model for designing effective mitigation policies? This research seeks to understand the motivations of the ports in developing the CAAP, the process of developing the CAAP, the Plan's provisions, and the Plan's impacts on the larger international trade community.

Historically the ports have enjoyed significant independence in part because of the large economic benefits generated from port operations. However, public perceptions of port-related trade have changed dramatically since 2000, primarily due to growing evidence of health damages associated with particulate emissions, traffic congestion, and continued rapid growth in trade volume. Faced with growing public discontent, but limited regulatory authority, state and local political leaders have proposed increasingly aggressive mitigation requirements. The ports, terminal operators, steamship lines, and other stakeholders have responded with both resistance and pre-emptive actions. The CAAP is the ports' response to these pressures. It provides an excellent case study of the change in environmental behavior within the ports, the motivations behind these actions, and outcomes of these policies.

The CAAP is important because it is the first multi-port plan in the nation to collaboratively address the air quality impacts of maritime trade. As a quasi-governmental agency, the ports use of this plan may illustrate opportunities for non-regulatory agencies to contribute to environmental improvement. As the largest ports in the country, the actions of Los Angeles and Long Beach offer a starting point to understand how environmental changes may impact other ports throughout the country and how ports can act to address environmental impacts. The health impacts of port related emissions make it imperative that emissions be reduced. Understanding the behavior of stakeholders within the port-related trade industry is essential for designing effective environmental mitigation policies.

The development, structure and establishment of the CAAP is explored in light of two sets of explanations for the changed policy environment. The first set is aimed at explaining why the Ports chose to take what was a very bold step in environmental mitigation; the second is aimed at understanding the structure and outcomes of the plan. The first set deals with possible motivations, for example social legitimacy: in an era of raised environmental sensibilities, the ports, like other large organizations, conform to changing norms of behavior. Other explanations include regulatory or economic pressures. The second set of explanations addresses outcomes. We hypothesize that the structure and implementation of the CAAP is best explained by the institutional structure of port-related trade, in which outcomes are determined by the relative

market power of different stakeholders within the international trade supply chain. Studying responses to the changed environment in the context of organizational motivations and institutional relationships will lead to a greater understanding of the nature of the port-related trade industry and the challenges associated with adapting to increasingly ambitious environmental goals.

Our research approach is a qualitative case study. We constructed a history of events leading up to the CAAP, conducted open-end interviews with key stakeholder representatives, and reviewed media coverage of the plan development and preceding events. Our report is organized as follows. The remainder of this chapter provides background on two topics that help to frame the events leading up to CAAP. The first is a brief summary of trends that highlights changes in trade patterns and the impacts of trade on the Los Angeles region. The second is a description of the institutional context of environmental regulation. Chapter 2 presents a literature review, and Chapter 3 describes the CAAP. Chapter 4 presents our research approach and methodology. Motivations for developing the CAAP are addressed in Chapter 5, and the CAAP development process is discussed in Chapter 6. Chapter 7 discusses CAAP outcomes and conclusions from the case study.

1.2 Background: Trends In Goods Movement And International Trade

Until the recession of 2008, US foreign trade was on a steep growth trajectory. US total foreign merchandise trade increased from $1.6 trillion to 3.4 trillion (in current dollars) between 1998 and 2008 (Federal Highway Administration, 2009). US total foreign trade as a share of gross domestic product (GDP) increased from 26% in 2000 to 30.1% in 2008, with goods making up nearly 80% of total trade (Bureau of Economic Analysis, 2011). Total shipments in the US as measured by value increased 27% from 2002 to 2008. Most freight transport in the US continues to be domestic (the foreign share is about 15% in 2008), meaning that the increase in goods movement flows in the US is not the result only of increased international trade.

International merchandise trade is relatively concentrated in a few gateways. The top ten gateways account for about 44% of all trade. The Los Angeles region has the largest share (about 11%), followed by the New York region (Federal Highway Administration, 2009). Port related trade is more concentrated. When measured in terms of value, the top five port complexes account for 53% of total waterborne imports and exports. Container trade is even more concentrated; the top 5 container port complexes (LA/LB, NY, Seattle/Tacoma, Savannah, Norfolk) account for nearly 70% of all container trade, and LA/LB alone account for 35%.[1]

1.2.1 Ports, Trade and Market Share

Container trade has followed a trajectory similar to that of total trade, with US container trade peaking at 45 million TEUs in 2007. The global economic recession significantly affected

[1] Data sources: http://www.marad.dot.gov/documents/U.S._Waterborne_Foreign_Trade_by_Custom_District.XLS, http://www.bts.gov/publications/national_transportation_statistics/2008/excel/table_01_47.xls

container trade, which declined to 37.2 million TEUs in 2009.[2] Table 1 gives trends in coastal shares. Shares have been relatively stable over nearly 20 years. The Pacific Coast share peaked in 2005 at 54.8% and has lost market share since to both the Atlantic and Gulf coasts.

Table 1.1: US Container Trade Coastal Market Shares; Source: Calculated by authors from AAPA data

	1990	1995	2000	2005	2007	2008	2009
Pacific	52.6%	51.1%	51.5%	54.8%	54.5%	52.8%	51.3%
Atlantic	42.2%	43.6%	42.9%	40.0%	39.8%	41.3%	41.8%
Gulf	5.3%	5.3%	5.6%	5.2%	5.6%	5.9%	6.8%

Among the west coast ports several changes have taken place. Because coastal competition extends to Canada and Mexico, Figure 1 gives TEU volumes by year, 1999 – 2009, and Figure 2 gives market shares for the same period for all west coast ports. All data are from the American Association of Port Authorities (AAPA). Figure 1 shows that the LA/LB ports dominate west coast container trade, with the Seattle/Tacoma complex in a distant second place with volumes in the 3 to 4 million TEU range, Vancouver and Oakland in the 2 million range, and all others below 2 million. The LA/LB ports had both the greatest absolute increase and decline over the period. With a loss of about 4 million TEUs since 2006 (a loss equivalent to the total volume of the second largest port complex), volumes are down to 2003 levels. Seattle/Tacoma suffered a similar loss in percentage terms, about 25%. These losses have resulted in a loss of market share, as shown in Figure 2. The LA/LB share peaked in 2006, when it reached over 60% of the west coast market. By 2009 its share dropped to 55%. In addition to the overall decline in trade from 2007 due to the global recession, the competitive positions of west coast ports have changed as well.

[2] Calculated from AAPA data, available online at http://www.aapa-ports.org/industry/content.cfm?ItemNumber=900&navItemNumber=551.

Figure 1.1: West Coast Port Container Volumes, 1999 - 2009

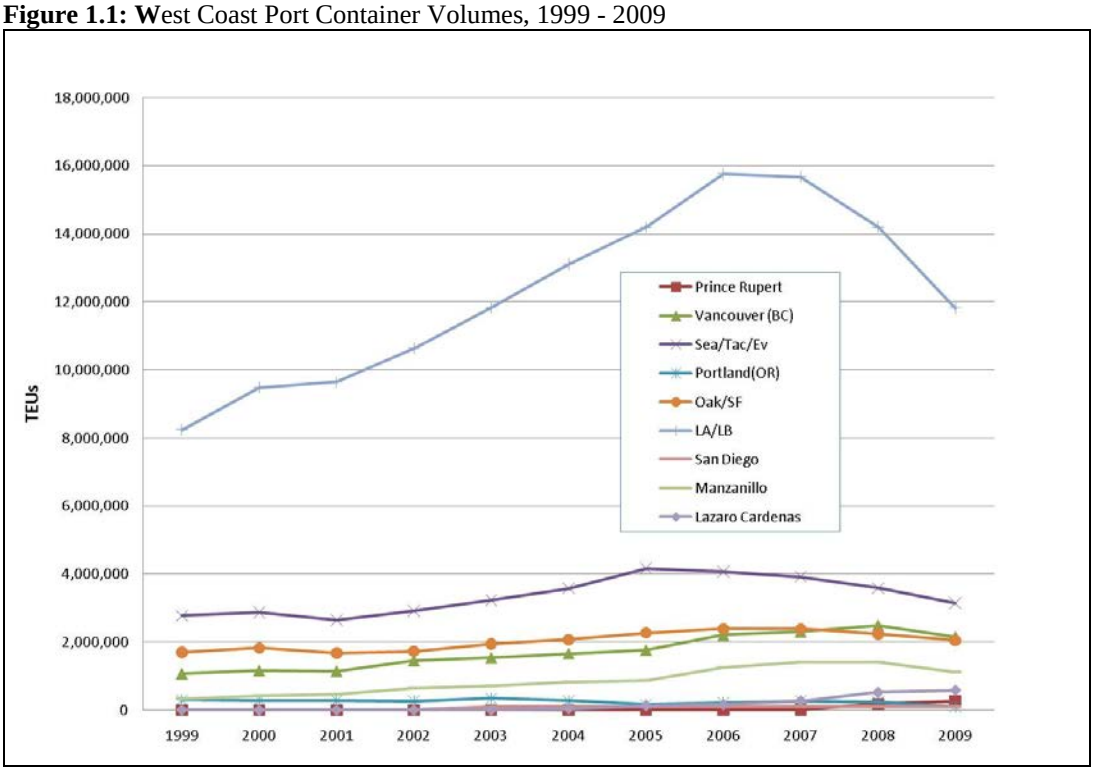
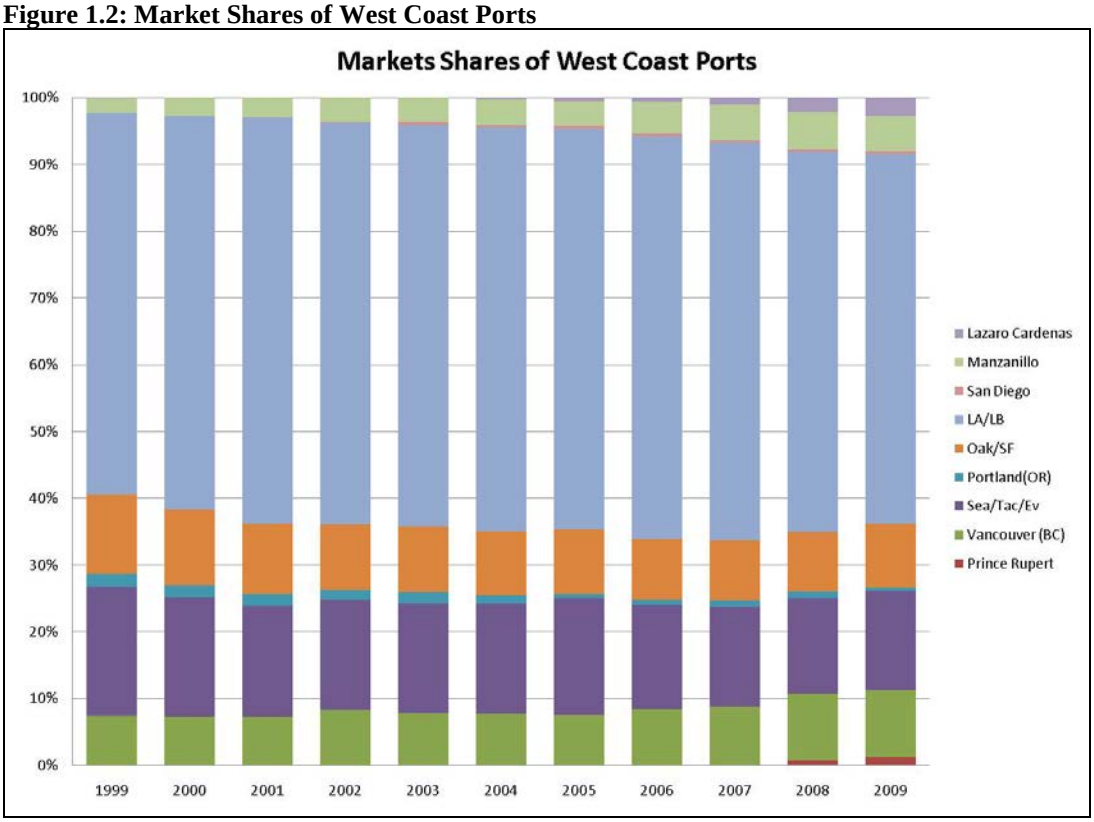


Figure 1.2: Market Shares of West Coast Ports



1.2.2 Impacts on Los Angeles Region

The San Pedro Bay port complex is the 5th largest in the world and the largest in the Western Hemisphere. Growth in trade has generated substantial benefits and costs on local residents. On the positive side, it is estimated that the logistics sector accounts for about 585,000 jobs (1 in every 12 jobs in the region), and provides significant tax revenue to local governments (Chang, 2005). However, these economic benefits come with large external costs: congestion, air pollution, noise, and other impacts on local quality of life. Erie (2004) has observed that international trade creates policy dilemmas because the benefits are dispersed (in this case lower prices for goods and services throughout the US) and the costs are concentrated. The dilemma is particularly strong for local public officials, who are dependent upon trade for tax revenue and economic development, but at the same time must respond to legitimate and increasingly serious citizen concerns.

The most noticeable impact for local residents is trucks on the roads and the congestion associated with them. It is estimated that the ports generate about 35,000 daily truck trips. Heavy-duty truck (HDT) miles in the Los Angeles region (i.e. those trucks with five or more axles) have increased faster than total vehicle miles traveled. The major routes serving port-related trade carry very large HDT truck shares: 12 to 14% of total daily traffic, compared to 2 – 3% for other highways in the region.[3] High volumes of trucks add to congestion problems and contribute disproportionately to incident related delays (Haveman and Hummels, 2004; California Highway Patrol, 2003).

Perhaps the most serious impact of increased trade is air pollution. Five main mobile sources operate at the ports, primarily relying on diesel fuel. Neither the ports, nor the South Coast Air Quality Management District (SCAQMD) have the authority to regulate these sources. Trains are subject to EPA regulation and ocean going vessels (OGVs) are subject to international and to a limited extent federal regulation. Ships use high sulfur content "bunker fuel," the cheapest form of diesel. Adding to the problem are the unique characteristics of the port drayage segment of the trucking industry which has resulted in an older (and dirtier) heavy duty diesel truck (HDDT) vehicle fleet.

Transportation sector emissions have grown at an average rate of about 2% annually (not including international bunker fuels) since 1990 compared to .8% for non-transportation sectors. Furthermore, emissions from trucks and locomotives have grown faster than emissions from cars (US Department of Transportation, 2006). Ships emit some 23 tons of sulfur oxides on a daily basis in Southern California and are responsible for almost 60% of the port's diesel emissions (Hanson, 2006a); the ports as a whole are responsible for some 48 tons of NOx on a daily basis (Hanson, 2006b). The ports' contribution to PM-related pollution in the region is expected to jump from 25% to 42% by 2020 (Hanson, 2006c).

[3] Calculated by the authors from 2002 California State Department of Transportation, District 7 traffic volume data.

1.3 Background: Institutional Context

Emissions in the freight sector have grown as a result of the growth in port-related trade through its peak in 2007. However, freight related emissions are also a growing share of the region's total emissions. This is explained by the historical independence of ports and the fragmented regulatory environment in international trade.

1.3.1 The Independence of Ports

Port operations are chartered under the Tidelands Act, which authorizes the port to conduct activities related to the function of maritime trade. Though a quasi-governmental agency, ports have traditionally had substantial independent authority. They have their own revenue source and a separate governing board, appointed by the mayor. While a certain portion of the ports' revenues must be diverted to the state, the rest must be spent with the sole intention of carrying out port operations. Thus the economic benefit of the ports comes more from the economic activity associated with port activity, not from the revenues of the port itself. Cities desire port growth because of the associated economic benefits of maritime trade including increased employment, sales, hotel taxes and potentially increased property values. For example, the POLB estimates that about one in eight jobs in Long Beach are linked to its trade and related activities.

Economic growth is a powerful incentive for cities and regions to support the port. Indeed, many US ports are subsidized via infrastructure investment, reduced service fees and other means as regions compete for port-related growth. Because of these competitive pressures (or the threat of such pressures), the ports have been able to resist and even bypass environmental requirements. For example, the San Pedro Bay ports faced regulatory pressures in the 1980's when state plans were not in compliance with National Ambient Air Quality Standards. The EPA created a Federal Implementation Plan that focused on the shipping industry. In response, an economic impact study was commissioned which showed that coercive regulation might lead to diversions and therefore negative economic consequences. Eventually, lobbying from elected officials and business groups resulted in an amendment to the 1990 Clean Air Act allowing a smog exemption for California (Erie, 2004). It was not until the rapid port growth of the late 1990s that the long history of isolation from environmental pressures came to an end.

1.3.2 The Regulatory Environment

Ports are a major link in a complex international trade supply chain. Ocean vessels deliver and pick up cargo; cargo is collected, moved, and stacked at terminals. Trains and trucks ship cargo to and from distribution centers, secondary processing facilities, or intermodal yards. Trucks collect and distribute goods within the region, while a combination of trucks and trains serves interstate trade. Thus many different entities and modes of transportation generate the emissions from port-related trade.

Authority over port emissions is shared between the US EPA, the California Air Resources Board (CARB) and the South Coast Air Quality Management District (SCAQMD). The Clean Air Act specifies the division of authority between federal and state agencies, and the California Health and Safety Codes designate authorities between the California Air Resources

Board (CARB) and local Air Quality Management Districts. State authority to regulate emissions comes from the California Health and Safety Codes, which provide authority to CARB to find feasible and cost effective strategies to reduce emissions from all mobile source categories.

a) On-road heavy duty vehicles

The Clean Air Act designates the authority to regulate on-road and off-road vehicles to the federal government, although under certain conditions, the states may set their own standards. Because California had begun to regulate air quality before the clean air act was in place, it has this authority. Under the Clean Air Act section 209(e)(2) California has authority to regulate truck emissions. In order to pass new standards, California must apply for a waiver from the EPA and prove that they are at least as protective of public health and welfare as the federal standards. Additionally the state must show that compelling and extraordinary conditions require stricter provisions, and that the new standards are not arbitrary and capricious.

b) Off-road vehicles and harbor craft

The same CAA section allows California to establish standards for off road engines unless the equipment is under 175 hp and used in construction or farm equipment or if they are used in locomotives or locomotive engines[4]. This provision thus covers cargo handling equipment (CHE) and local harbor craft.

The SCAQMD and CARB have concurrent authority to establish emissions and fuel standards. With special approval, the air district can set fuel standards that exceed the state's. This concurrent authority is limited, however, as the EPA can preempt fuel specifications. Regulations set by the EPA are often not stringent enough for local and state authorities. In September 2006, Catherine Witherspoon, an Executive Officer of the CARB sent a letter requesting the EPA to pass stricter standards for non-road sources including vessels (CARB, 2006).

c) Railroad locomotives

Railroad locomotives on the other hand are regulated at the federal level based on the federal government's authority on interstate commerce. The state may not set engine standards for rail locomotives.

d) Ocean going vessels

Perhaps the largest question of authority surrounding port related air pollution relates to ocean going vessels (OGVs). OGVs may be regulated by state, federal or international authority depending on the flag of origin and the distance of the vessel from shore. The EPA can set vessel fuel requirements and emissions standards, however these only apply to American flagged vessels, and with some limited exceptions, the commercial OGV fleet is not American flagged. All OGVs are primarily regulated under MARPOL[5], an international convention created by the

[4] Section 209(e)(1) states that no state can make requirements for non-road engines under 175 horsepower used in either farm or construction equipment or in locomotives or locomotive engines.

[5] The MARPOL convention is a combination of treaties from both 1973 and 1978 and has since been updated with a variety of amendments.

International Maritime Organization (IMO). The IMO is a specialized agency of the United Nations created in 1948 with the responsibility to develop and maintain a regulatory framework for shipping.

International treaties as well as federal and state laws determine when the IMO regulations are in place and when a nation has the authority to regulate beyond IMO requirements. The lack of clear authority over coastal waters makes it difficult for the state and by extension local authorities to regulate emissions from OGVs. One example of this is the controversy surrounding a recent CARB regulation that set emission limits and requirements for auxiliary diesel engines and diesel-electric engines operated on OGVs as far as 24 nautical miles (NM) off the California coastline. The Pacific Merchant Shipping Association (PMSA) challenged this regulation on the grounds that the CARB did not have the authority to set these requirements. Although PMSA initially won, CARB appealed and the Ninth Circuit Appeals court allowed the regulation to stand during the appeals process because of the urgency associated with addressing the health concerns. CARB has since rewritten the regulation such that it accomplishes the same goals but is more resistant to legal challenges.

The complex and fragmented structure of regulation, together with limitations on authority, restricts the ability of local agencies to control port-related emissions. Because of these constraints, efforts to reduce emissions have taken place through political and legal processes.

CHAPTER TWO: LITERATURE REVIEW

This chapter reviews two streams of literature. The first addresses motivations for voluntary socially responsible behavior by firms, and the second summarizes the recent literature on environmental regulation and outcomes related to ports.

2.1 Explaining Environmentally Responsible Behavior

It was noted in Chapter One that the CAAP is exceptional in many ways. It was a cooperative venture of the two ports. As will be further discussed in later chapters, the ports initiated the concept, were the key players among industry stakeholders and agency leaders, and were the main architects of the plan. What motivated the ports? One explanation is political: they are government entities with boards appointed by local elected officials, and hence were pressured to act. However, although the San Pedro Bay ports are public authorities, they have several private firm attributes: they are financially independent, do not receive public subsidies (unlike many other US ports), and they compete for business both with each other and with other west coast ports. The ports have therefore been described as quasi-public agencies, behaving in many ways like entrepreneurial firms. An increasing number of firms are implementing environmental policies voluntarily; thus the ports may be responding to larger concerns motivating firms more generally. This section reviews theories of environmentally responsible behavior on the part of private firms.

What motivates environmentally responsible behavior in firms? We define environmentally responsible behavior as actions that are not required by regulation, and do not necessarily lead to productivity gains. Examples are pervasive, from Wal-Mart's well publicized efforts in greening its supply chains to Nike's "trash talk" basketball sneaker made entirely of recycled materials. Several explanations have emerged in the literature, including a) social legitimacy, b) social pressures, c) threat of regulation, and d) the business case.

2.1.1 Social Legitimacy

The theory of legitimacy offers a strong explanation for why organizations are increasingly responsive to environmental concerns.[6] Legitimation describes the desire of a firm to improve the appropriateness of its actions within an established set of regulations, norms, values or beliefs (Saltzman et al., 2005). A firm's legitimacy, the resources it can access, and therefore its survival depends upon its ability to conform to "institutionalized norms of acceptability" (Bansal & Roth, 2000, 202).

Salzmann et al (2005) describe legitimacy as either institutional or strategic. Institutional

[6] Many of the motivations for corporate environmental responsibility that will be discussed below could be applied to the larger category of motivations for corporate social responsibility. In particular, the need to respond to stakeholder demands or to preempt further government regulation can be a motivation for product quality, adequate working conditions and worker safety.

legitimacy describes constraints on an organization due to the expectations placed on it. If a firm does not fulfill social expectations, it risks losing customers, business and profits. A decrease in customer loyalty, boycott of products, investor and NGO campaigns, or even law suits may result.

Conversely, strategic legitimacy describes corporate activities aimed at gaining legitimacy, including communication and social and environmental initiatives (Salzmann et al., 2005). Companies manage legitimacy by "(1) conforming to societal expectations, (2) selecting supportive stakeholders and (3) creating new ideas of what is legitimate behavior (Salzmann et al., 2)." By responding strategically to institutional norms, a firm can also improve its access to resources (Bansal, 2005).

Proactive policies that a firm takes towards improving environmental quality could be described as strategic legitimacy. These may be new products, changes in branding, a greater provision of public information, or philanthropic behaviors. Gains in social legitimacy can help a firm acquire a metaphorical "social license to operate," or adequate approval to allow a company to stay in business (Gunningham et al, 2004). Additionally, evidence has found that increasing trust with regulators has contributed to social legitimacy (Howard-Grenville, 2005)

2.1.2 Social Pressures

Social pressures for environmental responsibility are exerted on firms through a diversity of stakeholders. Although regulators can certainly be considered a stakeholder, they will be discussed separately below. Key stakeholders include consumers, other businesses, investors and shareholders. In a for profit firm, consumers are one of the biggest drivers of environmental change since their loyalty and business are easy to lose. Citizen groups, NGOs and other agencies can also influence change, primarily though law suits and local activism. Business parties and competitors such as suppliers and business-to-business consumers may also directly influence the behavior of for profit firms (Esty & Williamson, 2006). Firms may influence each other as well. An organization may choose to imitate the behaviors of others in the same industry thereby minimizing the risk of appearing outside the bounds of normal expectations (DiMaggio & Powell, 1983). Social pressures from community and environmental organizations have been linked with improved environmental behavior in one empirical study (Alberini and Segerson, 2002).

Investors and risk assessors also play a role in changing a firm's environmental practices. Due to increased liabilities, bankers and investors are developing stronger loan criteria that make it harder for environmentally irresponsible businesses to get access to necessary capital. Socially responsible investment programs allow investors to select funds that are more aligned with their particular views. Shareholders may exert influence via voting rights. Advantages to shareholder activism include forcing an organization to respond and generating publicity that might educate other shareholders about issues (O'Rourke, 2003).

2.1.3 Threat of Regulation

When companies go beyond what is legally required by government regulation, their motivations may be to preempt stricter regulation or to gain competitive advantage (Desimone & Popoff, 1997; Schot & Fisher, 1993). Operating beyond compliance can also be a strategy to obtain recognition from government and communities, an improved working relationship with

regulators, access to technical assistance and resources, and lower regulatory transaction costs, such as less routine compliance reporting or streamlined or expedited permitting (Fiorino, 2006). Being proactive with new technology can avoid delays and higher costs (Desimone & Popoff, 1997). Voluntary behavior may also help to set future standards, giving so called "first movers" an advantage. Thus, firms that don't track dynamic regulatory developments will be disadvantaged (Esty & Williamson, 2006).

The desire to preempt or shape regulations can be a strong motivator of environmental responsibility as a strategy (Lyon & Maxwell, 2001; May, 2005). Preemption has been a big factor as firms attempt to shape regulations to create competitive advantage (Barrett, 1991). Preemptive moves on the part of industry can take several forms. They may either preempt stricter regulations, or seek to weaken pending regulations, or manipulate requirements to disadvantage competitors (Lyon & Maxwell, 2001). Environmentally responsible behavior beyond compliance may also be used to gain trust with the regulator and hence result in less severe regulation.

Beyond compliance behavior may also have risks. If a firm demonstrates that more mitigation can be accomplished, the regulatory agency may raise standards accordingly, using the firm as evidence that the previous standards were not sufficiently ambitious. Firms may also invest in technologies or practices in an attempt to capture a first mover advantage, but may lose out to regulations based on different technologies. In addition, firms investing in new technologies may incur higher costs, while later adopters benefit from a now proven technology.

Evidence on whether beyond compliance behavior preempts stronger regulations varies. For example, when the Responsible Care code of conduct was established in 1970 by the American Chemistry Council (then the Chemical Manufacturers Association), 13% of the program standards were based on regulations. However, by 2000, 75% of the program standards were based on regulations. Whether the code became the framework for more regulation, or whether more regulation would have occurred with or without the code is unknown. However, companies who were early adopters of the code were likely well prepared when the code became law (King and Lenox, 2001) The PierPass program at the San Pedro Bay ports is another example of preemptive behavior. PierPass was established by the terminal operators in response to threatened state regulatory legislation. PierPass is described in Section 2.2.2 below.

2.1.4 The Business Case

The business case is explained by gaining profits from new environmental products or markets, or by the potential cost savings of more efficient operations, termed eco-efficiencies. Eco-efficiency considers a life-cycle analysis in product design, reduces the material and energy intensity of goods and services, and enhances recyclability, product durability and use of renewable materials and energy sources (Desimone and Popoff, 1997). Eco-efficiencies increase social legitimacy and enhance the firm's license to operate. There are many examples of companies realizing eco-efficiencies, including Dow and 3M (Hart, 1999; Hoffman, 1999).

Another aspect of the business case is developing new products and markets. Rather than hindering entrepreneurialism, idealistic values can be translated into valuable economic assets

when firms seize new opportunities, create new technologies, get ahead of the competition, reduce inefficiency, and attract new customers(Clifford & Dixon, 2006). A proactive approach towards the environment can increase customer loyalty which could lead to future purchases, new markets and products, and productivity gains.

The existence of a business case for environmental responsibility is widely debated in the literature (King & Lenox, 2001). Corporate environmental efforts may reduce costs by leading to eco-efficiencies, but may also increase costs, because environmental improvements require a high upfront investment. In competitive industries, these additional expenses may result in firms being priced out of the market (Buchholz, 1991). An environmental expense may lead to greater profits or divert resources away from other uses (Russo & Fouts, 1997). Additionally, skeptics question eco-efficiency, asking why these opportunities are just now being acted on and why all firms aren't chasing the same profits (Andrews, 1998).

Vogel (2005) reviews the literature and concludes that corporate environmental responsibility does not increase or decrease competitive advantage. Additionally, Thorton et al (2007) found that the characteristics of the industry being targeted affect the relative importance of factors motivating environmental performance. In a comparison of the likeliness of the trucking industry to adopt greener practices in Texas and California, they found that economic factors were the greatest predictors of performance. Interviews revealed that these so-called eco-efficiency arguments were more relevant to the firms studied than social pressures such as public impression, as would be expected in a highly competitive industry. Finally, when environmental and economic benefits overlapped, firms were more likely to take proactive actions

2.1.5 Interactions between Explanations

Many factors have been identified as incentives for participation in voluntary programs, and much work has been done to better understand what motivates firms. Less research has been done to decouple these explanations from each other, and the plausibility of one explanation over the other is highly dependent on context. External factors such as social pressures, the business climate, the position of a firm within an industry and the firm's relationship to regulatory agencies are examples of the many factors that would impact a firm's motivation for voluntary behavior.

Additionally, these explanations are related. For example, the business case as described here relates to cost savings directly associated with an environmental action. However, all explanations can indirectly influence a firm's ability to thrive. Customers' acceptance of firm behavior can be critical in maintaining market share. Social pressures such as lawsuits can create an economic burden; positive regulatory relationships can potentially reduce compliance costs. Also, social pressures convey a mismatch between societal expectations and firm behavior, which suggests a lack of social legitimacy. Lack of legitimacy can cause protests, lawsuits or boycotts, which may impact a firm's survival. Additionally, opponents may advocate for regulation, hence increasing the threat of regulation and regulatory pressures on a firm. It is thus quite possible that all of these factors could contribute to explaining environmentally beneficial behaviors.

More work is needed to understand these influences in context specific situations, and how

firms perceive program costs and benefits as a way to improve their competitive advantage and their license to operate. All of these explanations are possible in the case of the ports and the CAAP.

2.2 Environmental Issues And The Ports: Explaining Outcomes

The vast freight literature is mainly in logistics, operations research, or transportation economics (e.g., Button and Pearman, 1981; Geunes and Pardalos, 2005; Gunther and Kim, 2005; Chadwin et al, 1990; Ben-Akiva, Meersman and Van de Voorde, 2008). However, the combination of dramatic increases in freight traffic and transportation systems operating at or near capacity has resulted in growing visibility of freight and its role in urban congestion and environmental problems. It is perhaps not surprising that the emerging literature on urban impacts is coming from metropolitan areas where freight is a growing problem, for example Los Angeles, New York and Chicago in the US. Our interest here is on port-related environmental impacts and responses. This literature may be grouped into three categories: studies of impacts, studies of policies or actions aimed at reducing impacts, and studies that explain policy or action choices.

2.2.1 Studies of environmental impacts

There are a growing number of studies that document environmental impacts of port-related trade. The major impacts include local traffic congestion and air pollution. Traffic congestion problems have been extensively documented both nationally and in many regions. The federal government has sponsored several consultant studies that document both rail and highway congestion associated with the major freight nodes and routes (Cambridge Systematics, 2007; USDOT, 2007). These studies show highest levels of congestion in large metropolitan areas where trade is concentrated. Many studies have been conducted to document the need for rail and highway infrastructure expansions. These include studies in New York, California, and Chicago. For example, the Southern California Association of Governments (SCAG) facilitated the Multi-County Goods Movement Action Plan, a multimodal plan for expansion of surface freight transport capacity (SCAG, 2008).

Perhaps the most extensive studies of air pollution impacts have been conducted in Southern California. A USC research team has been conducting long-term health surveys for over a decade. These studies have demonstrated significant relationships between pollution (especially small particulates) and human morbidity and mortality (Coussens, 2004), and have estimated the economic costs of these health impacts (Kunzli et al, 2003). Studies of emissions and pollution concentrations have identified the port complex area as the highest exposure area. (SCAQMD, 2000). Zhu et al (2002) showed particle concentrations to also be very high in close proximity to freeways. Health impacts along freeway corridors were also documented in a study of Seattle and Portland (Bae et al, 2007). These studies played an important role in mobilizing demands to reduce diesel emissions. Impacts of port-related pollution have also been documented in the New York region. Lena et al (2002) document high volumes of truck traffic in low income neighborhoods near the Ports of New York and New Jersey. They calculate estimates of emissions, and conclude that low income residents experience higher exposure levels. Studies in the Houston area showed that the highest cancer risk from air pollution was

along the ship channel through Galveston Bay (Linder, Marko and Sexton, 2008)

2.2.2 Studies of policies aimed at reducing impacts

Rising congestion and air pollution concerns have motivated a variety of efforts aimed at reducing truck traffic. These include operational changes to increase efficiency and reduce truck travel, as well as strategies to shift freight to other modes, e.g. rail or water.

Rail is generally more competitive for moving cargo long distances, yet for shorter distances, trucking offers flexibility and can take cargo all the way to its final destination. Both Los Angeles and New York have plans to increase the rail modal share by investing in on-dock rail. There has been no independent analysis of the extent to which mode share would change as a result of such investments. Short sea shipping is aimed at using coastal shipping, and in some locations, river shipping, for distribution from major port hubs. Feasibility studies of short sea shipping have been conducted for Southern California and Northern California. A short sea demonstration was conducted by the PANYNJ.[7] Short sea shipping is not competitive with trucking based on time and transport costs (Le-Griffin and Moore, 2006), but when external costs of pollution are taken into account, short sea shipping has lower social costs (Banister and Berechman, 1999; Berechman, 2009).

Examples of operational changes that increase the efficiency of the supply chain include "virtual" container yards and chassis pools. Virtual container yards (Chang et al, 2006; Davies, 2006) allow truckers to locate an empty container close to the site where they have an import drop-off, thereby eliminating a non-revenue trip to a terminal where empties are typically stored. Chassis pools seek to share chassis, again to reduce non-revenue travel. Logistics studies demonstrate that truck travel would be reduced by such changes. However, organizational and institutional barriers (largely the ownership structure of containers and chassis) have to date prevented implementation.

Another set of strategies addresses port operations. Gate appointments allow truckers to make a scheduled pick-up or drop-off, which should reduce queuing at terminal gates (Giuliano and O'Brien, 2006; Namboothiri and Erera, 2007; Yahalom, 2001). Giuliano and O'Brien (2006) conducted an analysis of the state regulation AB 2650, aimed at reducing diesel truck emissions. It imposed a penalty of $250 on terminal operators for each truck delayed more than 30 minutes waiting to enter the gate. Terminals that operated gates 70 hours per week or offered trucks an appointment system to pickup or deliver cargo were exempt. The legislation had limited impact. No terminal at the ports of Long Beach and Los Angeles extended its hours of operation in response to the legislation; all but one terminal implemented an appointment system, and there were no measurable changes in truck queuing or pickup and drop-off transaction times as a result of the regulation.

Extending the hours of operation for terminal gates allows for truck traffic to be spread across more hours and days. Although a seemingly obvious solution for congestion and queuing at terminals, there are few examples of extended gate hours at North American ports. Ports that do have extended gate operations typically use them only for specific customers. A study on the potential for off-peak freight deliveries in the Manhattan and Brooklyn areas considered how

[7] Source: Author interviews at PANYNJ, November 2008.

operational changes would impact costs for shippers and receivers (Holguin-Veras et al, 2006). Interview research revealed several cases where off-peak deliveries resulted in increased productivity for shippers. The impacts of a greater number of customers requesting off-peak deliveries depended on the distance and travel time to the first stop. The study also showed that receiver costs likely increase in the off-peak, primarily due to labor costs.

The LA/LB ports now operate full scale extended gates which allows for pick-ups and deliveries to occur outside traditional hours.[8] The program, known as PierPass, assesses a Traffic Mitigation Fee (TMF) on eligible containers moved into and out of the ports during regular daytime hours. The PierPass program resulted in a significant temporal shift of cargo moves at the ports. Giuliano et al (2008) examined the effects of this shift on heavy truck traffic. They found that the redistribution of port cargo moves is reflected in hourly patterns of heavy truck traffic volumes on the major highways serving the ports. Using a traffic simulation model, they estimated PierPass effects on highway system performance for various weekday time periods. A shift of truck traffic out of daytime and into evening hours has resulted in little change in the level of peak period traffic volume, and hence in the level of congestion, despite significant growth in container volumes since PierPass was implemented. They conclude that the goal of reducing congestion (and hence diesel emissions) has been achieved.

Finally, Linder (2010) examined the impacts of the vessel speed reduction program at the LA/LB ports as an example of voluntary regulation. In 2001 an MOU was signed between the ports, PMSA and several regulatory agencies, establishing a voluntary 20 nautical mile speed reduction zone on approach and departure from each port. Vessel emissions are proportional to speed, so the MOU requested that vessels slow down as they approached the shore, thereby reducing emissions in the area where they would have the greatest impact on communities. In 2002, the first full year of the program, the participation rate, measured as the percentage of trips that complied with the lower speed, was 25% at each port. However, in 2005 and 2006, the Port of Long Beach initiated several incentives to further encourage participation in this program. Interestingly, though the incentives were only offered by the POLB, participation at both ports rose in these years. By 2007, participation was 85% at POLB and 81% at POLA. The success of this voluntary program suggests that the external pressures on the ports to reduce their emissions were felt by the industry as a whole causing an increase in participation even without incentives. In the 20 nautical mile zone, emissions reductions attributable to the program were estimated to be between 42% and 48% depending on the pollutant, compared to emissions had vessel speeds not been reduced.

2.2.3 Explaining outcomes and choices

Most relevant to our examination of CAAP are studies that examine motivations for strategy choices or seek to explain policy outcomes. Doig's comprehensive history of the Port Authority of New York and New Jersey (2001) describes the critical role of organizational structure (the still unique two state authority) and public entrepreneurs that garnered the support and resources to develop the authority as a large and powerful public entity. Erie (2004) has studied the LA/LB ports from the perspective of public infrastructure investment, arguing that development of the ports was part of a larger regional development strategy based on major

[8] As part of the PierPass program, most terminals now operate weeknight (Monday – Thursday) shifts from 6PM – 3AM.

infrastructure development.

More recently, Erie and MacKenzie (2010) use a governance framework to examine trends in infrastructure investment and management in Southern California. They argue that while municipal agencies and joint powers authorities have operated effectively in the past, this is no longer the case. There is a growing lack of consensus regarding where major infrastructure investments should be located, how they should be financed, and how environmental impacts should be addressed. Management of municipal agencies (including the ports) has become more politicized, and hence agreement on any issue becomes more difficult. Erie and Mackenzie see the ports' problems as being subject to increased political pressure that has forced a focus on environmental mitigation rather than on planning and investment for continued growth. Term limits, fiscal problems, and super majority voting requirements in a fragmented governance structure are suggested as explanatory factors.

Giuliano and O'Brien have offered explanations for both the results of AB 2650 and the PierPass program (Giuliano and O'Brien, 2007; 2008). Outcomes of AB 2650 were explained in the context of the economic and institutional structure of the international trade supply chain. Terminal operators chose to implement an appointment system because costs were far less than offering extended gate hours, and because the risks of non-compliance were small. Limited use of appointments on the part of trucking companies is explained by the way appointment systems worked. An appointment did not assure timely processing of the transaction, and hence did not reduce transaction durations. Although AB 2650 had limited impacts on port operations, it was more significant as a signal to port interests that their operations were no longer beyond the bounds of public intervention. It therefore set the stage for the PierPass program.

Giuliano and O'Brien argue that the case of PierPass is an example of self regulation that originated in response to a regulatory threat in the San Pedro Bay ports context. As a result of increased cargo volume, there was a need to reduce congestion and truck idling associated with terminal operations. In 2004, the legislature passed AB 2041. This bill would have authorized a charge for cargo moved between peak hours of 8AM and 5PM and the fee would be spent on congestion mitigation projects for freight. Almost immediately after this passed, terminal operators petitioned to the Federal Maritime Commission for permission to collaborate on and develop an off peak program. They established a non-profit called PierPass Inc to collect a Traffic Mitigation fee for all cargo processed between 8AM and 5PM Monday through Thursday. AB 2041 was withdrawn as a result of this program. By establishing their own program, the terminal operators maintained greater control over their operations and were able to keep the fee charged for their own use.

A few papers have used comparative case studies to understand policy choices and outcomes. Woudsma, Hall and O'Brien (2009) explore the role of stakeholder collaboration in the adoption of environmental innovations in port gateways. They compare the port of Vancouver, British Columbia, and the twin ports of Los Angeles and Long Beach (LA/LB), California. They consider environmental innovation as a new arena for port competition, because ports will be under growing pressure to reduce local environmental externalities. The challenge is how to adopt and implement innovations, given the constraints and complexity of the logistics supply chain and its associated stakeholders. Their research suggests that successful implementation requires the leadership of key public and private organizations, as well as

effective mediating factors (e.g. incentives, information, trust among stakeholders). They also suggest that collaboration among stakeholders is essential.

Giuliano (2010) examines programs to reduce landside congestion at two US west coast port complexes, Los Angeles-Long Beach and Seattle-Tacoma. The programs focused on grade separations to reduce conflicts between rail and highway traffic. Her comparison suggests that the Seattle program has been more successful. Differences in outcomes are explained by both institutional and contextual factors. The Seattle region is smaller, its environmental problems are less severe, and although its governance structure is quite fragmented, the regional planning agency plays a leadership role, and in this case fostered consensus building for the program among both local jurisdictions and industry stakeholders. In contrast, impacts in the Los Angeles region extend throughout the region. While Los Angeles and Long Beach may be motivated to respond to local concerns, they have little incentive to solve problems beyond their boundaries. In a vast and fragmented region, Giuliano found that none of the stakeholders had sufficient incentive to negotiate a consensus solution.

CHAPTER THREE: THE CLEAN AIR ACTION PLAN

This chapter describes the CAAP and its main provisions. The purpose of the Clean Air Action Plan is to reduce port-related emissions by nearly half within five years, far beyond what would be achieved by existing and planned federal, state and local regulation standards. Specifically, the CAAP seeks to reduce PM by 47%, NOX by 45%, and SOX by 52% from 2005 levels (POLA and POLB, 2006). The CAAP, officially passed in 2006, is a five year plan. Outcomes of the plan were to be evaluated at the end of the five years, and in 2010 a CAAP updated plan was established.

The CAAP is organized around the primary emissions sources at the ports, including heavy duty vehicles, (HDV, trucks), ocean going vessels (OGV), cargo handling equipment (CHE), harbor craft, and rail. Additional commitments include an update of port wide construction standards, the Technology Advancement Program (TAP), and an Infrastructure and Operational Efficiency Improvements Initiative[9]. The TAP includes a budget to test and implement new emissions reduction technologies related to various emissions sources. Because of our interest in the relationships between the ports and different pollution sources, this report will focus on the control measures.

3.1 CAAP Measures

The CAAP has 13 source specific control measures. We describe them by mode.

Heavy Duty Trucks: HDVs account for 10% of DPM, 26% of NOX, and 1% of SOX as compared to other port sources (POLA and POLB, 2006). The CAAP seeks to greatly reduce diesel emissions.

- *HDV1 – Performance standards for on road HDVs*: By 2011, frequent and semi-frequent callers will meet or exceed 2007 EPA diesel on road PM standards (.01 g/bhp-hr)
- *HDV2 – Alternative Fuel Infrastructure for heavy duty natural gas vehicles:* Ports would jointly construct an alternative fuel station (CNG or LNG) and maintenance facility on Terminal Island

Ocean Going Vessels: OGVs account for the largest share of the ports' emissions: 36% of NOX, 59% of DPM and 90% SOX emissions, (POLA and POLB, 2006) as OGVs are not subject to US national fuel standards.

[9] $5 million is budgeted for this measure. The following are listed as part of this measure: Focus on on-dock vs. near-dock rail infrastructure, grade separations, optical character recognition (OCR) gates at terminals, terminal cargo handling/configuration efficiency improvements, radio frequency identification cards (RFID), virtual container yards.

- *OGV1 – VSR Compliance*: 100% compliance with Vessel Speed Reduction program (VSR) for both 20nm and 40nm distances
- *OGV2- Shore power*: Shore power or equivalent in all container and cruise terminals and selected liquid bulk terminals at POLA within 5 years, and at all container terminals and one crude oil terminal at POLB in 5-10 years.
- *OGV3- Auxiliary Engine Fuel Standards*: Use of .2% or less sulfur marine gas oil in auxiliary engines, initially to 20nm and eventually to 40nm
- *OGV4 – Main Engine Fuel Standards*: Use of .2% or less sulfur marine gas oil in main engines, initially to 20nm and eventually to 40nm
- *OGV5 – Engine emission control devices*: Engine emissions reductions through different DPM and NOx control devices. This measure is coupled with the TAP to test and implement emissions reduction strategies. For example, the use of slide valves has already been implemented on several vessels to reduce NOx emissions

Cargo Handling Equipment: CHEs include vehicles that load and unload cargo from ships on to truck and rail and move cargo on the docks.

- *CHE1 Performance Standards for CHE*:
    - By 2007 all purchases will meet a .01g.bhp-hr PM by either purchasing the cleanest available NOX alternative fueled or diesel fueled engine, or by purchasing a different engine and then installing Verified Diesel Emissions Controls.
    - By 2010 all yard tractors will meet minimum EPA 2007 on road or Tier 4 standards.[10]
    - By end of 2012 all pre 2007 or pre Tier 4 top picks, forklifts, reach stackers, RTGs, and straddle carriers <750hp will meet at minimum the EPA 2007 on road or Tier 4 off road standards.
    - By end of 2014 all CHE with >750hp will meet EPA Tier4 off road standards. Starting in 2007, all CHE will be equipped with a CARB verified diesel emission control as an interim measure.

Harbor Craft: Harbor craft include tugboats, commercial fishing vessels, crew boats, excursion vessels, and work boats. Recreational vessels are generally excluded from this classification.

- *HC1 Performance Standards for Harbor Craft*:
    - Within 2 years all harbor craft will meet EPA Tier 2 standards.
    - Within 5 years, all previously repowered harbor craft will be retrofit with most effective CARB verified NOx and PM reduction technologies.
    - Within 5 years of becoming available Tier 3 engines will be installed.

Railroad Locomotives: Railroad locomotives include the Class I operators who serve the ports and the on and near dock switch engines used to form trains.

[10] The EPA releases standards for off-road engines, requiring cleaner engines to be phased into fleets by a certain time. Tier 4 represents the cleanest engine standard required to date, a significant reduction of PM and NOx as compared to Tier 0, 1, 2 and 3 engines.

- *RL1 PHL Switch Engine Modernization*: Implementation of a previous agreement where all Pacific Harbor Line[11] (PHL) engines will be replaced with Tier 2 engines, equipped with 15 minute idling limit devices, retrofit with either Diesel Oxidation Catalysts (DOCs) or Diesel Particulate Filters (DPFs), and will use either emulsified or alternative diesel fuel. All new engines will meet EPA Tier 3 standards.
- *RL2 Existing Class 1 Railroad Operations:* By 2011 all switcher and helper locomotives entering the ports will be 90% controlled for PM and NOx. Additional idling restrictions and fuel requirements (Ultra low sulfur diesel) may be imposed.
- *RL3 New and Redeveloped Rail yards*: Sets standards for any new or redesigned rail yards to include the cleanest available technologies, use idling limit devices, exhaust hoods, use of cleaner fuels, and have only clean CHE and HDV in use.

Although the control measures described above are similar in that they either require engine or fuel upgrades or other operational changes, the strategies for implementing each measure vary greatly. The most ambitious measures relate to HDV and OGV. The measures for HC and CHE are equipment based, while some of the truck and OGV measures require capital investments in alternative fueling infrastructure for trucks and shore side electricity for vessels. As described further below, the financial investments in the HDV and OGV measures are the largest share of the proposed budget.

The expectation is that these measures will greatly reduce emissions. The estimates given in the CAAP for anticipated emissions reductions were 61% for HDV, 40% for OGV and 15% for CHE. These estimates show the percent reduction that would be realized in 2010 compared to the 2005 baseline after accounting for the benefits of any relevant regulations. Emissions estimates for rail and harbor craft were not provided. Though regulations for CHE and OGV were considered in determining these estimates, the CARB drayage truck rule had not passed at the time of the document and was not factored in to the calculation. Since the drayage truck rule would also contribute to emissions reductions, the percentage reductions calculated in the CAAP would appear less significant than if the baseline was calculated with the regulations in place.

3.2 Costs of CAAP

The list of control measures and allocation of costs was the result of a long negotiation process, as will be discussed in Chapter Six. The total expected cost of CAAP is estimated to be about $2.1 billion (2006 dollars). Table 3.1 shows costs by year and by control measure. By far, the most costly measure is HDV1, often referred to as the truck replacement program or the Clean Truck Program (CTP), at about $1.8 billion, accounting for nearly 90% of the total cost. The CTP calls for replacement of the entire fleet of drayage trucks serving the ports, which number about 7,000 “frequent trucks” and 9,800 “semi-frequent trucks (based on 2005 emissions inventory data). The next most costly measure is roughly one tenth the cost, $179 million for

[11] Pacific Harbor Line provides rail services including transport, dispatching and maintenance for the Ports of Los Angeles and Long Beach and provides switching service to on-dock intermodal terminals.

OGV 2, alternative marine power. Several measures are listed as having zero costs, meaning that the costs will be incurred by the equipment owner (the steamship line, terminal operator, or railroad). The CAAP provides no information on these costs. There is also a line item of $12 million for China Shipping. This refers to the POLA settlement over the China Shipping terminal expansion project.[12] Specific use of the funds is not specified. The actual settlement was over $60 million and was to be used for cargo handling equipment retrofits, terminal electrification, and other emissions reductions strategies. The CAAP describes the $12 million as contributing to the Air Quality Mitigation Improvement Program (AQMIP), technology testing, and as a catch all for improvements in San Pedro and Wilmington.

The CAAP anticipates spending about half a billion dollars each year after the first year. What is the source of funds? Only a small portion will come from the two ports: 8.6% (about $178 million) from the POLA (including the $12 million from China Shipping settlement), and 11.6% (about $240 million) from the POLB including funding for infrastructure related to shore power. The SCAQMD will contribute 2.3% ($48 million). The source of funding for the remaining 77.5% is not specifically identified. The plan identifies impact fees and funds from bond measures as the most likely sources. Additionally, not all of the funding is newly dedicated for the CAAP. For instance, the ports would be required to finance some cold ironing infrastructure regardless of the CAAP due to the CARB regulation, and much of the funding for rail comes from a previously agreed upon MOU with PHL. In this MOU, the ports agreed to help fund PHL's transition to cleaner operating switch engines and locomotives. It also includes provisions for technology testing. The POLA has committed $16 million of the $21 million budget for this MOU, with POLB paying the remainder.

[12] See Chapter 5.

Table 3.1 Clean Air Action Plan Total Expected Costs by Control Measure & Initiative by Fiscal Year, (POLA and POLB , 2006, Table 7.5, p 172)

Total SPBPCAAP Funding	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Totals
SPBP-HDV1	44,000,000	474,600,000	458,300,000	414,000,000	414,000,000	1,804,900,000
SPBP-HDV2	2,000,000	2,000,000	0	0	0	4,000,000
SPBP-OGV1	5,100,000	4,400,000	4,400,000	4,400,000	4,400,000	22,700,000
SBP-OGV2	21,500,000	30,100,000	37,500,000	42,700,000	47,300,000	179,100,000
SPBP-OGV3	0	0	0	0	0	0
SPBP-OGV4	0	0	0	0	0	0
SPBP-OGV5	0	0	0	0	0	0
SPBP-CHE 1	0	0	0	0	0	0
SPBP-HC 1	0	0	0	0	0	0
SPBP-RL1	15,500,000	5,500,000	0	0	0	21,000,000
SPBP-RL2	0	0	0	0	0	0
SPBP-RL3	0	0	0	0	0	0
Tech Advancement Program	3,400,000	3,000,000	3,000,000	3,000,000	3,000,000	15,400,000
Infra/Op	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	5,000,000
POLA China Shipping	6,000,000	6,000,000	0	0	0	12,000,000
Admin	800,000	800,000	800,000	800,000	800,000	4,000,000
FY Totals	**99,300,000**	**527,400,000**	**505,000,000**	**465,900,000**	**470,500,000**	**2,068,100,000**

3.3 Observations on the CAAP

The CAAP is also interesting for what it does not include. First, although there is a goal for overall reductions, estimates of reductions by source are given only for HDV, OGV, and CHE. Second, neither the full costs nor the sources of all funds required to implement the CAAP are presented. Third, there is no cost/benefit analysis, or analysis of the cost effectiveness of the

selected control measures. We were unable to obtain more detailed information from either of the ports. The absence of cost effectiveness measures and the omission of costs expected to be incurred by private parties suggests that cost effectiveness was not one of the critical criteria in developing the CAAP.

Fourth, while the ports were the leaders and architects of the CAAP, they committed to fund only a small portion of the plan, leaving the bulk of the costs to be funded either by the general public via bonds, through grants or public incentive money, by beneficial cargo owners via container fees, or by private industry through other means such as lease negotiations. Arguments can be made to justify allocating costs in this manner. The benefits of reduced emissions are largely realized by local residents through reduced morbidity and mortality risks, and much of the demand for traded goods going through the ports is among consumers and producers in Southern California.

Fifth, the emphasis of the plan is not consistent with the greatest sources of pollution. For example, the clean truck program is by far the major component of the CAAP, yet HDVs constitute a much smaller source of emissions than OGVs, as noted above. This suggests that prioritization of CAAP measures was based on many factors, including the ability of the ports to influence various stakeholders outside of the regulatory environment.

Finally, while the CAAP is clearly an action plan, some measures have alternative implementation scenarios, reflecting the lack of consensus on these items at the time the plan was adopted. It was also subject to sunset in 2010, with continuation contingent upon analysis of the plan's effectiveness.

CHAPTER FOUR: RESEARCH APPROACH

Our research on the CAAP addresses two main questions. First, what motivated the ports to join together and agree on a five year plan of ambitious and costly environmental mitigation? Second, how might the process of developing the plan and its structure be explained? These questions require a comprehensive case study approach, drawing data from many sources. The data are mostly qualitative: stakeholder interviews, media reports, event histories, etc. This chapter describes our research approach and data sources.

4.1 Port Motivations

We have shown in previous chapters that the CAAP was developed at a time of rapid growth of port activity and rising local public opposition to the negative externalities of that growth. These conditions could have led to various port responses, yet the ports decided to collaborate in a voluntary effort that we describe as a form of self-regulation. The CAAP committed the ports to specific actions, but they had no legal authority to require actions from other industry stakeholders. The ports were the originators and primary architects of the plan. They initiated the concept and determined who participated. Regulatory agencies participated in the plan development process, but the plan contained no formal agreement with them. CAAP may therefore be best described as an example of voluntary self-regulation. Our hypotheses to explain this choice, stem from the four theories from the literature on private firm behavior that were described in Chapter Two.

4.1.1 Social legitimacy

In this case, social legitimacy would refer to changing expectations regarding how the ports should behave and what they should deliver to the local community. In the past, the ports were viewed primarily as economic engines that generated jobs and economic growth to the community. It might be argued that expectations have changed, and the ports are now expected to also clean up the air and reduce local traffic congestion. In addition, data on the health impacts of small particulates has increased awareness of health damages, generating an expectation that the problem has to be solved.

Changing expectations may be demonstrated by statements of political leaders and community leaders, as well as by lawsuits and other actions aimed at preventing the ports from operating as they have in the past. Without maintaining their social legitimacy, the ports risk losing their "license to operate;" they risk losing the political support needed to sustain operation. In a period of rapid growth, expanding capacity is a major concern for the ports, and the ports might be willing to make big changes in order to be able to proceed with expansion projects.

4.1.2 Social Pressures

Social pressures for environmental responsibility may be exerted on the ports from many stakeholders, including local political leaders, clean air advocates, citizen groups, or even port labor. The ports have been under increasing scrutiny since the China Shipping lawsuit in 2001, which set a precedent for mitigation requirements. Environmental advocacy organizations have scrutinized every project EIR, successfully delaying new expansion projects from going forward. The CAAP could be interpreted as a response to these pressures, showing that the ports

recognized the seriousness of the small particulate health problem and were taking a leadership role in doing everything possible to reduce pollution as quickly as possible.

4.1.3 Regulatory threat

As discussed in Chapter Three, the CAAP goes far beyond existing and planned regulatory requirements for emissions reductions. The CAAP may be an effort to pre-empt even more stringent regulation. The SCAQMD has targeted trucks, the railroads, and even ships. The agency has responded to successful legal challenges by changing tactics and trying again. At the same time, there have been many attempts to legislate various regulations on port operations and fees to pay for them.

It is also possible that the CAAP is aimed at setting standards that other ports will eventually have to meet as well, giving the ports a market advantage. By showing that great reductions in emissions can be accomplished, the ports are raising the bar for everyone else.

4.1.4 Business case

The final explanation for environmentally responsible behavior is based on the potential cost savings of more efficient operations. The CAAP may provide an opportunity for the ports to increase market share by attracting customers and clients who want a green port. Alternatively, the ports may have discovered a way to reduce costs by embracing eco-efficiencies, or environmental behaviors that simultaneously reduce costs.

The business case explanation is weaker than the others. A motivation for eco-efficiencies does not explain a joint agreement. Given that the ports are competitors, it would be more likely for the ports to try to "out green" each other, with each claiming to be greener than the other in order to capture more customers. This explanation also relies on the ports' customers seeking to do business with a green port. Ports compete on price and service, and cargo owners may not even know which port the shipment will travel through. We therefore do not expect business case considerations to be a major explanatory factor.

In addition to these hypotheses, it is also possible that the ports are taking these actions because of a moral imperative, given the scientific evidence of pollution impacts on human health that has become available in the past decade. For example, when the Green Port Policy was released, a Pulse of the Port video advertised Harbor Commissioner Doris Topsy-Elvord claiming that these actions were "the right thing to do," and Harbor Commissioner Mario Cordero describing the Green Port Policy as a "new ethic." (POLB, 2005) If a moral imperative was in fact driving the change in behavior, we would be required to ask, "why change now?" This would lead us back to our original question of what motivated the CAAP and an examination of the hypotheses described above. Additionally, such statements are consistent with the social legitimacy hypothesis. Table shows our hypothesis and possible evidence that could support each explanation.

Table 4.1 Explanations and possible evidence

Explanation	Evidence
Social legitimacy	Changes in public expectations and perceptions of Ports' roles and responsibilities and their responsibility for environmental externalities; port strategies to increase or achieve legitimacy
Social pressure	Advocacy group engagement, community mobilization, negative press, legal challenges to Environmental Impact Reviews on major capital projects
Threat of regulation	Legislative proposals. political discourse, regulatory agency efforts
Business case	Cost savings, customer preferences

4.2 Explaining Processes And Outcomes

The second set of questions in this research deals with the specifics of the CAAP: who decided what was included in CAAP, who participated in the development of CAAP, and how are the benefits and costs of CAAP distributed?

4.2.1 Actors and market power in the supply chain

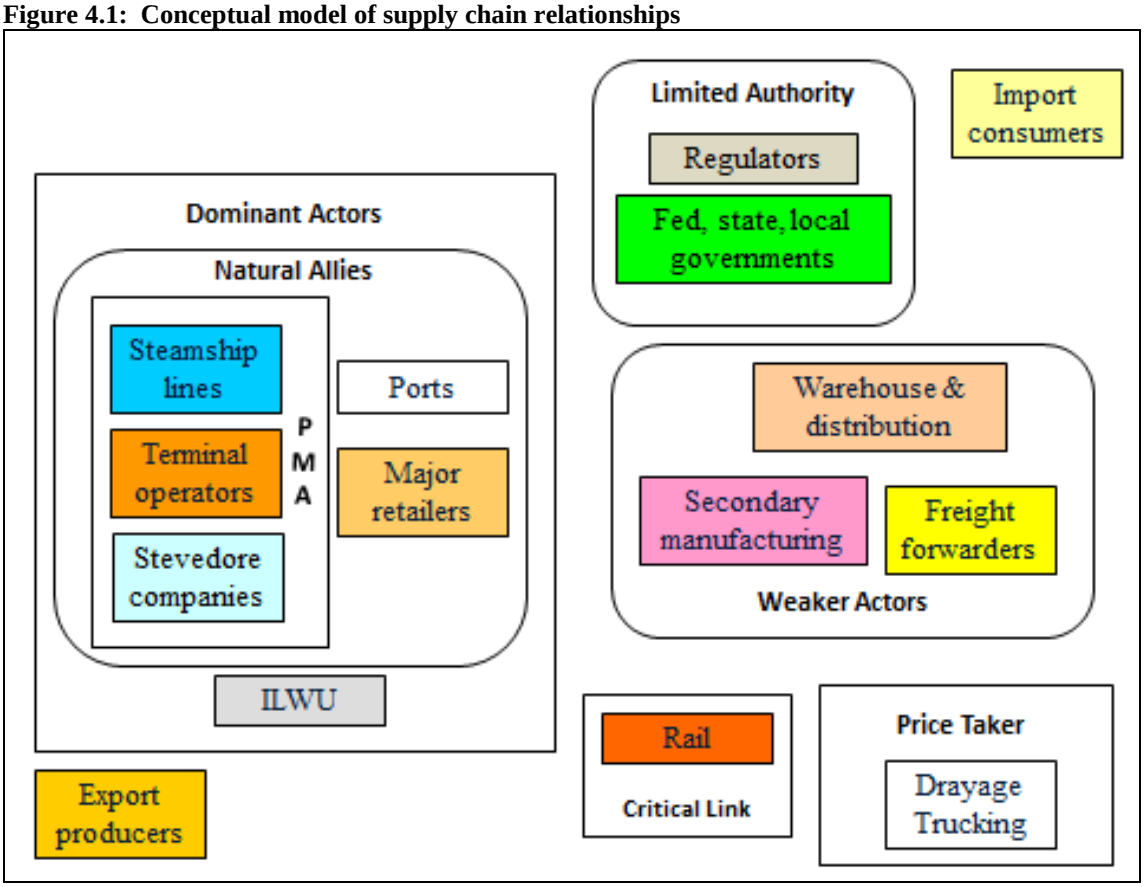
Following Giuliano and O'Brien (2008), we use a political economy framework to explain CAAP outcomes. Giuliano and O'Brien argue that institutional relationships and market power play a significant role in port-related trade. A set of "dominant actors" – ports, terminal operators, steamship lines, major retailers, and the ILWU – influence port operations, labor relations, and responses to regulatory and other threats. All but the ILWU are "natural allies", given their common interest in growing their businesses. For the port actors, this means efficient operations, profits and price competitiveness. A stylized model of these relationships is illustrated in Figure 4.1

There are many linkages between these allies, and they collaborate via trade associations and advocacy groups. In addition, federal maritime regulatory policy allows for cooperation among terminal operators for certain purposes, and for cooperation among ocean carriers in pricing within trade lanes. Major retailers are prime clients because of the volume of their business. They have influence on operations, as they can threaten to move elsewhere should prices rise or service quality decline. By virtue of its control of the longshore labor force, the ILWU has significant influence on port operations. One measure of ILWU power is the wages and benefits of its members; longshore labor is among the highest paid of all low or medium skill labor.

At the other end of the spectrum, the drayage trucking industry displays no market power. Its owner operators are among the lowest paid in the trucking industry, in stark contrast to the wages of ILWU workers (Monaco and Grobar, 2004; Monaco and Burks, 2011). Prior to CAAP, drayage truckers operated the oldest and therefore most polluting trucks. Unlike the terminal

operators, drayage truckers are subject to anti-trust prohibitions and have been unsuccessful in organizing for better working conditions or higher pay.

Figure 4.1: Conceptual model of supply chain relationships



Given these differences in market power and potential to cooperate, we expect differences in both the extent to which these stakeholders participated in the process, and in how they were affected by the CAAP provisions. With regard to participation, we expect that the dominant actors participated more than weaker actors. The ports would be less inclined to include stakeholders who had little ability to influence port business or garner political support, and more inclined to include those who did. Similarly, the ports would likely be more sensitive to costs of the CAAP that are imposed on the dominant actors, and less sensitive to those imposed on weaker actors. Thus, we would expect the most stringent and costly measures imposed on the weakest actors, namely the drayage truckers.

4.2.2 Role of regulatory agencies

Another group of actors to be considered is the regulatory agencies, SCAQMD and CARB. Because they have regulatory authority, we expect that they have a dominant role as well. Both agencies have plans that identify targets in emissions in future years, and one logical strategy for the CAAP is to simply accelerate reaching these targets. Also, if in fact regulatory pressure is a motivating factor, then the ports would want to negotiate with these agencies to preempt more stringent regulations. The agencies clearly have motivation to be actively

involved, given their responsibility for compliance enforcement.

The regulatory framework also plays a role in CAAP. Regulatory authority differs across pollution sources, as described in Chapter 1. Only American flagged ocean going vessels are subject to EPA engine standards, and international treaties to address vessel pollution must be ratified on the federal level. Railroads are subject to national regulation. Thus emissions reductions from these sources must rely on voluntary strategies. We expect that the extent to which these sources are targeted in the CAAP is related to their market power. Thus for example railroad engine improvements are listed as a cost in the plan, because the railroads have no incentive to incur these costs, and the ports have no ability to coerce them into doing so. Ocean shipping lines may be more inclined to cooperate, given the close working relationships among the dominant actors.

4.2.3 Alternative hypothesis: CAAP development as objective process

Our discussion so far has focused on motivations and outcomes based on political and power relationships. There is an alternative hypothesis: the CAAP was the result of an objective analysis of alternative strategies. This would involve some form of cost-effectiveness analysis of each alternative measure to generate a dollar value per ton of pollutant removed. Strategies would be ranked based on cost-effectiveness, technical feasibility, etc. As noted in Chapter Three, we were unable to obtain any documentation of such an analysis. We therefore do not expect that technical analysis played a significant role in development of CAAP.

4.3 Methods and Data

This research is a qualitative case study relying on empirical, qualitative methods. Qualitative research relies on comprehensive documentation, multiple sources of data, and a careful case study design. In this case, substantial background information has been accumulated from previous research, notably our research on the 2002 port shutdown, the appointment system mandated by AB 2650, the PierPass program, the Vessel Speed Reduction program, and the cargo handling equipment program (Giuliano et al, 2005; Giuliano and O'Brien, 2007; 2008; Linder, 2010). In addition, we conducted an events history, media review, a thorough review of documents surrounding the plan and a series of stakeholder interviews. Related documents include both the 2006 and 2010 CAAP, related regulations, a compendium of public comments related to the CAAP, and material supporting the programs, such as tariff amendments.

In order to analyze the motivations and outcomes behind the CAAP, an understanding of the context surrounding this plan was needed. This was gained by a comprehensive history of events related to the San Pedro Bay ports over the past 10 years complemented by a media analysis. A careful study of event history is necessary for understanding the sequence of key events and verifying stakeholder accounts, and ultimately for drawing conclusions about the mitigation strategies selected in the plan. Events included local and state legislation, releases of major studies, events that raise public visibility of the ports, actions of key stakeholders, changes in port operations and advocacy actions and lawsuits. The frequency, tenor, and topic of media coverage provide information on the extent to which port activity is perceived as newsworthy. Media coverage may reflect the image of organizations or the perceived importance of specific environmental issues. The media analysis provided a way to understand the perspectives of different stakeholders surrounding these events.

For the events history, we relied on an extensive timeline of key events available from the METRANS Transportation Center.[13] This information was complemented by a media search related to the CAAP. The media search concentrated on articles in the two primary newspapers, the *Los Angeles Times* and the *Long Beach Press Telegram*. We did not search stakeholder publications, but rather relied on interviews and the comprehensive METRANS timeline to elicit stakeholder perceptions. The media search was based on key words (port name, CAAP) and covered 2005 through January 2010. A total of 48 articles were found, with exactly half in each newspaper. Articles from the *Press Telegram* spanned the dates of July 10, 2006 through July 14, 2008, and articles from the *LA Times* spanned November 12, 2006 through August 29, 2009. Appendix A provides a list of all the news articles reviewed.

Additionally, open-ended interviews were conducted to explore the motivations and perceptions of stakeholders. Interviews included questions about the CAAP history, the process of forming the CAAP and its outcomes and current status. Questions for each interview were customized to the interviewee. Interviews were analyzed by organizing responses in a spreadsheet and comparing responses to the main hypotheses of the study.

The METRANS Transportation Center has good relationships with the international trade industry in Southern California. The Center for International Trade and Transportation (CITT) at CSULB has a policy committee made up of leaders from the industry. Using the policy committee members as a starting point, we identified representatives of the key industry sectors. In addition, community representatives and agency staff were contacted. We conducted a total of 10 interviews with 12 different people. The interviews were conducted in person when possible, and lasted between 45 minutes – 1.5 hours. For confidentiality purposes, titles and names are not provided. See Table 4.1 below. An example of interview questions is given in Appendix B.

[13] The Goods Movement Timeline is available at http://www.metrans.org/timeline/.

Table 4.1: Interview List

Interviewee	Length	Interview Date	Phone or in person
POLA (2 interviewees)	1.25hr	3/24/2010	In person
POLB	1hr	4/22/2010	In person
POLB	30 min	7/30/2010	Phone
PMSA (2 interviewees)	1.5 hr	3/24/2010	In person
Terminal Representative	1hr	03/25/2010	In person
Trucking Industry Representative	1hr	6/26/2010	Phone
Labor Representative	45 minutes	6/26/2010	Phone
Environmental Group Representative	1 hr	7/2/2010	Phone
AQMD	1hr	7/30/2010	Phone

CHAPTER FIVE: MOTIVATIONS FOR CAAP

This chapter examines motivations of the ports in developing the CAAP. We begin with a short history of events and legislative attempts to reduce port-related externalities. Next, we discuss media coverage around the time of CAAP development. These provide the context for evaluating stakeholder perceptions on motivations. Finally we discuss our findings with respect to the alternative explanations presented in Chapter Four.

5.1 History: Increasing Pressure on the Ports

Since the late 1990's, increasing pressure on the ports to address environmental problems is well documented. Public perceptions of the ports and trade they represent have shifted from generally positive to quite negative. After decades of relative independence from state or local control, port-related trade and associated truck traffic and emissions from trucks, vessels and cargo handling equipment are the target for regulation. The ports have had many challenges in moving new expansion projects through the environmental review process since 2000, and the two railroads serving the ports have been unable to move forward with expansion of near-dock rail facilities.

5.1.1 Increased visibility and changing public perceptions

Giuliano and O'Brien (2008) cite a number of events around the turn of the 21st century that raised visibility of port externalities. These include the AQMD Multiple Air Toxics Exposure Study II (MATES) released in 2000, the port shutdown of 2002, the opening of the Alameda Corridor in 2002, and a major investment study of the I-710 around the same time.

The MATES study assessed potential disproportionate cancer burdens and found that 71% of all cancer risk from air pollution comes from diesel exhaust (SCAQMD, 2000). A widely circulated map from the report showing diesel emissions concentrations was used to demonstrate that a "diesel death zone" existed around the ports. The MATES Study was followed by several reports from a longitudinal children's health study that documented a significant relationship of school absences, asthma and other lung diseases with exposure to particulate concentrations (Coussens, 2004). The California Air Resources Board (CARB) estimates 750 premature deaths per year from particulate exposure associated with ports and international goods movement activities, and 2,400 premature deaths from all goods movement in California (California Air Resources Board, 2006). These numbers have been widely circulated.

For the general public, trucks are the most visible aspect of port-related trade. The Alameda Corridor, a 20 mile, $2.4 billion rail cargo facility opened in 2002, yet truck traffic on highways continued to increase. Although the Alameda Corridor was not intended to increase the rail modal share or operate near capacity for many years, public perceptions suggested such expectations, and the Corridor came under criticism for not solving the truck traffic problem (Agarwal, Giuliano and Redfearn, 2004). A major study of the I-710 also took place in the early 2000's. The study was based on an expected tripling of port trade by 2020, and the analysis generated alternative plans for greatly increasing capacity of the facility, some of which required

the taking of adjacent properties. The study generated significant local opposition that in turn caused state and local transportation planners to temporarily suspend I-710 expansion plans. Nearly a decade later, 6 primary alternatives for expansion of I-710 are being considered under an extensive environmental review process with the draft EIR expected to be released in Spring 2012.

The port shutdown of 2002 also raised public awareness of port-related traffic. The breakdown in contract negotiations between the ILWU (International Longshore and Warehouse Union) and the PMA (Pacific Maritime Association) resulted in a nine day shutdown of west coast ports. While ships queued in the harbor, the I-710 and other main port trucking facilities experienced greatly reduced truck volumes and congestion. For the public, the shutdown illustrated how much truck traffic was generated by the ports (Giuliano et al, 2005). Air quality researchers took the opportunity to conduct measurements of particulates, showing how much emissions increased as a result of the vessels idling at the harbor waiting to be emptied (Singh et al. 2006)

At the same time that opposition to the effects of port activities was growing, the ports and regional business advocates were aware of increasing pressures to expand operations. In 2004 port-related trade encountered a version of a "perfect storm." The ports had anticipated an increase of 5% in trade, but the actual increase was 12%, facilitated mainly by the use of new 8000 TEU ships. Shortages of longshore and railroad labor led to long wait times for arriving ships, severe delays, and a diversion of 100 vessels to other ports (Giuliano & O'Brien, 2008). Ships idled in the harbor, and drayage trucks queued at the terminals. The 2004 experience reinforced the industry perception of the need for significant capacity expansion, yet growing public opposition was making expansion difficult if not impossible.

5.1.2 Pressures I: Lawsuits

The EIR process allows stakeholder groups to challenge findings, ultimately via lawsuit. We observe during this period increasingly successful use of the EIR process and lawsuits to force air pollution mitigation. The first successful challenge to a port expansion project was launched in 2001. A lawsuit was filed against the POLA for violating the EIR process in the expansion of the China Shipping Terminal. The lawsuit was initiated by a local homeowners group, which was joined by several environmental non-profits including the Natural Resources Defense Council (NRDC). A settlement was reached in 2004. It included $60 million worth of environmental mitigation to reduce diesel truck emissions, use yard equipment powered by cleaner burning fuels and use alternate marine power, also called cold ironing. Cold ironing uses electric power so that ships can turn off engines while in port. The success of the NRDC China Shipping settlement effort provided a model for dealing with subsequent expansion efforts. This lawsuit set a precedent regarding the extent of environmental mitigations that could be gained through use of the CEQA process. From the port's perspective, the threat of future lawsuits was enough to delay the release and certification of EIRs for upcoming projects.[14]

[14] As part of the settlement, the port was required to recirculate an EIR but was permitted to begin construction of phase 1 prior to its certification. When the EIR was recertified in 2008, the City of Riverside challenged the document claiming that traffic impacts caused by increased train volumes hadn't been adequately considered.

Few EIRs were certified in the period following the China Shipping law suit and the release of the CAAP. Following the 2001 China Shipping challenge, only two additional projects had EIRs certified at the POLA, although neither was for a significant terminal expansion. One was for the Cabrillo Way Marina project in 2003 and the other was for the Port Police Headquarters, California Maritime Center, and Charter High School in 2005. The Cabrillo Way Marina was a supplemental EIR certification, meaning that a modification was proposed to the original project.

At the POLB, the Pier J South Terminal development project was certified in 2004, but sent back by the Long Beach City Council and not pursued further. The EIR was originally certified in August 2004, then challenged by the AQMD and several environmental groups. The City Council rescinded the certification returning it to the port for further analysis. POLB Executive Director Richard Steinke is quoted as saying the following in a POLB press release: "In preparing for the appeal, new issues came to light that we felt warrant further evaluation… What is happening is the way the process is supposed to work. Comments by the City Council, public and other agencies are being taken into account to produce a better document. Rescinding the certification will give the board and staff the opportunity to fully re-examine the environmental document" (POLB, 2004). Despite the intention to rerelease the document, the project was eventually abandoned by the port.

Tables 5.1 and 5.2 show the certification dates for project EIRS at the Ports of LA and Long Beach respectively. Note that the certification of additional expansion projects did not occur until after the release of the CAAP.

Table 5.1 POLB Projects with Approved EIRs, 2001-2010

Projects with Approved EIRs	Port	Document Type	Date Certified by BOHC	Construction Status
Gerald Desmond Bridge Replacement	POLB	FEIR	8/9/2010	Construction expected to begin 2012
Middle Harbor Redevelopment Project - Piers D, E and F	POLB	FEIR	4/13/2009	Portions of the project are currently under construction
Final Administration Building and Maintenance Facility Project	POLB	FEIR	12/15/2008	The budget for the project was vetoed by the Mayor of Long Beach
Pier J South Terminal Development	POLB	FEIR	8/2004	Certified and sent back. Project abandoned.

Table 5.2 POLA Projects with Approved EIRs, 2001-2010

Projects with Approved EIRs	Port	Stage	Date Certified by BOHC	Construction
San Pedro Waterfront Project	POLA	FEIR	9/29/2009	Construction scheduled for fall 2011
Wilmington Waterfront Project	POLA	FEIR	6/18/2009	Design phase, no construction date announced
Port of Los Angeles Channel Deepening Project	POLA	FEIR	4/29/2009	Under construction
China Shipping Container Terminal Project Berths 97-109	POLA	FEIS/FEIR	12/8/2008	The original EIR was certified in 2001, then circulated again as the result of legal action. As part of the settlement, construction on phase 1 was allowed prior to completion of document. The re-circulated document was certified in 2008. Phase 2 is under construction, and phase 3 is in the design stage.
Pacific L.A. Marine Terminal LLC Crude Oil Terminal	POLA	Final SEIS/SEIR	11/20/2008	No construction started.
TraPac Container Terminal Project - Berths 136-147	POLA	FEIS/FEIR	12/6/2007	Some elements under construction, some elements still in design phase.
Port Police Headquarters, California Maritime Center, and Charter High School	POLA	FEIR	05/05	High School Completed, Police Headquarters under construction
Supplemental Environmental Impact Report for the West Channel/Cabrillo Marina Phase II Development Project (Cabrillo Way Marina)	POLA	SEIR	12/3/2003	Under construction, completion expected fall 2011

Although the CAAP may have led to an environment where projects could advance, the process of certifying these documents was not free of environmental challenges. Table 5.3 shows the environmental challenges that occurred on major terminal expansion projects following the CAAP. Two examples will be discussed further.

Table 5.3 Legal remedies taken against major expansion projects.

Project	Port	Year	Action Taken	Result
China Shipping Container Terminal Project Berths 97-109	POLA	2001	Lawsuit filed.	Settlement reached in 2004. Project construction underway.
Pier J South Terminal Development	POLB	2004	Appealed to the Long Beach City Council	City council asked the port to revisit the EIR. No new version has been released.
TraPac Container Terminal Project - Berths 136-147	POLA	2007	Appealed to LA City Council	MOU signed in 2008 to allow for the project to proceed with port funded mitigations as well as a community mitigation fund. Portions of project underway.
Pacific L.A. Marine Terminal LLC Crude Oil Terminal	POLA	2008	Appealed to LA City Council	Unsuccessful appeal.
Middle Harbor	POLB	2009	Appealed to Long Beach City Council	The appeal was denied and portions of the project are underway. The original document included $15 million of mitigation funds.
China Shipping Container Terminal Project Berths 97-109 (Reissued EIR)	POLA	2009	Lawsuit filed. City of Riverside vs. City of Los Angeles	The case was filed due to unanalyzed rail impacts from the recirculated China Shipping EIR that was recertified in 2008. The case is currently under appeal. Project under construction.

5.1.2.1 TraPac Project

The approval of the TraPac EIR in December 2007 is thought by many to be a direct consequence of the CAAP (POLA interview), but there were several challenges to the project. According to Executive Director Geraldine Knatz, the POLA worked on the EIR for over 4 years

in order to "deliver an EIR to the board that you could feel good about certifying"[15] (Sahagun, 2007). Even with the supposedly bullet proof environmental document, the project was still criticized due to the short term increase in emissions. Although the project would reduce emissions from what they would otherwise have been in the long term, these gains would take eight years to realize (Sahagun, 2007). Critics called for a faster implementation of low-sulfur diesel in vessels and more electrical infrastructure to reduce vessel idling while at port.

The certification of the EIR was appealed to the Los Angeles City Council in late December 2007 (a few weeks after its original certification) by a group of 20 different appellants. The appeal was the first step taken by the appellants and was resolved through negotiations before a lawsuit occurred. On April 4, 2008, a settlement was reached that allowed for the passage of the EIR in exchange for several mitigations as well as the establishment of a community mitigation fund (POLA, 2008). The Port Community Mitigation Trust Fund was finally approved by the Board of Harbor Commissioners in October, 2010 and was modeled after the settlement agreed to in 2008, where funds would be used to pay for school air filtration systems, health care clinics, job training centers, among other mitigation projects in the surrounding communities of Wilmington and San Pedro. A non-profit called the Harbor Community Benefit Foundation (see http://hcbf.org) was created to oversee grants from this fund. In addition to $12.04 million in startup funding and funding for initial mitigation projects, the funding for the nonprofit fund is tied to future growth at the port as projected in the EIRs for terminal expansion projects. For the TraPac expansion as well as a list of other expansion projects whose EIR release was anticipated at the time of the agreement, $3.50/ TEU will be transferred to the fund. Annual growth from facilities existing in 2007 would also be measured and $2.00/TEU would be transferred to the fund (POLA, 2010).

Components of this project are currently under construction, including Harry Bridges Boulevard, the Buffer, and portions of the wharf, yet the project was moved through at great cost to the port. This unique agreement also paved the way for additional expansions as it ties funding for community projects directly to growth at the port.

5.1.2.2 Middle Harbor Redevelopment project

At the POLB, the Middle Harbor Redevelopment Project was certified on April 13 2009. The EIR included $15 million for mitigation, $5 million each for: school grants, health care and senior facilities, and programs to reduce greenhouse gases. Almost immediately, the cities of Commerce and Riverside and a coalition of 13 groups, including the NRDC, the Coalition for Clean Air and others, filed administrative appeals, asking for additional information to be included in the EIR and for the EIR to be re-circulated with the additional analysis. On May 12, 2009, the Long Beach City Council voted 9-0 to deny the appeals and move forward with the project. Construction has begun. Although the challenges to this expansion project were less severe than those that the TraPac expansion encountered, the atmosphere surrounding expansion projects remain tense.

[15] The full quote was: In her comments before the board Thursday, Knatz said: "Last January, port management and staff agreed on five important things this organization had to achieve in 2007. No. 1 on our list was 'deliver an EIR to the board that you could feel good about certifying.' We believe we have done that."

Additional projects remain uncertified with the ports still working on the EIR documents. For instance, at the POLA, the Southern California International Gateway (SCIG) project EIR has not yet been completed although the Notice of Preparation was certified in December, 2005. At the POLB, the Notice of Preparation for the On Dock Rail Support Facility at Pier B has just been completed in 2009 with the preparation of the EIR currently underway.

5.1.3 Pressures II: Politics and Regulation Efforts

Growing public dissatisfaction with port-related trade and its negative impacts also led to pressure on local officials to "do something." As explained in Chapter One, the ability of local agencies to regulate emissions is limited. Thus political pressures led mainly to legislative efforts at the state level. The first successful legislation passed to address port impacts was AB 1775, which required covering coke in transport and open storage, due to the detrimental impacts of the loose coke dust (Giuliano et al. 2007). In 2001, Karnette introduced the first proposal for a cargo fee to fund congestion mitigation efforts; it died in committee. After 2001, legislative efforts increased rapidly in the period leading up to CAAP, as illustrated in Table 5.4.

There are several observations to be drawn from Table 5.4. First, air quality was the focus of the legislation, and it provided the mechanism to justify regulatory action. For example, AB 2650 was an attempt to spread drayage trucking over more hours of the day. US ports typically service truck deliveries and pick-ups only during regular weekday hours. For those unfamiliar with the complexities of port operations, extending gate operating hours is an obvious solution to truck congestion at the terminals and on the local highways. AB 2650 was enforced by the SCAQMD, as its formal purpose was to reduce diesel emissions by reducing queuing at terminal gates.

Second, the scope of legislation increased over time. AB 2042 would have established an air quality baseline for the two ports. No project would be allowed that increased pollution levels beyond the baseline. AB 2041 would have established a regional governing body, the Port Congestion Management District, and authorized a charge for cargo moved during weekday business hours, with the revenue to be spent on freight-related congestion mitigation projects.

Third, several bills represent ambitious attempts to claim regulatory jurisdiction. SB 1397 which passed in the senate but died in the assembly in 2004 would have given SCAQMD authority to regulate locomotive emissions. Even if it had passed, this legislation would very likely be challenged due to preemption at the federal level. Additionally, AB 1101 proposed regulating ports and distribution centers as stationary sources. This would have also increased the AQMD's authority.

Fourth, cargo fees to fund mitigation efforts outside the ports had almost no support in 2001, but by 2006 were avoided only by veto of the Governor, reflecting a growing political consensus that the costs of mitigation should be borne by trade interests. Fifth, more aspects of port operations became the subject of regulatory proposals, for example mandating priority berthing for vessels using low sulfur fuels, or requiring ports to negotiate emissions technology changes via terminal lease agreements, suggesting changing perceptions of the role of government in addressing trade-related externalities. Finally, efforts to improve conditions for

drayage truckers (reduced truck turn times, collective bargaining) were unsuccessful throughout the period, reflecting a lack of political support for this constituency.

Table 5.4: California State Legislative Activity Associated with Mitigating Port-related Trade Impacts, 2000 – 2006

Year	Bill	Status	Description
2000	AB 1775	Passed	Required covers on coke piles and on coke in transport
2001	Karnette	Died in committee	First proposal for cargo fee
2002	AB 2650	Died in committee	Reduced queue time at terminal gates; reduced turn times
2002	AB 2650 revised	Passed	Reduced queue times at terminal gates
2004	AB 2042	Passed by Legislature; vetoed by Governor	Established baseline for "no net increase" in emissions
2004	SB 1397	Passed in Senate; died in Assembly	SCAQMD authority to regulate locomotive emissions
2004	AB 2041	Passed by Legislature; withdrawn by sponsor (Lowenthal)	Port management congestion district + container fee for environmental mitigation, infrastructure, security
2005	SB 760	Not passed	$30/TEU mitigation fee in LA/LB
2005	SB 761	Passed in Senate; died in Assembly	Truck turn time maximum 60 minutes
2005	SB 762	Passed in Senate; died in Assembly	Joint Powers Authority to license, limit, and regulate trucks at the port
2005	SB 763	Passed	Priority berthing for vessels using low sulfur fuels
2005	SB 764	Passed in Senate, died in Assembly	Caps on port emissions to 2001 levels
2005	SB 848	Died in committee	Collective bargaining for truckers
2005	AB 1101	Died in Assembly	Regulate ports, distribution centers as stationary sources
2006	SB 927	Passed by Legislature; vetoed by Governor	$30/TEU mitigation fee in LA/LB
2006	SB 1829	Passed in Senate; died in Assembly	Limits trucks wait time to 30 minutes in line and 30 minutes inside the terminal
2006	SB 1601	Died in Senate	Require best available technology to reduce NOx emissions through lease agreements

Source: Giuliano and O'Brien, 2008

Local elected officials also had a role to play in putting pressure on the ports. Local officials were closest to the local communities and NGOs demanding change, and also were well aware of the economic value of the ports. They faced the dilemma of responding to public concerns but preserving the economic vitality of the ports. Both ports have a long history, having been established as municipal agencies in 1909 (Los Angeles) and 1921 (Long Beach). For most of the 20th century, they enjoyed substantial independence and were subject to little oversight by city elected officials (Erie, 2004). However, late in the 20th century governance arrangements changed. Both ports now are governed by 5 member boards, with all members appointed by the mayor and approved by the City Council. Major decisions (contracts, capital projects) are subject to City Council oversight.

Events played out differently in the two cities. In 2001, Mayor Hahn of Los Angeles convened a No Net Increase Task Force, which began to look at options to reduce emissions. However, bigger changes took place with the election of Antonio Villaraigosa in 2004. He made improving air quality at the POLA one of his highest priorities. He appointed David Freeman, a known environmentalist to the POLA Board of Harbor Commissioners. Geraldine Knatz, then Managing Director (second in command) of POLB and already gaining visibility for her efforts at port greening, was hired as POLA Executive Director. Villaraigosa was well-known for his strong support of union labor, and labor issues eventually became a major factor in outcomes of the CAAP.

In Long Beach the mayor prior to the CAAP was Dr. Beverly O'Neil who ended her third term in 2006. In 2006 Mayor Bob Foster, who had served as president of Southern California Edison and led the company through several clean energy programs, replaced O'Neil as mayor. Although several of the Long Beach Harbor Commissioners had careers in public service, none had careers in an environmental field. Though both ports had a history of environmental efforts, the leadership change in Long Beach was less dramatic than in Los Angeles, where the new mayor was willing to take a more radical approach.

5.1.4 Port and Industry Responses

In response to these pressures, the ports began to take actions to reduce their emissions. The ports are landlords; they lease space to terminal operators, and it is the terminal operators that determine how the ports operate. In earlier years, the ports argued successfully that as landlords they had little control over tenant operations, and since terminal operators have long term leases (typically 30 years), there are few opportunities to change tenant lease provisions. Given the rate of technology change, long-term leases have limited utility as a mitigation strategy.

The ports began to respond to air pollution concerns in the early 2000s. As noted above, The No Net Increase effort was launched in 2001, and the POLA Board of Harbor Commissioners adopted a goal of not increasing emissions beyond a 2001 baseline (POLA, 2004). In 2004, the POLA released its measured 2001 emissions baseline and announced an Air Quality Mitigation Incentive Program, providing funds for emission reducing demonstration projects. In 2005, the POLB announced its Green Port Policy and approved $33 million for Green Port projects included in their budget of $411million. An additional $100 million was reserved for the Green Port Fund (POLB, 2005). On May 1, 2006, the POLB signed its first green lease with Matson terminals, and shortly signed a second green lease with ITS. During

this period, the ports began a joint vessel speed reduction program, funded retrofits for cargo handling equipment, and began technology testing programs.

The Clean Air Action Plan could therefore be viewed as a logical next step in response to increasing pressures on the ports. However, as a comprehensive plan, the CAAP was very different from previous efforts; it identified specific emissions reductions targets and action steps. It also represented a formal agreement between the two ports to cooperate rather than compete in order to achieve ambitious environmental mitigation objectives.

Events of the 2000s clearly show that public, political and regulatory pressures affected the ports. Changing public perceptions affected the social legitimacy of ports and port-related trade. By the mid 2000s, expectations of port behavior on the part of local communities and their representatives had fundamentally changed. The ports' "license to operate" was contingent upon solving the air pollution problems their activities were generating.

5. 2 Motivations

We conducted open ended, in depth interviews with stakeholders and reviewed the media coverage of CAAP to gather additional information on motivating factors for CAAP. Events of the previous five years support the regulatory threat explanation, as well as the social legitimacy and social pressures explanations. How was the CAAP perceived in the public media, and how did key stakeholders explain CAAP?

5. 2. 1 Perceptions of key stakeholders

This section summarizes responses from our interviews with key stakeholders. As noted in Chapter Three, we agreed to keep the identity of interviewees confidential. We therefore simply refer to representatives of the various stakeholder groups.

5.2.2.1 POLA

POLA representatives noted that air quality problems were not an issue in the maritime sector until recently. Other environmental issues such as water pollution had gained more attention and had been dealt with. However, in the recent decade, the ports were under increased scrutiny from regulatory officials, elected officials and the general community for air quality problems. "Particularly there was a perception that there was disproportionate impact on the local community from goods movement." POLA wanted to challenge this perception.

POLA representatives also stated that they couldn't move forward with projects without "significant controversy" or "significant political backlash." "A lot of projects were needed but not brought forward." The TraPac terminal expansion project was cited as one that was severely delayed as a result of this controversy. POLA representatives associated its recent approval with actions taken related to the CAAP. "CAAP brought credibility to the ports, and we couldn't have approved TraPac without the CAAP." They also reported that while bad feelings from the community were not gone, they had in fact dissipated. This suggests that the CAAP helped to restore social legitimacy, allowing it to continue to operate and expand. Respondents also mentioned that the change in the administration led to the desire to put a more dramatic plan into place, signaling the political motivations of the plan.

Several comments from the interview also supported our hypothesis that the CAAP was a response to regulatory pressures. The interviewees stated that regulators played a key role in scrutinizing the EIRs of capacity expansion projects. Any new project that came under development was subject to intense scrutiny. Respondents also noted that as a result of the CAAP, they have a much stronger working relationship with the CARB and AQMD. They meet regularly with agency officials and have also gained their backing for new projects. Interestingly, the support from regulatory officials reinforces the support of the community.

There was little support for our hypothesis that the CAAP was a way to attract customers who wanted a greener port or to benefit from eco-efficiencies. Respondents did not identify the attraction of a green port as a major factor in developing the CAAP. Respondents acknowledged their loss of market share in the economic recession, but noted that whether CAAP had anything to do with these losses was impossible to know. Interviewees did mention that there might potentially be advantages to being a leader, and other ports were already beginning to experience pressures to create similar air quality plans.

5.2.2.2 POLB

The tone of the interview from the POLB was somewhat less reactive than that of the POLA, and the creation of the CAAP was described as an opportunity. The interviewee mentioned that the EPA, CARB and AQMD all had regulations for port sources and in some cases they were contradictory or competing. The CAAP was an "opportunity to develop specific goals and targets and to put everything down on paper." The interviewee described the CAAP as a "road map." The port "saw an opportunity to get out in front of this instead of wait and be reactionary."

Problems with the EIRs were not mentioned specifically as a reason for the CAAP, but the interviewee did acknowledge that the plan did help with projects due to the credibility gained from labor and citizens. The plan has also increased the expense and complexity of some projects, particularly those related to electric infrastructure.

It was also noted that relationships with regulators and the community had improved as a result of the CAAP. Examples cited of improved community relationships included positive comments at public meetings and positive feedback in a community survey.

Regarding business impacts, the POLB representative's response was consistent with POLA. He reported that it is possible that market share was lost due to the CAAP but that it could also be due to the economic downturn or changing business models in the industry that favor diversification. He also mentioned that the ports actions regarding the CAAP have pushed other ports to take action as well, particularly in the northeast.

5.2.2.3. Other Interviewees

Other interviewees provided similar background regarding the formation of the CAAP. The CAAP was part of an evolving process, where the ports realized they needed to do something as trade volumes grew. Research was emerging about the health impacts of particulates, and environmentalists, the scientific community and even politicians were beginning to put pressure on the ports. Public pressures were increasing; community representatives began to attend and make statements at harbor commission meetings. The terminal representative mentioned that it was not just air quality that was gaining attention, but

that as trade volumes grew, "quality of life was being challenged all over California due to traffic and congestion."

The labor representative specifically linked these pressures to hold ups on port expansion and said that the port "realized that any type of expansion would be determined by the community." Similarly, the trucking representative said that environmental issues and in particular the truck problem were hindering port expansion. The PMSA also mentioned that the CAAP was part of an evolving process and mentioned early initiatives at each port including the Healthy Harbors Initiative at the POLB and the 2002 POLA Clean Air Plan.

The PMSA, the trucking representative and environmental group representative also mentioned that the China Shipping lawsuit was a major step in the evolution of the CAAP. The environmental representative commented that the ports were realizing that their "bottom line would suffer if they didn't fix these problems," and that "environmental groups can stop us from growing, cost us money, and cause anger amongst our business partners." Additionally, the PMSA points out that the CAAP would not have been possible without early actions taken by industry as many of the measures in the CAAP had been previously tried voluntarily by the industry.

5.2.2 Media Review

The main CAAP news topic from the beginning was the Clean Truck Program, the most controversial and costly part of the CAAP. The CAAP called for replacing the entire fleet of drayage trucks. As will be further discussed in Chapter 7, the original proposal was to restructure the entire drayage industry by requiring trucking companies to purchase the new trucks and hire drivers, thus eliminating the owner operators that comprised the vast share of the local drayage industry. Funds to finance these purchases would come from a container fee. Thus much of the media coverage is on the various controversies and lawsuits surrounding the Clean Truck Program.

In the *LA Times*, the CAAP is generally mentioned as background to larger issues surrounding the ports such as health concerns, expansion of the ports, funding clean air efforts and container fees. The *LA Times* covered few details about the CAAP beyond the Clean Truck Program. The *Press Telegram* articles describe the CAAP in more detail and address more aspects of the plan. While the Clean Trucks Program is mentioned often, it is not usually the center of the article.

The difference in coverage between the two newspapers is reflected in the mentions of different pollution sources in the various articles. For instance, there is only one article in the *LA Times* that mentions either all five or four out of five of the major pollution sources addressed by the CAAP: trucks, vessels, rail, cargo handling equipment and harbor craft. In the *Press Telegram*, three articles mention all five sources and two mention four out of five. Of the sources mentioned, trucks had the most attention, followed by vessels, rail, cargo handling equipment and finally harbor craft. The coverage of each source suggests its relative importance in the public eye. The majority of attention was given to trucks, and this was also the most costly and controversial component of the plan.

5. 3 Support for Research Hypotheses

Newspaper coverage supports the hypothesis that the CAAP was an attempt to improve the social license to operate: to reduce delays associated with EIRs and to expand infrastructure. Port expansion is a recurring theme in these articles. In at least two cases, the CAAP was directly linked to port expansion. For instance: "With the recent approval of the Clean Air Action plan, which aims to reduce port-generated air pollution by 45% over the next five years, the LA-LB port complex plans to expand existing terminals, build new rail yards and widen roads to allow more trade than ever" (Sahagun, 2007a).

Similarly, there are many quotes where it is clear that air quality improvement efforts are being pursued in order to open the door for expansion: "Unless we can clean the air, we're not going to move forward with any of these projects. The community won't allow it," he said. [referring to Bob Kanter, POLB] "In fact, I expect that every one of the environmental impact documents for these projects will be challenged and end up in court" (Sahagun, 2007b). In addition, the *Press Telegram* frequently mentions opportunities for public input, announcing public meetings or providing information on where to send comments. In announcing the of responding to public concerns. This does not occur in the *LA Time*s, most likely because of its broader readership.

Newspaper coverage offered less support for the idea that the CAAP was a response to regulatory pressures or an attempt to gain increased leniency from regulatory authorities. There was little mention of regulatory agencies or new regulations. They were mentioned only as potential funding sources, or for their specific financial contributions. Although the connection with gaining competitive advantage for coming regulations was not mentioned, the idea of being a leader, and setting the stage for future improvements worldwide was emphasized. The CAAP is described as aggressive, the first in the country, and pioneering. Although this need not apply strictly to regulation, it suggests that the ports are leading the country and perhaps even the industry in new standards for air quality from port operations. This could lead to a future competitive advantage for the ports.

The articles provided little support for the idea that the CAAP was a response to customer demands for a greener port or a way to profit from eco-efficiencies. There was no support for the hypothesis that the CAAP was a way to increase/maintain business because customers desire a green port. Although some of the ports clients are discussed as being green themselves, the articles do not suggest that these clients chose the ports because of their greenness. On the contrary, critics of the CAAP raise fears that higher costs and regulations will drive away port business. Additionally, the impression given is that CAAP is a costly endeavor for the ports.

In these news articles the ports portray the CAAP as the means to achieve a greener, more efficient port that will also be more economically viable. The narrative suggests that expansion will lead to greater efficiencies in the future that will offset the upfront costs of CAAP implementation. By "growing greener" the ports will be able to handle the cargo more cleanly and efficiently than if they did not grow at all – the expected outcome if the ports had not implemented the CAAP. This might be interpreted as a long-run eco-efficiency argument, but one that has yet to be demonstrated. It is of course in the ports' interest to emphasize future net

benefits of the CAAP and to communicate a positive message to potential customers around the world.

The news articles also contain several quotes from port officials stating that the CAAP was established out of concern for the community and because caring for them was the right thing to do. In reference to the truck plan, "The people of San Pedro and Wilmington have been subsidizing the port industry for years with their lungs," Los Angeles harbor commission President S. David Freeman said. "We absolutely have to get this done to justify the expansion of the port" (Marroquin, 2007). In the following quote, Geraldine Knatz refers to reducing the health risk faced by the surrounding communities. "Given the urgency in reducing air pollution and health risk in communities adjacent to the port, we have put forward more aggressive time frames and requirements for cleaning up the truck fleet," Knatz (Marroquin, 2007). Again, it is in the interest of the ports to convey concern for the community. Many of the ports' actions were controversial, and without community support, might not have been possible. More importantly however, the leaders of both ports were well aware that community concerns had to be addressed in order to move forward with any new expansions projects. James Hankla, an industry leader, remarked, "it isn't easy being green, but it's the only way to do business here" (Hanson, 2007a).

5. 4 Summary/ Conclusion

Our review of events leading up to the CAAP, media accounts and stakeholder interviews all provide extensive evidence that the CAAP was a response to social pressures that were restricting the ability of the ports to expand. The ports faced increasing pressures through growing attempts to impose regulations on port operations, several successful lawsuits that blocked or threatened to block major infrastructure expansion projects, and increased local political pressure. These pressures were identified in our interviews, with port representatives and others explicitly identifying the CAAP as a means to push projects forward. In the language of social legitimacy, the ports (and by extension port-related trade) had lost their license to operate, and were faced with no further growth unless the sources of public opposition could be addressed.

Our second hypothesis, that the CAAP was a response to regulatory pressures is also supported. The plethora of regulatory and legislative efforts emerging prior to the CAAP demonstrates the increasing scrutiny placed on the ports. The ports did not have authority over the pollution associated with the majority of port operations, and indeed until recently argued that they had no control over the operations of their lessees or steamship lines, and hence should not be held responsible for the resulting emissions. In the face of growing efforts to impose regulations on port operations, the ports shifted to a more preemptive strategy. The fear of stricter regulations was legitimate, because if regulations were too onerous, they could drive business away from the ports. Therefore the ports saw that it was necessary to gain the trust of regulators. In fact, the regulatory agencies played a key role in the development of the CAAP, as will be discussed in the next chapter. Pressures from regulatory officials were mentioned by port interviewees, and both ports reported that relationships with regulators improved as a result of

the CAAP.

Our third hypothesis, that the CAAP was an attempt to capture more environmentally conscious customers or to profit from eco-efficiencies was not supported. Though there are examples of the industry taking proactive measures to abate their emissions and experimenting with alternative approaches, there is no evidence that shippers selected a port based on its air quality. In fact, the opposite is true; higher costs associated with upholding environmental standards may have driven business away from the ports. Furthermore, the idea that the ports supported environmental efforts as a way to reduce their costs due to eco-efficiencies doesn't apply since operating costs and any subsequent savings would be borne by the terminal operators.

The ports were under economic pressures to expand, but expansion was threatened by community opposition to the ports' polluting activities. Social pressures were threatening the ports' licenses to operate and hence their legitimacy as an organization. Economics played a role, as community opposition was threatening the ports' ability to retain customers due to perceived capacity constraints. The theory of social legitimacy does therefore apply in this case, and further, this case supports the idea that quasi-government agencies such as ports do respond to public demands for environmental quality. The environmental review process provided a direct mechanism to give the community influence over port operations. Furthermore, regulatory legitimacy also threatened to drive up costs and drive away customers.

CHAPTER SIX: THE CAAP DEVELOPMENT PROCESS

This chapter describes the CAAP development process. We examine stakeholder participation, development of the CAAP measures, and stakeholder perceptions. Based on our previous research, we hypothesize that the "dominant actors" would have more influence in the CAAP development process. These include the ports' natural allies: terminal operators, ocean shipping lines, major retailers, as well as longshore labor. Conversely, we expect that those with little market power within the international trade supply chain would not have much participation or influence in the CAAP. These include the drayage industry, wholesalers, and small retailers. The interstate railroads, which provide a critical link to interstate trade and are protected by federal interstate commerce law are unlikely to have been included.

In this case other stakeholders are critical. Since the CAAP was in large part a response to environmental advocates and local communities, we would expect that they would be included. Similarly, regulatory agencies are important partners, because these agencies have the authority to measure and determine emissions reductions, as well as impose regulations to achieve emissions targets. The CAAP anticipated going beyond existing standards; understandably, the ports would want to assure receiving credit for achieving emissions reductions beyond the standards.

Another way of considering participation is through mitigation strategy. We might expect that sources already under control of local and state regulators would not be targeted in the plan, because emissions reductions from these sources are already strictly regulated and largely achieved. For example, cargo handling equipment is regulated by CARB as an off-road source, and hence is already subject to emissions reductions targets. Unless significant additional reductions are deemed possible, there is little benefit to including further CHE regulations in the plan, so little reason to engage terminal operations in the discussion. In addition, CHE improvements may be accelerated though terminal leases so the ports had a mechanism to influence this source.

Conversely, sources that are not subject to state or national regulatory control are likely to have the greatest possibility for significant emissions reductions, as in the case of OGVs. Because OGVs are regulated at the federal and international level as described above, OGV emission reductions at the ports would need to take place through voluntary compliance. In this case, the ports would have a strong incentive to include steamship lines in the process in order to negotiate the desired reduction strategies.

6.1 Results From Interviews and CAAP Documents

6.1.1 Who Participated?

The CAAP was created in cooperation with the AQMD, CARB and EPA, then released to the public for comment on June 26, 2006. The plan was made available on the ports' websites, public libraries and in various languages. In addition, four public meetings were held

where individuals had the opportunity to make formal comments on the plan. At the request of five different organizations including the NRDC, Coalition for Clean Air, PMSA, and Long Beach Alliance for Children and Asthma, the ports extended the initial 30 day comment period for another 30 days to collect feedback on the plan. The final plan was released and approved on November 20, 2006.

Our interviews confirmed that the CAAP development was a closed process. The ports chose to restrict the process to themselves and regulatory agencies for two reasons, according to the POLA respondents. First, if one stakeholder was included, all stakeholders would expect to be included. Second, because of the diversity of interests among stakeholders, it would be difficult to get consensus on what would be included in the plan. It was assumed that the business community would argue for less stringent measures, while the local community would want more stringent measures. They also emphasized a concern with the "technical merit" of each mitigation measure, and the need to negotiate with the regulatory agencies on that basis. They were concerned with generating a plan that was feasible and did not rely on untested or yet to be developed technologies. POLB representatives described a process where staff came up with measures and evaluated their impacts.

Informal networks among key stakeholders (e.g. our dominant actors) allowed for some input and participation, despite the closed nature of the process. Terminal operators had indirect input into the plan based on relationships with the ports. Operators were consulted informally to test feasibility of different possible mitigation strategies. Operators also attended meetings held by regulatory agencies where the CAAP mitigation strategies were discussed. The ILWU was kept in the loop through relationships with port management. Environmental advocates had the opportunity to testify at public meetings and provide public comments. At the request of several groups, the ports had a direct meeting with the NRDC, Coalition for Clean Air, and the Los Angeles Alliance for a New Economy on September 28, 2006.

Not all key stakeholders were included, even informally. The PMSA (which represents terminal operators and global shipping companies) claimed to be completely excluded from the process, and saw this as leading to an adversarial relationship with the ports. They argued that ocean shipping companies are the ports' primary customers. Since they would be responsible for implementing some of the mitigation measures, they should have had direct input into the plan development process.

Public comments received by the ports document that most stakeholders were excluded and dissatisfied with the extent of their ability to influence CAAP development. Some comments referenced the No Net Increase plan of several years earlier, which was far more inclusive. Examples of comments include:

- From an ocean shipping line: While they participated in public meetings, they "were not included in any portion of its drafting, policy making, or in the development of discussion of any of the technical appendices." (POLA and POLB, 2006, p 290).

- From Union Pacific: Although the railroads participated in previous efforts, such as NNI, "the specific rail control measures proposed in the CAAP, while building on work done in NNI and GMAP, are still in a conceptual state and were formulated without input from

the Railroads" (POLA and POLB, p. 292)

- From California Trucking Association: "The failure by the San Pedro Ports to include private stakeholders in the development of the Plan has resulted in a plan that in its current form can never be implemented" (POLA and POLB 2006, p. 194). "It is difficult to understand why the CAAP was developed with no input from the trucking industry. CTA's input could help your agencies with the challenge of increasing the capacity of port complexes while simultaneously reducing net pollution associated with port operations" (POLA and POLB, 2006, p. 187).

Once the CAAP was developed, a stakeholder working group was created by the ports to advise on the implementation of the plan. According to the trucking industry respondent, there were six industry representatives, including the PMSA, Future Ports (a trade association), Majestic Realty (a major owner of industrial real estate), a railroad representative and a trucking representative. There were also six labor representatives and six representatives of environmental groups. The interviewee felt that the industry was underrepresented and labor groups were over represented. They were picked by the mayors' offices, not the industry. "This was a task force that would be right for a labor plan, but not for an industry plan." An environmental group representative doubted that this group had any real decision making authority or effectiveness. She felt the primary purpose of the group was for stakeholders to gain information to then share with their members.

6.1.2 Selecting Mitigation Measures

The ports were facing a daunting challenge: how to develop a set of mitigation strategies that could be implemented, given legal and funding limitations. The ports did not have many options. They could not impose more stringent regulations on ocean shipping lines due to lack of jurisdiction, so were left with providing incentives or imposing new provisions on terminal operators that would mitigate ship emissions. Hence changes to OGVs were limited to vessel speed reduction and burning of cleaner fuels near shore, made attractive with financial incentives (and notably not fees that would impose costs on steamship lines).

The Class I railroads were subject to EPA rules, and short of lobbying EPA to impose more stringent standards on locomotives, the ports had little capacity to target the railroads for emissions reductions. One possibility was in CEQA reviews of new rail projects, where additional mitigation requirements might be included as part of a project's approval. Another was persuasion, coupled with financial incentives. Thus the CAAP included an MOU with PHL to upgrade locomotives, where the ports, and potentially public funding, would finance the upgrades.

The ports have more control over terminal operators, because terminal operators sign leases with the port owners. However, because leases are long-term, the ports must wait until a lease is renewed or modified to negotiate changes to the conditions of the lease. The CHE strategies are an example of using lease provisions to require changes in operating equipment. Another example is the cold ironing provision for OGVs. In this case terminal operators were required to use electrification infrastructure, but the ports funded the projects. We surmise that no terminal operator would have agreed to incur such an expense, and the ports were unwilling to take the risk of losing a major terminal operator. Additionally, costs of these capital

improvements may be recouped through lease payments over time.

Options for heavy duty trucks were quite different. As noted previously, the drayage trucking industry is made up of predominantly small companies who contract with independent owner operators. Until CAAP, both ports took the position that drayage trucking was outside their control. In the case of AB 2650, the terminals each developed a compliance strategy, and the regulation was monitored and enforced by SCAQMD. In the case of PierPass, the ports were passive players. Terminal operators organized the program and set up the independent authority to collect and distribute the fees. Terminal operators were able to collaborate and set prices as a result of earlier exemptions obtained from the Shipping Act of 1984.

With CAAP, the ports took the position that they had the authority to control entry and exit of all vehicles on port property, including authority on vehicle ownership and attributes. They used that authority to structure the Clean Truck Program around a concession system, completely restructuring the industry.[16] This effort, with minimal participation by those to be affected, is consistent with the market power relationships we described in Chapter 4. Drayage trucking was an easy target, given their dependent position in the trade supply chain. Section 6.2 discusses CTP in more detail.

6.1.2 Perspectives of Stakeholders

POLA representatives identified feasibility as a key determinant of plan measures. They knew that measures had to be considered feasible by their tenants, since they would be implementing many of them. It is important to note that feasibility as defined by the ports does not include cost-effectiveness. Our POLB representative stated that economics were not a critical factor, because the ports weren't limited economically; "it was more a question of what was realistic." We also observe that the cost of the CAAP was expected to be paid largely by others. A second priority was to reduce emissions by the greatest amount as soon as possible. Previous versions of the ports' air quality inventories provided the data on emissions sources and where the largest potential gains could be achieved.

The single largest source of emissions is OGVs, yet OGVs were not targeted heavily in the plan. When asked why the CAAP was focused on trucks rather than OGVs, POLA representatives stated that industry structure was a third important consideration. OGVs are owned and operated by large shipping conglomerates, while trucks are often owned and operated by an individual. Therefore, "it was easier to ask the shipping companies to internalize their environmental costs for moving goods. Truck drivers couldn't afford to do this on their own." Additionally, the visibility of the truck problem made them a key target. Concerns included safety, insurance and neighborhood complaints such as parking and driving residential streets at night.

The PMSA also felt that trucks were prioritized because they were a visible source. They suggested that the earlier Gateway Cities program provided an opportunity for a trial run. They further noted that no cost effectiveness evaluation had been done to determine the success of the earlier program. The PMSA also offered a political explanation, claiming that the trucks program

[16] While the goals of the Clean Truck Program were included in the 2006 plan, the specific details of how the program would operate were determined after the plan was finalized. This will be discussed in more detail in section 6.2.

was organized by the teamsters, and it was the teamsters who presented the plan to the ports. The trucking representative agreed that the teamsters had a role in presenting the plan to the Mayor's office and that the choice to begin with trucks was likely political. In addition, they also felt that the trucks were "low hanging fruit" because the necessary technology, in this case the 2007 EPA approved engines, were already available. Other interviewees explained the focus on trucks and ships as resulting from their status as large polluters and because technologies were available.

6.1.2 Working with regulators

Another strategy employed in the CAAP was to work with the regulators (particularly CARB) to adopt more stringent standards, and to make sure that the CAAP provisions fed into future standards. In most cases, the control measures were coordinated closely with regulations for each source. In some cases, the measure was written to accelerate implementation of an existing regulation, or the measure had requirements that exceeded a regulation. One intended outcome of this coordination is referred to as a backstop process, where the incentives offered for particular measures could sunset into a required implementation of a CARB regulation. Table 6.1 below summarizes the relationship between CAAP measures and corresponding CARB regulations.

For example, HDV1 (the Clean Truck Program), corresponds to the CARB regulation, *Requirements for In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks at Ports and Intermodal Rail Yard Facilities* passed in December 2007. CAAP requires dirty trucks to transition to 2007 engines earlier than CARB, however, and CARB includes engine requirements out to 2023 that CAAP does not require. Similarly, CARB passed a regulation to require that 50% of vessel calls for container, cruise and reefer ships use cold ironing by 2014 and that 80% use cold ironing by 2020. Where the infrastructure is available, CAAP will require use of cold ironing through lease negotiations. In this way, CAAP accelerates implementation of the regulation to the extent possible. Additionally, the regulation allows for vessels to avoid cold-ironing if they can use a technology proven to offer equivalent emissions reductions. Through their TAP, the CAAP is also encouraging testing of these alternate technologies. Regulations for CHE and harbor craft also correspond to CAAP measures.

Table 6.1 Relationships between CAAP measures and CARB regulations

Measure	Approved by CARB	Name of Corresponding Regulation (If Applicable)
SPBP-HDV1	December 2007	Requirements for In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks at Ports and Intermodal Rail Yard Facilities
SPBP-HDV2	NA	No Regulation
SPBP-OGV1 (VSR)	NA	No Regulation, but under consideration by CARB
SBP-OGV2 (AMP)	December 2007	Rulemaking to Consider Adoption of Proposed Regulations to Reduce Emissions from Diesel Auxiliary Engines on Ocean Going Vessels While at Berth at a California Port
SPBP-OGV3	May 2009	Rulemaking to Consider the Adoption of a Proposed Regulation for Fuel Sulfur and Other Operational Requirements for Ocean-Going Vessels Within California Waters and 24 Nautical Miles of the California Baseline (July 24, 2008)
SPBP-OGV4	May 2009	Same as above
SPBP-OGV5	NA	No Regulation
SPBP-CHE 1	December 2006	Regulation for Mobile Cargo Handling Equipment at Ports and Intermodal Rail Yards
SPBP-HC 1	November 2007 Amendments in process, posted May 2010	Commercial Harbor Craft Regulation Amendments to the Regulations to Reduce emissions from Diesel Engines on Commercial Harbor Craft Operated within California Waters and 24 Nautical Miles of the California Baseline
SPBP-RL1	NA	No Regulation
SPBP-RL2	NA	No Regulation, although CARB has an MOU with several rail lines
SPBP-RL3	NA	No Regulation

The effort of the ports to collaborate with the regulatory agencies and backstop CAAP with regulations were documented in our interviews with POLA and POLB. According to the POLA representative, one of the most beneficial results of the plan was that the "ARB has aligned their regulatory strategies with the CAAP." The respondent noted that all marine vessel rules were aligned with CAAP and that the state-wide vessel fuel rule and the shore side power

rule stemmed from the CAAP. This happened because industry representatives discussed their position at various meetings: "when the industry agreed to do something for the CAAP, the ARB saw that the industry thought this was feasible and built this into the rules. They gave the state the information needed to support statewide rule making."

POLB representatives shared a similar opinion. The CAAP put pressure on CARB to more aggressively move forward with regulations and it also provided them with the information needed to form their programs. They "squeezed CARB" and this "accelerated the CARB efforts." The AQMD representative confirmed the relationship between CARB and the ports and felt that the shore power rule and truck rule were "at least informed if not based upon actions of the ports." The AQMD viewed the CAAP as a positive influence as it would help to "level the playing field around the state" by creating uniform requirements.

The ports were not as successful at the federal level. Both port representatives stated that the CAAP did not influence EPA regulations. There was particular disappointment regarding the rail measures and EPA's unwillingness to accelerate locomotive emissions requirements.

The backstop strategy had some potentially significant benefits for the ports. First, it may help the ports' competitive position as all ports in the state must follow the same rules. Although the ports of LA and Long Beach are by far the largest in the state, this standardization reduces the opportunity for ports within California to compete on the presence or absence of environmental regulations. Second, having a hand in designing the regulations, the ports have the advantage of regulations most appropriate to their circumstances, while other ports in different circumstances may find the regulations more difficult or costly. Finally, by integrating CAAP into the regulatory system, the ports were eventually able to rely on regulatory agencies to be the primary enforcer.

6.1.3 Stakeholder responses to proposed plan during public comment phase

In addition to the lack of input, many comments compiled in the CAAP addendum addressed implementation approaches. In some cases, specific measures of the plan were addressed, but most of the discussion related to larger principles of implementation. Groups commented on the ports' strategies, methods of collecting fees, the aggressiveness of the plan and the relationship of the plan to current regulation. Additional criticisms related to the lack of specificity involved in the plan.

The PMSA, shippers and terminal operators advocated for flexibility in implementation. Flexibility included 1) relying more on incentives and voluntary programs; 2) adapting provisions in new lease negotiations to the unique circumstances of each lessee (terminal operator); 3) allowing for alternative technologies to meet the emissions reductions objectives.

Costs were a great concern for many. These groups, together with the railroads, sought a more detailed cost effectiveness analysis. They noted that most of the costs would be borne by industry, yet there was no cost analysis to justify such expenses. The lack of input into the process added fuel to the fire of complaints related to expenses. Because they were excluded from the process, some groups were not convinced that all costs were justified. Pasha Stevedoring Terminals wrote: "Requiring extraordinary investment in questionable technology and purchases of millions of dollars of equipment within an unreasonable timeframe based upon

the arbitrary timing and nature of lease negotiations may appease some vocal activists but will have potentially devastating financial impact on some businesses" (POLA and POLB, 2006, p. 260).

Interestingly, the ports directed all groups to their set of responses to frequently occurring comments where they write "The Ports did not quantify: 1) new equipment, infrastructure, or increased operational and maintenance costs that the industry may incur or 2) air pollution related health impacts and cost to the public. The CAAP was developed primarily as a tool for the Ports to identify measures to be implemented for reducing air quality impacts from port operations. Therefore, in the context of a planning document for the Ports, only the costs that needed to be considered for the Ports' future budget planning were estimated" (POLA and POLB, 2006, p. 19). The ports also wrote, "However, it is important to keep in mind that it is ultimately the shipping industry and the cargo owners that will bear the burden of reducing emissions from the goods movement sources" (POLA and POLB, 2006, p. 19).

Industry groups were also concerned about how the plan would be funded, particularly with respect to possible impact fees. They understood that if sufficient public funds were not forthcoming, more of the cost was likely to fall on industry. Sea Launch, an ocean-based satellite launching company, proposed more public funding. APM opposed fees on vessels or terminal operators, and suggested user fees instead (e.g. fees charged to beneficial cargo owners). Terminal operators cited additional costs as potentially devastating for business.

The CTA and Port Truckers Association expressed different concerns about costs. The CTA supported fees on beneficial cargo owners to pay for truck replacement and retrofit, rather than public funds. The Port Truckers Association named almost all other sources including "Ports/Shipping Companies/Motor Carriers/Brokers/Importers/Distributors/Retailers" (POLA and POLB, 2006, p. 204) as responsible for paying for not only the costs of retrofit or replacement but for the lost wages of independent drivers whose jobs would be eliminated under the plan.

Several comments addressed the relationship of proposed measures with regulatory requirements. They included questions of preemption as well as the aggressiveness of the proposed measures. For instance, one terminal operator commented that the CARB CHE regulation is already considered "aggressive" by industry standards and questioned the need to go beyond that. They argued that the CARB regulation was the outcome of an established process that included public input, studies, and was vetted for cost-effectiveness, financial impact and legality. If CARB acknowledged that the CHE regulation was aggressive based on this process, how could targets beyond these regulations be considered feasible? Moreover, they argued that regional targets create problems for industry, as there is no certainty that these targets would be adopted outside of Southern California, reducing incentives for suppliers of the required technology to serve such a small market.

Comments from railroad firms reflected their market positions. PHL only operates within the port area, and their contracts already included emissions reduction targets. Their comments were focused on gaining greater acknowledgement of their efforts and making clear that agreed upon emissions reductions were dependent upon the availability of more efficient locomotive technology. BNSF and UP, the two major Class I railroads that serve the West

Coast, argued that the ports had no legal jurisdiction. Operational controls and emissions are under federal jurisdiction, per federal interstate commerce law. They argued that any attempt to impose standards not consistent with EPA standards would cause problems. The locomotive engine industry's technology development is based on meeting the EPA standards. Creating different standards would in effect create different locomotive technology markets, reducing scale economies in engine production, and generating operational problems for national railroads. Lease negotiations leading to different operating requirements across terminals would add to difficulties. Ultimately, overly ambitious emissions standards could lead to reduced rail mode share, having the unintended consequence of pushing even more cargo to the less efficient truck mode. The California Trucking Association submitted similar arguments; the plan would be unenforceable due to anti-trust and federal preemption under interstate commerce law.

The ports were not very responsive to these comments, and no major changes were made to the CAAP as a result of public comments. In response to concerns about stakeholder participation, the ports asserted that their public participation process was adequate and that all comments received were responded to or acknowledged in the CAAP's Comment Compendium. In response to the claim that the plan was too aggressive, the ports argued that the measures were necessary in order to achieve early emissions reductions. In response to legal issues, the ports argued that the CAAP was a living document, and the legality and feasibility of the various measures would be determined over time. In response to cost issues, the ports laid out a set of principles for assigning costs including charging the source of pollution rather than cargo in general, and making those who benefit from goods movement – in this case the beneficial cargo owners – absorb as much of the burden as possible.

6.2 Clean Truck Program

The Clean Truck Program is by far the most costly and controversial element of the CAAP. It therefore merits special attention in this research. While the goals of the program as well as options for meeting them were outlined in the CAAP, many details of program implementation were determined after the CAAP was adopted in November 2006.

6.2.1 Program Description

The CTP, stemming from measure HDV1, is intended to replace or retrofit all frequently and semi-frequently calling trucks at both ports with cleaner engines. Specifically, all trucks would have to meet EPA 2007 standards by 2012. The first component of the CTP was a progressive truck ban with three phases:

- By 10/1/08 ban all pre-1989 trucks
- By 1/1/10 ban all 1989-1993 trucks, and require 1994-2003 trucks to use a CARB Verified Diesel Emissions Control Strategy (VDECS)
- By 1/1/12 ban all trucks not meeting 2007 EPA standards

The second component was an enforcement program. All trucks were required to register in the ports' Drayage Truck Registry and equip themselves with a Radio Frequency

Identification Device (RFID) that allowed each terminal operator to verify if the truck was compliant with the program. The RFID tags were also used for security purposes. If the truck did not have the RFID, it would be turned away at the terminal gate. This authority was written into a tariff agreement in 2007.

The third element was the Clean Truck Fee, a fee of $35/TEU charged to the beneficial cargo owner (BCO) for any loaded container carried by a noncompliant truck (e.g. pre-2007). The intent of the fee was to incentivize truck owners to retrofit or replace their trucks on their own and to help finance port funded retrofits and replacements. The fee structure offered exemptions to empty containers, containers moving between port terminals, containers moving on rail, 2007 compliant trucks acquired with non-port funds, and trucks using alternative fuels. In this way, trucks that were compliant and self-financed were exempt, while trucks that used port funding for their retrofit or replacement were charged. Slight distinctions existed between what was charged at each port as explained in Table 6.2. Collection of the fee began in 2009.

Table 6.2 Exemptions to the Clean Truck Fee of 35/TEU for Loaded Containers.

If you have a:	Port of Los Angeles	Port of Long Beach
Diesel Truck (Engine year 2007 or newer) purchased without Clean Trucks Program funds	Cargo Owner DOESN'T Pay (100% EXEMPT)	Cargo Owner DOESN'T Pay (100% EXEMPT)
Alternative Fuel truck (i.e. LNG) (Engine Year 2007 or newer) purchased with or without Clean Trucks Program funds	Cargo Owner DOESN'T Pay (100% EXEMPT) No Scrappage required	Cargo Owner DOESN'T Pay (100% EXEMPT) No Scrappage required
Legacy LNG Truck (See POLB Tariff for Details)	Cargo Owner DOESN'T Pay (100% EXEMPT)	Cargo Owner DOESN'T Pay (100% EXEMPT)
Gateway Cities Truck (Engine year 2006 or older)	Cargo Owner Pays Fee $35 per loaded TEU	Cargo Owner DOESN'T Pay (100% EXEMPT)
Diesel Truck with a 2006 or older engine	Cargo Owner Pays Fee $35 per loaded TEU	Cargo Owner Pays Fee $35 per loaded TEU
Diesel Truck (Engine Year 2007 or newer) purchased with Clean Trucks Program funds	Cargo Owner Pays Fee $35 per loaded TEU Scrappage of old truck required	100% Exempt if truck is purchased before 5/4/2009 and proof of scrappage is provided $35 per loaded TEU FEE APPLIES if truck is purchased on or after 5/4/2009. Scrappage of old truck required

Source: http://www.portoflosangeles.org/ctp/CTP_Clean_Truck_Fee.pdf

The fourth element was the port agreements with licensed motor carriers regarding conditions of drayage truck entry to port terminals, the most controversial part of the program. The original proposal was for the ports to enter into concession agreements with licensed motor

carriers (LMCs) who would in turn use company owned trucks and employee drivers for drayage services. The rationale was that only large carriers had the expertise and financial capacity to turn over a fleet and maintain it appropriately. The ports argued that by virtue of the low wages paid to drayage truckers, they had no means to purchase new vehicles, and would be unable to maintain them given such small profit margins. The LMC was responsible for registering trucks in the registry, compliance with all safety, insurance and security requirements (such as ensuring that workers have the appropriate Transportation Worker Identification Credential (TWIC), and paying the annual concession fee plus a fee for each truck operated. As explained further below, in October 2009 the POLB abandoned the concession model and instituted a truck registration agreement instead.

6.2.2 Legal Issues

The owner operator drayage truckers and small drayage companies that had served the ports for decades strongly opposed the concession plan, but had no means to organize (given anti-trust prohibitions) or communicate a case to the public. As the public symbol of port pollution and unsafe trucks, and composed mainly of non-English speaking immigrants, the industry had neither the image nor capacity to launch an effective opposition campaign. The American Trucking Association (ATA) stepped in and became the lead opponent to the concession plan. On July 28, 2008, the ATA sued both ports, challenging the legality of the concession model and demanding an injunction to stop it.

The ATA had two major concerns. First, concessions were opposed on the basis of interference with interstate commerce. They claimed that certain aspects of the concession were preempted by the Federal Aviation Administration Authorization Act (FA4) because the ports did not have the authority to regulate the prices, routes or services of motor carriers[17]. Second, the ATA was opposed to the restriction to employee drivers. As explained by one of the interviewees, the traditional business model for drayage trucking was a blended fleet operated by a motor carrier licensed by the state Department of Transportation. The licensed motor carrier (LMC) can either hire employee drivers or independent owner operators who bring their own equipment. Thus restrictions on this blended model were viewed as an attempt to dictate trucking industry business practices. Related to the issue of employee drivers was the less openly discussed concern of unionization. It was widely known that the Teamsters and NRDC were working together to influence the CTP, and many trucking company owners saw the concession plan as a way for drayage drivers to unionize as Teamsters. However, the ATA was careful to focus only on the legal issues related to concession, while at the same time noting its full support for the expected clean air improvements.

In response to the request for injunction, the ports filed their opposition motion on August 21, 2008 claiming that the ports are sovereign and it is in their authority to manage their land as they see fit. Second they claimed that the "market participant doctrine" applied to them and that since they were providing a service as a commercial entity, the concession agreements

[17] Although a decision regarding the program was reached in the courts, the POLA also lobbied for legislative amendments to the Federal Aviation Administration Authorization Act (F4A) so that Ports could have greater regulatory authority over harbor trucking. Mayor Villaraigosa was an advocate for this change and was also supported by the Mayor of Oakland, the Mayor of Newark, NJ, and the Mayor of New York City. To our knowledge, no changes have been made.

were valid. Third, they claimed that the program held great importance for safety and security as well as public and environmental health (POLA, 2008b). On September 8, the US District court denied the request for an injunction, but the Court of Appeals reversed this decision in March 2009, allowing an injunction until a trial could take place. The district court allowed the clean air portions of the plan to remain, but not the concession model. In August 2010, the court reversed the injunction and upheld the Clean Truck Program at POLA along with its concession model. At the time of writing, the POLA had reinstated its concession model.

In October 2009, POLB settled with the ATA out of court and shifted to a registration model. The registration model still required compliance with safety, security and environmental provisions as well as registration in the Drayage Truck Registry. The registration agreement did not require employee drivers. In response to this settlement, the NRDC along with other environmental groups sued the POLB in January 2010 saying the suit illegally weakens efforts to improve air quality. Environmental groups support the employee model because they feel that independent owner operators won't have the resources to properly maintain their trucks and that without this maintenance, the environmental benefits of the new trucks will be compromised.

Similarly, the Federal Maritime Commission filed suit on November 18, 2009 to request an injunction on the grounds that the CTP violated the Shipping Act of 1984 by reducing competition and causing an unreasonable increase in transportation costs and reductions in service (FMC, 2008). The court overturned this suit and found in favor of the ports on April 2009. In June 2009 the FMC dismissed the suit on the grounds that current economic conditions did not lead to the unreasonable change in price previously predicted (FMC, 2009).

6.2.3 Financing and Business Impacts

As a result of the plan, more than 75% of all trips were made with trucks compliant with 2007 standards as of February 2010 (POLA and POLB, 2010). Funding for truck retrofits and new vehicles came from a number of sources in addition to the CTF. Proposition 1B[18] provided $98 million towards $50,000 grants for the purchase of 2007 trucks. POLB provided $37.5 million in lease to own financing as well as $1 million for the retrofit of 1994-2003 trucks. The POLA provided $44 million for grants of $20,000 for privately funded 2007 trucks. In addition, POLA, POLB and AQMD provided $25 million for purchase of LNG trucks. In order to qualify for this funding, the trucks had to also receive Prop 1B money then they received an additional $50,000.

Despite the availability of grants and lease arrangements, the costs of purchasing a new truck were too high for many owner operators. The funding provided was not enough to fully replace a truck, so owners had to make up the difference. One interviewee reported that economic conditions at the time of the program made it very difficult to get credit to fund the remainder of the purchase. In addition, security and safety requirements added to costs, and the newer trucks were more expensive to operate. According to our trucking industry respondent, the result was the elimination of the most marginal operators and reduction in the size of the local

[18] Proposition 1B, also known as the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006 was passed by voters in 2006. It authorized $1 Billion dollars in bond funding for incentives to reduce goods movement related diesel emissions. In addition to grants for Clean Trucks, Prop 1B provided money for many goods movement related projects including grade separations, highway improvements, and other port related projects.

industry, as well as increased rates. The CTP had the effect of cleaning up the industry. The new requirements "make[s] it a more serious business" because truckers "can't operate on the fringe anymore." A terminal operator also expressed concern that the program may have reduced the supply of drayage trucks and drivers. Because of the recession, it is difficult to determine the extent or cause of changes in supply; even without CTP, the decline in trade would have eliminated some drayage operators.

6.2.4 Observations on CTP

We have noted that although drayage trucking represents a smaller portion of particulate and other emissions than other sources, it was targeted for the biggest changes. What motivated the ports to establish such a controversial program? There are models other than the concession model that could be used to retrofit the fleet, and in fact POLB eliminated this component as a way to settle with the ATA. The commitment of POLA to the concession plan, and its willingness to fight a lengthy and costly legal battle suggests that a lot was at stake. The strong alliance of the Mayor with organized labor, the public perception of drayage trucking as being the main problem, and the support of environmental justice groups to improve the lot of poorly paid immigrant workers may have all played a role. POLB was in a somewhat different position and went a different direction, likely due to the relatively greater economic importance of the port on the city economy.

6.3 Findings

Development of the CAAP represents a break with the dominant actors model. Unlike the NNI effort or the PierPass program, the ports elected to create the CAAP independently. Stakeholders were included only to the extent that the ports needed to determine whether a strategy could feasibly be implemented. Thus informal interactions took place with terminal operators or steamship lines or longshore labor, all of whom had a form of veto power. Environmental groups and local community groups also had indirect access. In fact, it was their success in preventing port expansion projects and influencing public perceptions that had motivated the CAAP. Collaboration with regulatory agencies is explained by the agencies' roles in both pollution measurement and regulation. It would do no good for the ports to invest in a massive change of business practices if the emissions reductions were not verified and acknowledged.

Restricting participation was defended on practical grounds; it would have been impossible to generate such a plan in a few months under an open, consensus based process. The public comments support the ports' perceptions. Industry comments were overwhelmingly negative, citing cost, feasibility issues, and threats to business. Community comments urged that the plan go further to reduce pollution. Nevertheless, excluding the ports' natural allies and business partners was a big risk. Ultimately, beneficial cargo owners determine the route of discretionary cargo. If a major customer decides that the LA/LB ports are too costly or unreliable, there are other options for getting goods to markets. Taking this risk may reflect the degree to which the ports felt there was no option but to satisfy the demands of environmental and community leaders. The only other alternative was to forego any future growth of the ports. Taking the risk may also reflect the political nature of the CAAP, with city leaders insisting that

pollution problems be solved.

Another indicator of the breakdown between ports and their natural allies was their treatment of CAAP costs. Industry representatives were clearly dissatisfied with the lack of consideration of the costs that would be imposed on terminal operators, steamship lines, railroads and others. Yet the ports simply responded that these costs were beyond the scope of their analysis.

With regard to CAAP costs, the strategy seems to have been to come up with the plan and obtain funding later. For the ports, the big issue was getting access to funds to finance the $1.8 billion CTP. Development of CAAP took place at a time when port volume was growing rapidly, and when the fees imposed by the PierPass program had apparently no impact on business. Thus the ports could assume that additional fees would have little effect. Even in a growing market, however, response to fees is not inelastic. Thus another critical component was access to bond financing, at the time expected via the Prop 1B state infrastructure bond program. The need for this funding also influenced the shift in the ports' institutional relationships.

By far the most radical part of the CAAP is the CTP. True to our dominant actors model, the drayage industry had no part in the development of the CTP. Rather, the evidence suggests that implementation of the CTP was the result of external influences: the LA City mayor's well-known ties to labor; the teamsters union seeing an opportunity for additional members, the NRDC and others arguing that independent owner operators did not have the means to either purchase new trucks or maintain them properly, and that restructuring the drayage industry would lead to better jobs and increased safety. Due to these external influences, the two Ports eventually chose to implement the program differently. POLA has continued to push for the original program that requires approved trucking firms and employee drivers, while POLB has abandoned the concession model.

CHAPTER SEVEN: OUTCOMES AND CONCLUSIONS

This chapter examines CAAP outcomes in terms of CAAP implementation and impacts. We summarize outcomes of the various CAAP strategies, and describe its impacts on stakeholders and stakeholder relationships. It bears noting that the CAAP has not been completed, and longer term impacts are yet to be observed. At the time of writing, the ports were working on a 2010 draft CAAP.

7.1 Outcomes

Implementation of the CAAP proceeded swiftly. Progress has been made on many of the Plan's measures, and emissions reductions have been documented. According to the ports, for the year 2009, the CAAP lead to a 58% reduction in DPM, 48% reduction in NOx and 61% reduction in SOx as compared to the emissions that would have been released in 2009 without any of the CAAP control measures. Interestingly, these figures only account for control measures applied to OGV, CHE and HDVand exclude any reductions that may be associated with harbor craft or rail (POLA and POLB, 2010b). This section summarizes CAAP implementation to date. Appendix C provides a summary table describing the status of each of the control measures.

Heavy duty truck measures

Chapter Six described implementation of HDV1, the CTP. As of February, 2010, 75% of the drayage trips are now compliant with EPA 2007 standards. HDV2 called for constructing an LNG terminal with the intent of shifting 50% of all truck trips to alternative fuels. A CNG and LNG facility was completed in March 2009. No data are available on extent of alternative fuel use.

OGV measures

OGV1 called for 100% participation in the vessel speed reduction program to 40 nm from shore. As of 2009, the participation rates were 92% and 90% at 20 nm (the distance under the previous VSR program) for POLB and POLA respectively, and 72% and 53% at 40 nm. Incentive tariffs (e.g. berthing rate discounts) and dock gang assignments at 40 nm, enforced via lease requirements on terminal operators, were implemented.

OGV2 called for electrification of all container and cruise terminals by 2011 for POLA and 2016 for POLB. By 2010, 2 container berths at POLA and 1 at POLB were AMP capable. Only a small share of container ship calls has used AMP: 4% for POLA and 1% for POLB. The main constraints to electrification include the high costs of the AMP infrastructure and the need for ships to be retrofitted to use it.

OGV3 sets a low sulfur fuel standard for auxiliary engines (the engines that power ships while at dock or anchor), and OGV4 sets the same standard for main engines. Because CARB instituted the same requirement in 2007, all ship calls were compliant for auxiliary engines, and about 13% were compliant for main engines. In April 2008, however, the regulation was suspended due to legal challenges from the shipping industry claiming that CARB did not have jurisdiction. The ports instituted a voluntary program supported by incentives that paid for the incremental cost of using cleaner fuel while in transit, in exchange for participation in the VSR program and use of the cleaner fuel in auxiliary engines while at berth. This program began in July 2008, giving CARB the opportunity to rewrite the regulation in a more defensible way. When the new law took effect in 2009, the incentive program ended. Between July 1 and December 31 of 2008 14% of all OGV calls at the POLA and 6% of all OGV calls at the POLB voluntarily switched to low sulfur fuel in their auxiliary engines.

OGV5 is part of the technology advancement program, and calls for testing of technologies to reduce ship emissions. A few technologies have been tested to reduce NOX emissions.

Cargo handling equipment

CHE1 seeks to accelerate upgrades of equipment. Implementation is through lease requirements. At least two POLB terminals have signed "green leases" which include the upgrade requirements.

Harbor craft

HC1 seeks to accelerate upgrades of emissions technologies, reaching increasingly strict standards in 2 and 5 years. Ports have provided information and facilitated seeking of funding sources. In 2009, the Port of Long Beach began construction of shore power infrastructure for tug boats at the Foss Terminal. At POLA, tub boats at the Crowley terminal can use shore power. The extent to which upgrades have been achieved is unknown[19]

Railroads

RL1 targets the small PHL railroad that operates the switch engines used in on-dock rail. All PHL engines were to be replaced with cleaner engines using emulsified or alternative diesel fuel and retrofitted with diesel particulate capture systems. By mid-2008 all of the fleet had been replaced. It should be noted that this agreement was in place prior to the adoption of CAAP, and the purchase of the new engines was funded with $10 million from the ports and $3.2 million of Carl Moyer funding via the AQMD. The amount spent by PHL to comply with the agreement is unknown.

RL2 calls for all switcher and helper locomotives operated by the Class I railroads to be 90% controlled for PM and NOX, be subject to idling restrictions, and use ultra low diesel fuel. As of 2010, according to the ports, some idling has been reduced and some use of the ultra low fuel has occurred. In this case the ports and CARB have no jurisdiction, and the provision was

[19]The 2009 Emission inventory provides limited information on engine replacements. It is assumed that most of the replacements were made between 2001 and 2005..

contingent upon an MOU between the railroads and CARB. RL3 requires "cleanest available technology" to be used in any new or redesigned rail yard. No new rail yards have been developed since start of CAAP.

7.1.1 Observations on Outcomes

We make the following observations regarding the performance of CAAP to date. First, much of the CAAP has been implemented, and emissions reductions have taken place. It was beyond the scope of this project to verify the emissions reductions calculated by the ports. We cannot say whether the ports' numbers adequately accounted for the slowdown in port traffic and the overall reduction in economic activity within the region over the past four years, which would have reduced emissions independent of any changes due to the CAAP.

Second, with the notable exception of the CTP, the best performing measures were those that were already in progress prior to CAAP, either initiated by the ports or regulatory agencies. For instance, the ports built on the success of the existing VSR program and the PHL engine replacement program. The CAAP also included regulatory measures that were under consideration by CARB at the time of document creation, for example the shore power regulation which was finalized in 2007. Third, as would be expected, low cost measures were more successful than high cost measures. Measures that involved high costs to industry, such as the capital investment required for cold ironing, or fleet upgrades were negotiated slowly. Even smaller operational changes that involved some cost, such as an upgrade to cleaner burning fuels, had mixed success. In contrast, the VSR program had developed over several years, and the ports had learned what incentives were effective in getting ships to comply (Linder, 2010). In prior work we found that the additional travel time incurred as a result of slowing down was quite small, and the incentive of pre-arranged gangs did not impose large costs on terminal operators. Although lower cost strategies such as VSR are effective, they target a limited portion of vessel emissions.

Despite the controversy and lawsuits, the CTP has achieved its main goal, that of replacing the drayage vehicle fleet. This is a remarkable achievement. How did the ports manage to prevail? First, the ports provided a substantial amount of funding, but also relied on state money from Prop 1B bond funds for the program. Second, the ports were able to force their replacement plan on drayage trucking, because the industry was not sufficiently organized or capable to object. Third, the ports effectively used their position to portray opponents as ignoring the health problems of the community, getting in the way of progress to clean up the air, and profiting from the low wages and poor working conditions of immigrant drivers.

7.1.2 Observations on Strategy

The ports followed two main strategies in developing CAAP. They restricted participation in the development of the Plan, and they aligned with regulatory agencies to get the plan provisions supported by the existing regulatory framework. The ports were responding to social and political pressures. They knew that a consensus-based process would be time consuming and would limit options. They understood that the public had to be convinced that

emissions would be reduced. Thus the emphasis was on one of the most visible symbols of port pollution, the drayage truck.

Alignment with regulatory agencies provided the "backstop" and provided a long-term structure for further emissions reductions. The ports took the initiative to make big changes, but were able to withdraw from self regulation by working with regulatory agencies to formalize their programs. On the other hand, by formalizing these requirements, the ports will have to do more to go beyond compliance in future iterations of the CAAP.

Strategically, working together and formalizing air quality efforts into an action plan helped attract some of the positive publicity that the ports desired. Both ports had previous independent policies and task forces in place to deal with air quality issues. In addition, several programs and agreements were in place prior to the CAAP. However, the CAAP trumped them in that it was a specific plan, grouped previous efforts into one umbrella, and was launched uniformly by both ports. Though the plan also attracted negative publicity and litigation, this may have helped to convey the message that the ports were serious about air quality issues. As noted in previous chapters, these strategies had many potential advantages for the ports.

7.2 Impacts on Stakeholders

7.2.1 Changes in relationships

The CAAP has led to several changes in stakeholder relationships. Perhaps the two most significant changes are the alienation of many industry segments and the strengthening of the relationship between the ports and the air quality agencies, SCAQMD and CARB. The alliance among ports, steamship lines, terminal operators – the "natural allies" – has been broken, or at least weakened. Our interviews showed the dissatisfaction of industry partners with the CAAP development process. The official comments and testimony included many questions and concerns about the program. The ports' almost dismissive treatment of concerns about costs further illustrated the breakdown in key relationships.

The PMSA respondent said, "…the relationship has become adversarial as a result of exclusion. This was a reversal from the past." The respondent also noted that there was a sentiment among shippers that they were not getting the level of service they were paying for. The PMSA website's "blog corner" reflects the dissatisfaction with the ports, with several entries criticizing the politicization of decision-making, the burdensome nature of environmental rules, and the lack of concern with maintaining the ports' competitiveness.

We note that although relationships had soured, there were still some signs that the ports were responding to shipper concerns. For example, the proposed infrastructure fee was postponed to 2012, POLA discounted berthing rates, and both ports continue to provide the financial incentives associated with the VSR program despite the already high participation rates.

The break between the two ports over the CTP provides further evidence of the breakdown. Although the ports have historically been in strong competition with one another, they also have a long history of cooperating when it is in their interest to do so. Clearly the CAAP was something that required cooperation; neither port could have imposed such a plan

independently. Since they compete for the same market, additional costs of any sort would simply cause them to lose business. But the two ports face somewhat different political environments. The Port of Long Beach and its associated business comprise a much larger share of the city's total economic activity than is the case for Los Angeles. In addition, the Long Beach City Hall is located a short distance from the ports. Physical proximity likely reinforces the interdependence of the city and its port. In contrast, the Los Angeles City Hall is 20 miles north of the ports, and port-related activity is not the only important economic engine in the city. With regard to the CTP, Mayor Villaraigosa is well known as a staunch labor supporter, and was willing to take a risk. Ultimately the stakes became too high for Long Beach to continue to fight for a restructured drayage industry.

The second big change was the close collaboration of the ports with the state and local air quality agencies. Given the goal of significantly reducing emissions in a short period of time and the constraints on what the ports could do by themselves, this collaboration makes sense. As noted in Chapter Six, aligning with the regulatory agencies was necessary to persuade them to take actions only they had the authority to take, as for example in building in a diesel emissions reduction schedule to state regulations. Regulatory agencies provided the backstopping for some of the CAAP elements, giving them enforcement authority. Incorporating CAAP elements into regulations also allowed the ports to use the CAAP as a short-term enforcement strategy and shifting long-term responsibility back to the regulatory agencies. Our trucking representative concurred that the CARB measures would prevent backsliding on diesel emissions, and it was her view that the state would continue to increase standards as new engine technologies develop. Finally, collaboration allowed the ports to shape the rules, presumably to their advantage.

Our interviews suggest that the relationship between the ports and regulatory agencies is not entirely smooth. Some potential for conflict remains, particularly between the ports and SCAQMD. SCAQMD's position that ports can be regulated as an indirect source is not shared by the ports. When SCAQMD began considering additional backstopping rules, the Long Beach port representative argued that further rules were unnecessary, given that the ports had already gone far beyond regulatory requirements.

Another important relationship for the ports is that with the local community. The perception of our port representatives is that community relations have improved. In their view, getting projects approved has become easier. For example, the POLA representatives stated that the TraPac project would not have been approved without the CAAP. Additionally, "CAAP brought credibility to the ports; we were moving forward with something serious and aggressive." While the perception is important, the objective evidence on a changing relationship will come as port projects move to implementation without the same frequency of lawsuits and community opposition as was the case in the decade of the 2000s.

7.2.2 Business Impacts

A major issue associated with the CAAP is its impact on the competitiveness of the ports. The added costs of complying with the CAAP, as well as the uncertainty associated with restructuring the drayage industry and introducing new technologies, should in theory have some negative impact on port competitiveness, all else equal. The AAPA data show that the LA and LB ports have lost market share. Port volumes have declined relatively more in the recession than west coast ports in Canada and Mexico. However, it is not possible to separate out what

effect the CAAP might have had, compared to price and service adjustments at other ports and the relative intensity of the economic recession in different parts of the US.

The consensus among interviewees was that there have been cargo diversions; however, most interviewees found it difficult to separate the impacts of the CAAP on the port business from the decreases in business due to economic changes. The POLB interviewee admitted that there was a loss of market share but it was hard to know if it was due to environmental policies. He pointed out that in response to labor issues in 2002, many shippers began to use a multi-gateway strategy, and the ports have not fully recovered their market share since that time. The terminal representative reported that higher costs such as the clean truck fee led to a diversion of cargo and in particular discretionary cargo. However, she could not say how much diversion was due to the fees as opposed to the economic climate. The labor representative felt that the economic down turn has reduced cargo flow but also that the CAAP has caused shippers to look at alternative routes.

As explained by the POLA interviewee, most tenants also have terminals in other ports, so they can easily shift their business to other places where they have terminals. The PMSA and labor representatives reported that fees and regulatory costs related to environmental mitigation have become known within the industry, and other ports have begun to advertise their lower costs. For instance, the port of Seattle is advertising that they are "fee free." The PMSA reported a feeling among shippers that they are paying more to use the SPB ports but they are not getting anything in return. If the fees were more directly related to infrastructure improvements, they felt there would be less diversion.

The terminal representative also indicated that maintaining the shipper's business was a challenge. They were not able to pass on additional costs incurred because the shipper could easily leave the ports. In addition to a slight decrease in business, she reported that the terminals were incurring other losses such as retired equipment that they were unable to sell. She said that ordinarily they would sell this to ports at other countries, but due to the economic climate, they weren't able to do so. She was hopeful that they would sell when the economy turned around. When asked if her terminal was considering moving to another port, she indicated that they had made long term plans to stay. They would like to expand if possible and they were committed to a longer lease. However, she also pointed out that they would need to follow the shippers. Decisions about their terminal are tied to the shipping companies that call there frequently. Furthermore, she felt that other ports would have to face similar challenges at some point.

Because the CAAP is the first national effort of its kind, port officials felt that other ports would soon feel environmental pressures and also be forced to adopt similar measures as they were "at the leading edge of a new movement." Because they were leading the way, they felt that the plan would not harm them in the long term. Eventually other ports would be forced to catch up. The trucking industry representative agreed that other ports would eventually have to implement similar environmental efforts. However, since the other ports are so much smaller, she points out that their actions won't be required to be as drastic.

The competitive environment is constantly changing. States and localities around the US are investing in infrastructure to attract additional trade. The Panama Canal expansion is scheduled to open in 2014, allowing large ships another route to Midwest and eastern US

markets. New railroad connections are being built to increase the efficiency of trade lanes from Mexico to US markets. As competition increases, cost, speed and reliability will determine the flow of discretionary trade. It may not be so much the CAAP as the cumulative impacts of fees and prices as well as congestion at the ports, on the highways, and on the rail lines that affect the future of the southern California ports.

7.3 Summary on Overall Impacts

This report began with the statement that the CAAP was unprecedented in its process, structure and ambitious emissions reductions goals. Much of the plan has been implemented, and significant emissions reductions have been achieved. We offer some observations on overall impacts of CAAP in this final section.

7.3.1 Conclusions on CAAP

We offer the following conclusions on CAAP:

- *A response to social and political pressure:* CAAP was a response to social and political pressure that had built up over several years. From the release of MATES II in 2000 and the first NRDC lawsuit to the build-up of legislative regulatory efforts and repeated challenges to new projects, the ports were facing an increasingly untenable situation. It became clear that the ports would not be able to continue to grow without responding to these pressures. The CAAP was an effort to regain legitimacy and protect the long term fortunes of the ports

- *Realigned institutional relationships:* The decision of the two ports to collaborate and develop the CAAP with little participation from key industry stakeholders was necessary in order to construct a strong emissions reduction plan. The consequence was a breakdown in longstanding alliances among ports, ocean shipping lines, terminal operators and others. The decision to link CAAP with state and local regulations, and to collaborate with regulatory agencies to make this happen was strategic. It resulted in a new alliance between the ports and regulatory agencies. Whether the old alliances will be reconstituted when CAAP is completed remains to be seen.

- *Provisions reflected constraints and market power positions:* CAAP provisions were based on what could be done, not on what would lead to the greatest emissions reductions at least cost. Provisions reflected regulatory constraints: ocean shippers faced voluntary regulations, such as VSR, or were not financially responsible for costly provisions such as cold ironing (except for their own vessel retrofits.) The Class I railroads could not be pushed beyond the provisions of previously signed MOUs with CARB and the ports. New conditions could be imposed on terminal operators when leases were renewed or revised, but these conditions led to costs that were negotiated rather than imposed. In contrast, the entire drayage industry was intended to be restructured, without any significant input from those who would be most affected.

- *A long term strategy with short term benchmarks.* The CAAP was strategic in that the measures were written to have clear endpoints while at the same time, leaving the door open for future improvements. The majority of CAAP measures built on state and local regulations, pushed regulators to impose more rigorous standards, and were structured to

leave regulators as the long-term enforcers. At the same time, by creating such an ambitious plan, the ports were taking on the responsibility of a longer term investment in continuous improvement. The CAAP update that was released in 2010 focuses on additional beyond compliance measures, such as the creation of port-wide and source specific emissions standards. While the initial source specific measures discussed in this report remain largely the same in the new version, the CAAP brought about a longer term expectation of emissions reductions. Though still unproven, the updated CAAP gives evidence of that commitment.

7.3.2 Broader Implications of CAAP

Our study suggests some broader conclusions regarding CAAP. First, social and political pressures are real and significant. There is strong evidence to support our conclusion that the ports were motivated by social pressures and concerns about social legitimacy. Social pressures came from many sources: the NRDC and other environmental advocates, community organizations, local and state political leaders, and regulatory agencies. The election of Mayor Villaraigosa and his reconstitution of the Board of Harbor Commissioners reflected a big change in the political climate. Protecting port business was no longer the only objective; addressing environmental concerns became at least equally important. As a strong defender of union labor, the Mayor was an obvious supporter of restructuring the drayage industry to an employee workforce that could then be unionized.

Second, CAAP is a demonstration of the potential power of ports in determining the conditions of port trade. No other entity could have put together such an ambitious plan and accomplished so much. The ports were influential in getting many of the state bills rejected and persuading the Governor to veto bills that would impose new fees on port trade. They are active participants in international forums aimed at reducing emissions of ships. Their large financial resources have allowed them to fund dock electrification, alternative fuel facilities, and even development of new technologies. The ports also had the power to impose new costs on even their close allies. Ports historically have been recognized as particularly powerful public organizations; it would appear this remains the case. Perhaps the best example was the ability of the POLA to have their concession model upheld in court. Even if this case is appealed and reversed, their influence is demonstrated by the ability to change the fundamental business model of a key part of the supply chain.

Third, the objective of CAAP to restore social legitimacy and allow the ports to grow has yet to be demonstrated. Although agreements have been made to allow the TraPac expansion project to go forward, for example, the consequences of this agreement will be important to monitor moving forward. This agreement gives citizens even greater say in how port money is spent as there is an active citizen oversight committee. Environmental and community challenges are expected on several projects that remain in the queue, including the Southern California International Gateway (SCIG), and the proposed BNSF near-dock rail yard. The continuing challenges to the CTP, and the break between the two ports on the CTP leaves the ultimate outcome on future structure of the drayage industry still uncertain. This issue is particularly complex, since the NRDC has a pending lawsuit against the Port of Long Beach for allowing independent owner operators to serve the port. In the current recessionary environment, there is less pressure to get new projects done. If trade recovers to pre-recession levels (and the 2010 numbers suggest that trade is recovering), there will be growing pressure to

push expansion projects forward. If the ports succeed in getting expansion projects under construction, and market share is maintained or increases, the business payoff of CAAP will be demonstrated.

Fourth, the extent to which CAAP has affected the ports' competitiveness is unknown. The CAAP was launched on the eve of a severe recession that resulted in a drop of port traffic of 25%. 2005 was the peak year for Pacific Coast market share, and the share has gradually dropped since 2005. Within the Pacific Coast market, the LA/LB share peaked in 2006 and has declined since then. Prior to the recession, the main problems for LA/LB were congestion on the rail and highway networks and the growing efforts to impose fees and regulate port related trade operations. It is not possible to unravel which of these major factors may have contributed more to the decline in market share, or indeed whether these changes were more a function of changes in service and prices at other ports. Competing ports have used the problems at LA/LB in their marketing, which suggests that other ports see these problems as a way to attract business. The choice facing the ports was whether a radical emissions reduction program was more risky than continued constraints on any port expansion and continued deterioration of local public and political support. Port respondents felt that the CAAP was the better option, and in the long run would be the most beneficial to the ports.

Finally, there is the question of whether the CAAP sets a precedent that will be followed at other ports as local communities become increasingly intolerant of port related externalities. All the major US ports have some form of "green port" program. These programs typically include water quality, recycling, energy efficiency, etc. Several ports have implemented some form of extended gate hours including the ports of Savannah and New Orleans, and a few have even implemented clean truck programs that require drayage truckers to register with the ports and use newer trucks. However, the programs are far more lenient than the CTP. For example, the Seattle program requires registration and use of 1994 model year trucks or newer. The Ports of New York and New Jersey also require registration and use of 1994 model or newer trucks, with all pre-2007 level trucks to be phased out by 2017 (compared to 2012 in LA/LB). Neither program has a clean truck fee, and neither calls for the restructuring of the drayage industry.

There are several reasons to expect that emissions reductions efforts at other ports would not be as dramatic as those included in CAAP. First, only the Los Angeles region is a severe non-attainment area for ozone (and a non-attainment area for other criteria pollutants). No other major port is located in a metro area with a more serious air quality problem. Thus no other area has either the same incentive to implement aggressive programs or the regulatory support to backstop such programs. Second, the dominant position of the LA/LB ports in west coast trade had allowed them to impose higher prices and presumably generate more profit that could be used to subsidize strong clean air programs. Third, the port trade is highly competitive, and states and localities that see port trade as an engine for economic development have no incentive to impose costs or regulations that would discourage business. Thus is it more likely that "green practices" developed at LA/LB will be scaled back and adapted to local circumstances in ways to communicate the message of being green without incurring substantial costs to shippers or cargo owners. Fourth, other ports have the benefit of learning from LA/LB. It is only reasonable that other ports would not wish to incur a long court battle to try to restructure the drayage trucking industry when a registry system and modest equipment requirements will accomplish almost as

much. The success of the VSR program, developed over several years of experimentation at LA/LB, provides a useful model for other ports. Thus we would expect other ports to take the most successful parts of CAAP and adapt them to local circumstances.

Perhaps the greatest lesson from LA/LB to other ports is to not allow public opinion to become so negative before taking action. The Seattle ports, for example, have little need to regulate drayage truck emissions beyond EPA requirements, as the air pollution problem is minimal (only Tacoma is non-attainment, and only for PM 2.5). Moreover, use of low sulfur fuels for OGVs will have far more impact on particulate reduction. However, drayage trucks are the visible symbol of port operations to much of the public. Because problems are less severe at other ports, it is also easier to be proactive.

The LA/LB ports took unprecedented action in the CAAP, and in the process alienated key stakeholders, empowered local communities, possibly lost competitive advantage, and significantly reduced emissions. Improved air quality will generate large health benefits in the form of reduced morbidity and mortality. Whether the ports' strategy to "grow green" helped them to maintain competitiveness is unknown and will likely be difficult to determine. From an air quality perspective, the CAAP was a success.

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APPENDIX A: LIST OF NEWS ARTICLES FOR MEDIA REVIEW

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APPENDIX B: SAMPLE INTERVIEW FORM
" Interview Questions for the Ports"

Origins of CAAP

1) We would like to clarify the regulatory environment, including EPA, ARB and AQMD.
    a. What do you see as your responsibility in reducing emissions?
    b. What kind of jurisdiction does each agency have?
2) How did the idea for the CAAP come about?
    a) How did the CAAP emerge as a cooperative effort with the POLA?
3) Who was involved in developing the plan?
    a. Who did the port consult?
    b. Who participated in the development process?
    c. What role did regulatory agencies have in creating the plan?
    d. Who made the decisions regarding what ultimately went into the plan, and how did this decision process work?
    e. Can you talk about the stakeholder working group?
4) How were the elements of the CAAP (e.g. specific provisions, targets) determined?
    a. What criteria were used to decide what went into the plan?
    b. How was the order of implementing the CAAP goals determined?
    c. What where the economics behind what was included in the plan? (In which ways did the plan make economic sense?)
5) What were the port's reasons for creating the CAAP?
6) What role did external factors play in influencing the ports' decisions?
    a. Did the China Shipping Law suit influence the creation of the CAAP?
    b. Did knowledge of state efforts regarding green house gases and AB 32 have an influence?

Status and Outcomes

7) What is the current status of the CAAP?
8) How has implementation changed in light of recent economic changes?
9) What were the strategies for financing the plan? Have these changed in light of recent economic conditions?
10) Has your business changed as a result of the CAAP, ie,
    a. gain or loss of customers, attracting different customers?
    b. Ease of project construction?
    c. Different relationships with regulators/customers/community/other ports?
11) What were the regulatory outcomes of the CAAP?
    a. Have any regulations resulted from the CAAP?
    b. Have you had input into regulations?

APPENDIX C: SAMPLE INTERVIEW FORM " Interview Questions for Industry"

Origins/background

1) In your opinion, how did the idea for the CAAP come about?
2) What, if any, level of participation did you have in creating the CAAP?
3) Is it significant to your business that the plan was a joint effort between the two ports?

Implementation

4) How has the CAAP changed your operations? How will this change in the future?
5) Does the CAAP result in an economic gain or loss for your company?
6) Have you participated in any incentive programs resulting from the CAAP?
    a. Technology testing/ TAP program?
7) Is there a regulatory benefit for beyond compliance efforts? Do you receive credits from regulatory agencies from beyond compliance efforts?

Outcomes

8) Has your business changed as a result of the CAAP?
    a. Have you gained or lost customers?
9) Do you think the CAAP has changed the competitiveness of the ports?
    a. Do you think you would increase/decrease your business with the ports as a result of the plan?
10) How does the CAAP compare to environmental efforts at other ports? (if relevant)

APPENDIX D: DETAILS ON OGV REGULATION

Several laws delegate control of California's coastal waters to the state and the federal government, and international treaties specify a nation's authority over ocean waters, primarily related to their distance from shore. Table D.1 summarizes authority as related to distance from shore according to international and federal law.

Table D.1 State and national authority over ocean waters

Zone and Distance from Shore	Authority held by nation (U.S. Commission on Ocean Policy, 2004)	Meaning for OGV emissions	Authority granted by
0 NM Baseline	All waters inland of the baseline are under national sovereignty	US law applies	1958 United Nations Convention on the Territorial Sea and the Contiguous Zone and the 1982 United Nations Convention on the Law of the Sea
0-3 NM[20] Overlapping state and federal waters	US maintains control over commerce, but state can argue authority for environmental protection.	Overlapping state and federal authority	Submerged Lands Act of 1953
0-12 NM Territorial Sea	Nations have sovereignty over this space, but allow for the "innocent passage" of foreign vessels and air craft.	US law applies to all vessels	Declared by Regan in 1988 and recognized by United Nations Convention on the Law of the Sea
12-24 NM Contiguous Zone	Nation has authority for fiscal, immigration, and sanitary laws.	US law applies to all vessels	President Clinton declared this zone in 1999
12-200 NM Exclusive Economic Zone	Nation may use the living and nonliving resources in this area for economic purposes and can exert authority for scientific exploration and environmental protection. US does not assert control over vessel transit.	International Law Applies	Regan declared EEZ in 1983 but this also overlaps with the Continental Shelf, described by the 1958 United Nations Convention on the Continental Shelf

[20] In Texas and Florida, the state has authority out to 9 NM.

Zone and Distance from Shore	Authority held by nation (U.S. Commission on Ocean Policy, 2004)	Meaning for OGV emissions	Authority granted by
Beyond 200 NM High Seas	Shared waters.	International Law Applies	

While it is accepted internationally that US jurisdiction over OGV emissions extends to 24 NM, the boundary between state and federal authority is less clear. A multitude of state and federal agencies have some say over coastal waters[21]. States can manage, develop and lease the resources in the 0-3NM zone, however, the federal government retains control of commerce, navigation, power generation, national defense and international affairs in this area. Although the area beyond 3 miles from shore is federally controlled, states can challenge federal actions using the Coastal Zone Management Act. According to this law, the federal government must approve a state's coastal zone management plan, but the state may challenge federal activities that could impact its coastal resources in a way that is contrary to this plan. The multiple authorities involved in this zone provide a system of checks and balances between the state and federal government.

[21] Within California the Resources Agency of California, the California EPA, the California Health and Welfare Agency and all of their departments have some role to play in management of coastal waters. At the federal level, the departments likely to have the most influence over ocean going vessels are the EPA who can monitor and enforce pollution control, the National Oceanic and Atmospheric Administration (NOAA) and the US Coast Guard and Maritime Administration.

APPENDIX E: STATUS OF CAAP MEASURES

Measure	Goal	Accomplishments/status	Implementation Strategies
HDV1 – Performance standards for on road HDVs	By 2011, frequent and semi-frequent callers to meet or exceed 2007 EPA on road PM standards (.01 g/bhp-hr).	The first ban on the dirtiest trucks (pre 1989 engines) took effect in October, 2008. In Jan 2010, all pre 1993 MY engines were banned. The ports report that "As of February 2010, more than 75% of the trips are made with trucks meeting 2007 + standards." (POLA ad POLB, 2010, p 72)	Port tariffs were changed to enforce a progressive truck ban. A clean truck fee was charged for "dirty" trucks to provide incentive funding. Additional sources of public money were used to incentivize new truck purchases.
HDV2 – Alternative Fuel Infrastructure for heavy duty natural gas vehicles	To construct a LNG facility and have 50% of port truck trips use alternative fuel. Alternative fuel use would be in addition to CTP improvements.	A CNG and LNG facility was constructed by Clean Energy. It was operational as of March 2009.	Incentives were initially used for the transition to LNG. Now that the station is completed, lease negotiations will be used to require alternative fuel use.
OGV1 – 100% compliance with VSR for both 20nm and 40nm distances	Their goal was 100% participation at both 20nm and 40 nm	The program has been expanded from 20nm to 40nm with participation rates of 92% at 20nm and 72% at 40nm at POLB and 90% and 53% at POLA by 2009 (POLA and POLB, 2010).	Several terminals were required to participate through lease requirements, and all vessels were provided with incentive tariffs and the option for voluntary participation.

Measure	Goal	Accomplishments/status	Implementation Strategies
OGV2- Shore power	Electrification of all container and cruise terminals by 2011 at POLA and by 2016 at POLB	At POLA, 2 container ship berths are AMP capable. In 2009, 4% of Container ship calls used AMP . At POLB 1 container berth and 3% of container ship calls were completed in 2009 (POLA and POLB, 2010).	Lease requirements were put in place to ensure use of existing infrastructure, and incentives were provided for alternative technology testing. The ports will fund much of the infrastructure costs, however vessels will need to pay for their retrofits. More lease requirements will be created as infrastructure is available, however in 2014, CARB also requires use of AMP.
OGV3- Auxiliary Engine Fuel Standards	Vessels should use fuel of .2% or less sulfur content.	Between July 1 and December 31 of 2008, 14% of all OGV calls at the POLA and 6% of all OGV calls at the POLB voluntarily switched to low sulfur fuel in their auxiliary engines. (POLA and POLB, 2010 p.107)	Use of low sulfur fuel is included in lease requirements and was also encouraged through incentive programs at both ports. This control measure will also be supported by ARB regulation.
OGV4- Main Engine Fuel Standards	Vessels should use fuel of .2% or less sulfur content.	In 2007, 26% of all OGV calls at the POLA and 6% of all OGV calls at the POLB used low sulfur fuel in their main engines. Between July 1 and December 31, 2008, 14% of all OGV calls at the POLA and 6% of all OGV calls at the POLB participated in the Fuel Incentive program and voluntarily switched to low sulfur fuel in their main engines. (POLA and POLB, 2010, p 114)	Use of low sulfur fuel is included in lease requirements and was also encouraged through incentive programs at both ports.

Measure	Goal	Accomplishments/status	Implementation Strategies
OGV5 – Engine emission improvements[22]	To continue to test engine improvements through the TAP program	Ongoing technology testing. For example, under the TAP program, the use of slide valves was tested for their ability to reduce NOx.	As new technologies become available, lease requirements, tariff changes, and incentives will be used.
CHE1- Performance Standards for CHE	See equipment standards described above.[23]	At least two terminals at POLB that have been required to upgrade their equipment through a "green lease".	Lease requirements require terminals to upgrade their equipment on a more accelerated schedule than required by the ARB.
HC1 Performance Standards for Harbor Craft	Within 2 years all harbor craft will meet EPA Tier 2 standards. Within 5 years, all previously repowered harbor craft will be retrofit with most effective CARB verified NOx and PM reduction technologies. Within 5 years of becoming available Tier 3 engines will be installed.	No information available, however ports have taken steps to inform owners of upgrade opportunities.	Operators have used Carl Moyer funding and other grants to accelerate the retrofits and emissions reduction measures. Where possible the ports will use leases to require changes. In addition, they have hosted several workshops to inform operators of available funding and have distributed a fact sheet to inform operators of technical requirements. Overall, the goal of this measure accelerates CARB requirements by 2 years.

[22] An additional OGV measure was added into the 2010 update. This measure is intended to support the IMO passage of the Emissions Control Area (ECA) in March 2010. In order to support these requirements, the ports will use lease negotiations to further encourage technologies that meet this goal. All vessels built after Jan 2016 must comply with the new MARPOL standards.

[23] By 2007 all purchases will meet a .01g.bhp-hr PM by either purchasing the cleanest available NOX alternative fueled or diesel fueled engine, or by purchasing a different engine then installing Verified Diesel Emissions Controls. By 2010 all yard tractors will meet minimum EPA 2007 on road or Tier 4 standards.
By end of 2012 all pre 2007 or pre Tier 4 top picks, forklifts, reach stackers, RTGs, and straddle carriers <750hp will meet at minimum the EPA 2007 on road or Tier 4 off road standards.
By end of 2014 all CHE with >750hp will meet EPA Tier4 off road standards. Starting in 2007, all CHE will be equipped with a CARB verified diesel emission control as an interim measure.

Measure	Goal	Accomplishments/status	Implementation Strategies
RL1 PHL Rail Switch Engine Modernization	Implementation of a previous agreement where all PHL engines will be replaced with Tier 2 engines, equipped with 15 minute idling limit devices, retrofit with either DOCs or DPFs, and will use either emulsified or alternative diesel fuel. All new engines will meet EPA Tier 3 standards.	All sixteen of the new switcher locomotives were placed into service in mid-2008. They did a demonstration of LNG and hybrid electric locomotives.	This measure was accomplished through an MOU and operating agreements with PHL.
RL2 Existing Class 1 Railroad Operations	By 2011 all switcher and helper locomotives entering the ports will be 90% controlled for PM and NOx. Additional idling restrictions and fuel requirements such as use of ultra low sulfur diesel may be imposed.	Idling has been reduced and USLD fuel has begun to be phased in.	This measure relies on enforcing a MOU between CARB and the rail lines as well as EPA standards.

Measure	Goal	Accomplishments/status	Implementation Strategies
RL3 New and Redeveloped Rail yards	Sets standards for any new or redesigned rail yards to include the cleanest available technologies, use idling limit devices, exhaust hoods, use of cleaner fuels, and have only clean CHE and HDV in use.	Since no new rail yards have been developed, this measure has not advanced.	This measure will be implemented through "the CEQA process and the discretionary project approval for new near-dock rail facilities or modifications to existing near-dock rail facilities" (POLA and POLB, 2010, p.158)