

# PORT OF LOS ANGELES EMISSIONS INVENTORY HIGHLIGHTS - 2011



## FOREWORD

This document provides an overview of the air quality improvement efforts associated with the Port of Los Angeles (POLA) in reaching its goals as presented in the San Pedro Bay Ports Clean Air Action Plan (CAAP). This Port of Los Angeles Emissions Inventory Highlights presents 2011 inventory findings, trends in emissions and cargo since 2005, emission reduction measure progress, and

upcoming highlights for 2012 and beyond. This document does not replace the detailed annual emissions reports; it draws information from these documents and reports progress in the context of the CAAP goals in a reader-friendly format.

([www.portoflosangeles.org/environment/studies\\_reports.asp](http://www.portoflosangeles.org/environment/studies_reports.asp))



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Photos by POLA and Starcrest





## INTRODUCTION

This document is the first edition of the Port of Los Angeles (POLA) Emissions Inventory Highlights Reader, which will be published in conjunction with the completion of the annual emissions inventories. This document tracks key elements from the inventories and other programs and compares them with the goals presented in the San Pedro Bay Ports Clean Air Action Plan (CAAP) and the 2010 CAAP update. The CAAP focuses on emissions of diesel particulate matter (DPM), oxides of nitrogen (NO<sub>x</sub>), and sulfur oxides (SO<sub>x</sub>).

In March 2006, a groundbreaking meeting occurred at the highest level between POLA, POLB, and the South Coast Air Quality Management District where all parties expressed the need to work jointly toward solutions to reduce emissions from port-related operations. Shortly thereafter, the Ports also engaged the California Air Resources Board and the United States Environmental Protection Agency Region 9 in the spirit of cooperation to help the Ports develop the original 2006 San Pedro Bay Ports CAAP and subsequently the 2010 CAAP Update.

As part of the 2010 CAAP update, both POLA and the Port of Long Beach (POLB) developed mass emission and health-risk reduction standards in coordination with the United States Environmental Protection Agency (EPA) Region 9, the California Air Resources Board (CARB), and the South Coast Air Quality Management District (SCAQMD). These emission reduction standards set the bar for performance for port-related emission sources and represent the Ports' "fair share" in reducing emissions in the South Coast Air Basin (the Basin). The standards are compared to 2005 baseline levels.



The Port of Los Angeles is America's premier port and has a strong commitment to developing innovative strategic and sustainable operations that benefit the economy as well as the quality of life for the region and the nation it serves. As the leading seaport in North America in terms of shipping container volume and cargo value, the Port supports more than 830,000 regional jobs and \$35 billion in annual wages and tax revenues. The Port of Los Angeles - A cleaner port. A brighter future.

In addition, the CAAP sets out various measures for ocean-going vessels (OGV), harbor craft (HC), cargo handling equipment (CHE), rail locomotives (RL), and heavy-duty vehicles (HDV). Additional initiatives, such as the Technology Advancement Program (TAP) and the zero emissions effort, support POLA's efforts at attaining and maintaining the standards.

The challenges of the CAAP are not only reaching the most aggressive reduction targets of any port, but maintaining the standards while the Port continues to grow. POLA is leading with solutions and investing today in technologies that will ensure that growth can be accomplished without significant impact on the surrounding communities and environment.

The **San Pedro Bay Standards** are a statement of the Ports' commitments to significantly reduce the air quality impacts from port operations. Achievement of the standards listed below will require coordination with our agency partners diligent pursuit of all of the existing CAAP measures and aggressive action to seek out further emissions and health risk reductions from port-related sources from strategies that will emerge over time. The standards are relative to 2005 conditions.

**Health Risk Reduction Standard** - By 2020, reduce the population-weighted residential cancer risk of port-related DPM emissions by 85%.

**Mass Emission Reduction Standards** -

By 2014, reduce emissions by 72% DPM, 22% NO<sub>x</sub>, and 93% SO<sub>x</sub>

By 2023, reduce emissions by 77% DPM, 59% NO<sub>x</sub>, and 93% SO<sub>x</sub>

Growing POLA green and sustainable includes not only reducing emissions from port-related sources, but to undertake sustainable projects that provide the communities closest to the port with beneficial uses that help mitigate the impacts from port operations, as well as help preserve historic sites in and around the port. Examples from 2011 include the completion of the Wilmington Water Front Park and the restoration of Angel's Gate Lighthouse.



The Wilmington Waterfront Park, formerly known as the Harry Bridges Boulevard Buffer Project, was designed as an element of the Berths 136-147 TraPac Container Terminal Project approved by the Los Angeles Board of Harbor Commissioners in 2007 to provide public open space between Port operations and adjacent residences in Wilmington. The Park, completed in 2011, is a 30-acre largely contiguous landscaped area which includes the El Paseo Promenade that provides a pedestrian and bicycle connection from the east to the west end, continuing for approximately nine blocks. (<http://www.portoflosangeles.org/recreation/wwpark.asp>)



## REPORT CARD

POLA developed a "Report Card" summary in 2009 which helps distill each current-year inventory and compare it to 2005, showing progress toward the CAAP goals. The report card has been effective in communicating a high level understanding of emissions reduction progress to date, describing Port efficiency measured in emissions per twenty-

foot equivalent units (TEUs), and showing pollutant emissions for the five emission source categories. Additional relevant information is also provided each year on the report card.

The report cards are posted annually on the POLA website ([www.portoflosangeles.org/environment/studies\\_reports.asp](http://www.portoflosangeles.org/environment/studies_reports.asp))



## AIR QUALITY REPORT CARD 2005 - 2011

### PRIMARY POLLUTANTS DEFINED

DPM = Diesel Particulate Matter  
 NOx = Oxides of Nitrogen  
 SOx = Oxides of Sulfur  
 PM<sub>2.5</sub> = Particulate Matter less than 2.5 microns in diameter  
 PM<sub>10</sub> = Particulate Matter less than 10 microns in diameter  
 CO<sub>2</sub> = Carbon Dioxide (A Green House Gas contributor)

### OVERALL EMISSIONS REDUCTIONS CY 2005-2011

Pollutant	CY 2005 - 2011	
	%	tons
DPM	71%	634
PM <sub>2.5</sub>	69%	580
PM <sub>10</sub>	71%	693
NOx	51%	8,392
SOx	76%	4,038

### EMISSIONS PER 10,000 TEU HANDLED

Pollutant	CY 2005 - 2011	
	%	tons
DPM	73%	0.86
PM <sub>2.5</sub>	71%	0.80
PM <sub>10</sub>	73%	0.95
NOx	54%	11.84
SOx	77%	5.5

### OCEAN-GOING VESSEL EMISSIONS REDUCTIONS

Pollutant	CY 2005 - 2011	
	%	tons
DPM	69%	333
PM <sub>2.5</sub>	67%	304
PM <sub>10</sub>	69%	395
NOx	30%	1,608
SOx	75%	3,895

### HEAVY-DUTY VEHICLE/CLEAN TRUCK EMISSIONS REDUCTIONS

Pollutant	CY 2005 - 2011	
	%	tons
DPM	91%	223
PM <sub>2.5</sub>	91%	204
PM <sub>10</sub>	91%	222
NOx	78%	4,948
SOx	91%	38

### HARBOR CRAFT EMISSIONS REDUCTIONS

Pollutant	CY 2005 - 2011	
	%	tons
DPM	36%	20
PM <sub>2.5</sub>	36%	18
PM <sub>10</sub>	36%	20
NOx	33%	441
SOx	92%	6

### RAIL EMISSIONS REDUCTIONS

Pollutant	CY 2005 - 2011	
	%	tons
DPM	46%	27
PM <sub>2.5</sub>	48%	26
PM <sub>10</sub>	46%	27
NOx	39%	660
SOx	94%	92

### CARGO-HANDLING EQUIPMENT EMISSIONS REDUCTIONS

Pollutant	CY 2005 - 2011	
	%	tons
DPM	56%	30
PM <sub>2.5</sub>	54%	27
PM <sub>10</sub>	54%	29
NOx	47%	735
SOx	83%	7

### CO<sub>2</sub> EQUIVALENT REDUCTIONS BY SOURCE TYPE

Source Type	CY 2005 - 2011	
	%	metric tons
Ocean-Going Vessels	23%	69,917
Harbor Craft	9%	5,298
Cargo Handling Equipment*	- 8%	- 10,457
Rail	16%	12,867
Heavy-Duty Vehicles	26%	121,498
<b>TOTAL</b>		<b>199,123</b>

\* All percentages reflect a reduction in emissions except cargo handling equipment.

### SAN PEDRO BAY STANDARDS

- The San Pedro Bay Standards establish the long-term emissions-reduction and health risk-reduction goals for the ports of Los Angeles and Long Beach.
- Emission Reduction Standard for DPM, NOx, and SOx have target years of 2014 and 2023 to support state ambient air quality goals.
- Health Risk Reduction Standard has a target year of 2020 to align with CARB's Goods Movement Emission Reduction Plan.

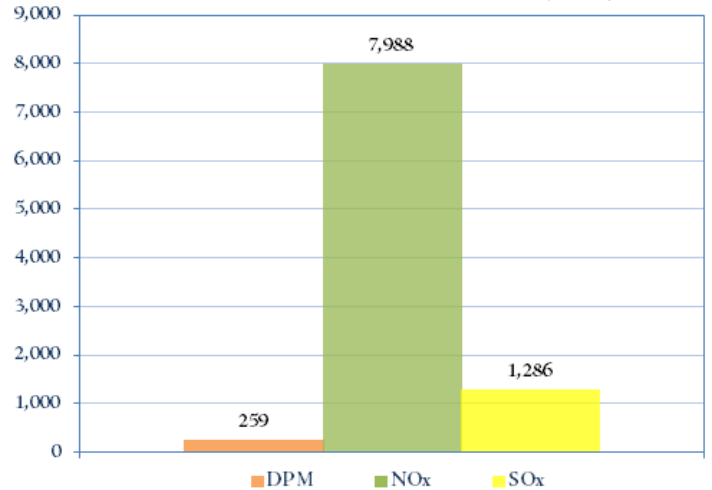
Clean Air Action Plan (CAAP) Goals (% reduction compared to 2005)	2014	2023
DPM	72%	77%
NOx	22%	59%
SOx	93%	93%

Health Risk Reduction Standard (% reduction in residential cancer risk compared to 2005)	2020	85%
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## 2011 EMISSIONS INVENTORY SUMMARY

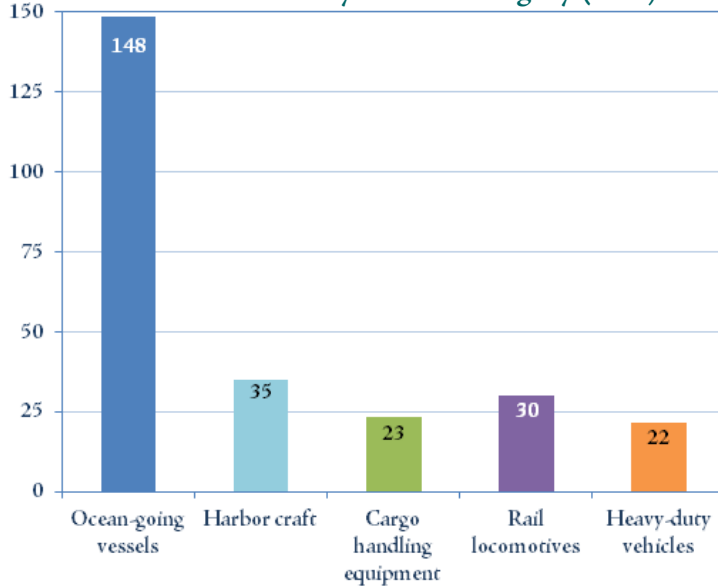
The POLA emissions inventory and CAAP focus on emissions of DPM, NO<sub>x</sub>, and SO<sub>x</sub> as well as greenhouse gases. In addition, other pollutants are included in the more detailed technical reports ([www.portoflosangeles.org/environment/studies\\_reports.asp](http://www.portoflosangeles.org/environment/studies_reports.asp)). In 2011, the ocean-going vessel source category continues to be the significant driver of DPM, NO<sub>x</sub>, and SO<sub>x</sub> emissions, while greenhouse gases, expressed in carbon dioxide equivalents (CO<sub>2</sub>e), were dominated by heavy-duty vehicles as well as ocean going vessels. Total emissions for DPM, NO<sub>x</sub>, and SO<sub>x</sub> and emissions by source category, including CO<sub>2</sub>e, are presented in the following tables (in metric tons).

Total DPM, NO<sub>x</sub>, SO<sub>x</sub> Emissions (tons)

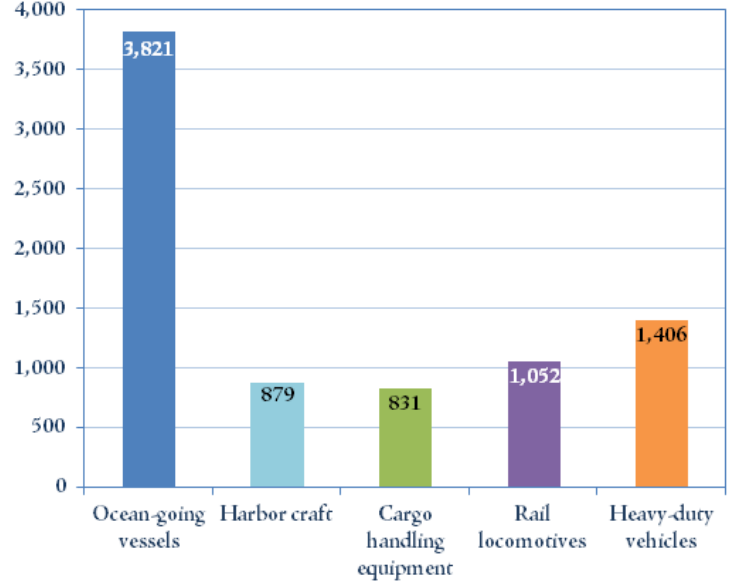


Note that total CO<sub>2</sub>e is not added to the figure due to scale issues with the other pollutants.

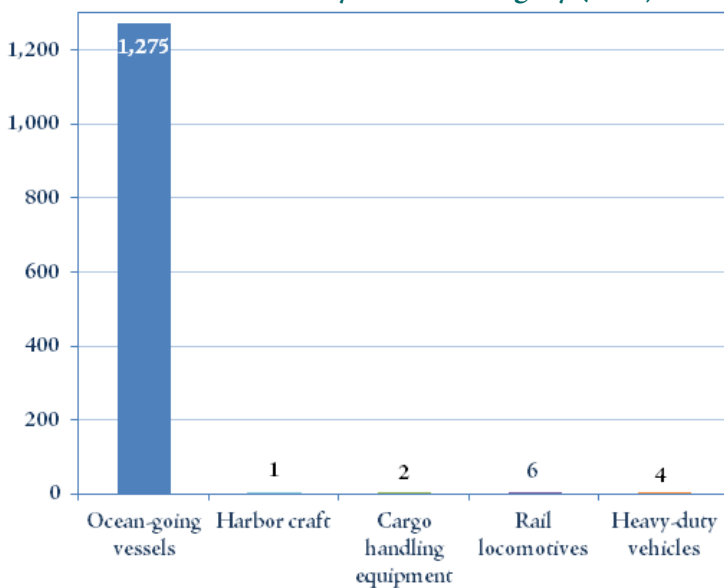
DPM Emissions by Source Category (tons)



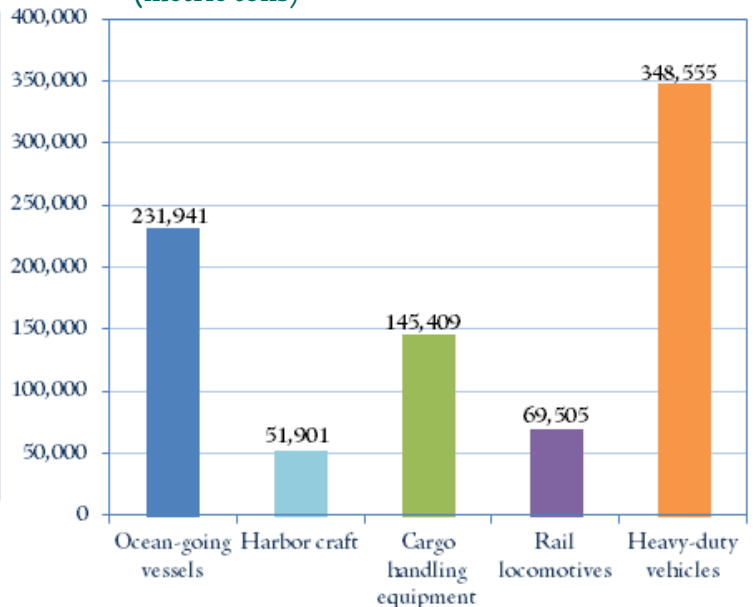
NO<sub>x</sub> Emissions by Source Category (tons)



SO<sub>x</sub> Emissions by Source Category (tons)



CO<sub>2</sub>e Emissions by Source Category (metric tons)

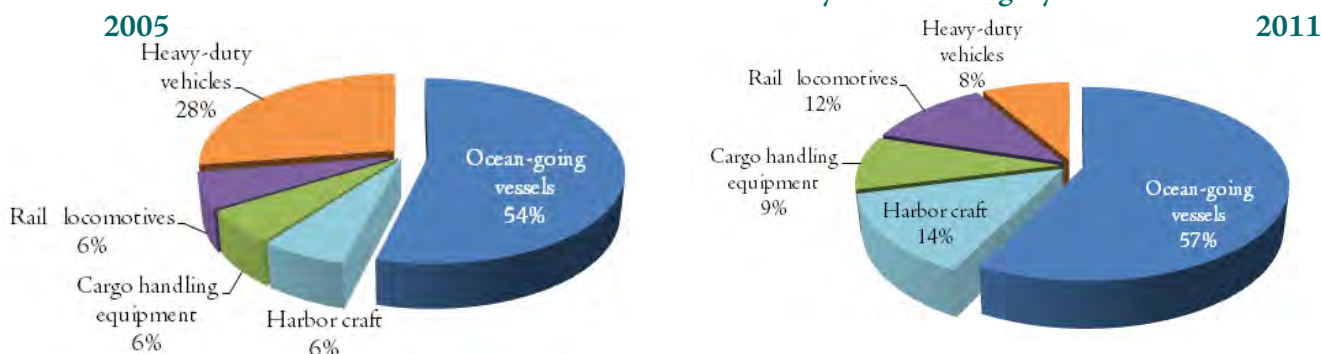




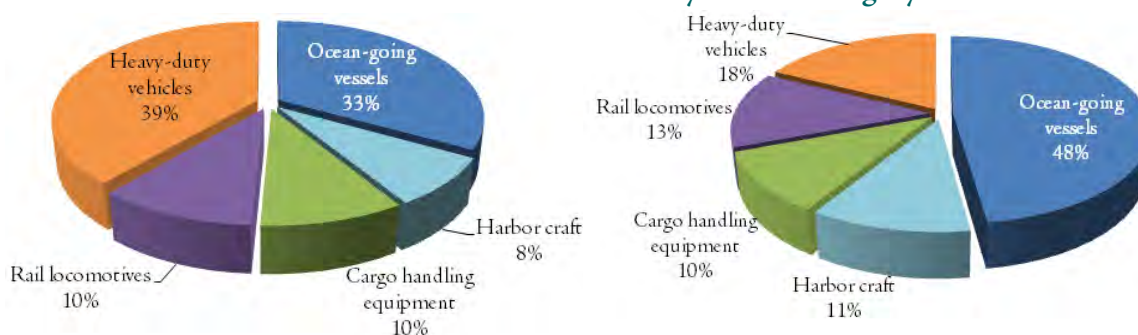
## SOURCE CATEGORY CONTRIBUTION CHANGES 2005-2011

The contribution of each source category to total port-related emissions has changed since 2005 due to the implementation of the CAAP measures, various regulatory requirements that have come into effect for all source categories, and industry efforts to reduce emissions. The following figures illustrate the changes in port-related emissions contribution by source category between 2005 and 2011. Ocean-going vessels continue to make up over 95% of all port-related SO<sub>x</sub> emissions and therefore are not shown in the figures below.

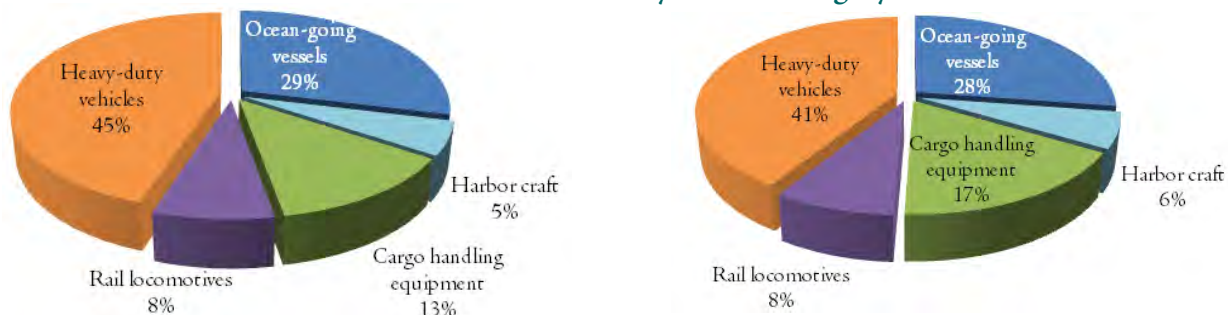
### DPM Emissions Contributions by Source Category



### NO<sub>x</sub> Emissions Contributions by Source Category



### CO<sub>2e</sub> Emissions Contributions by Source Category

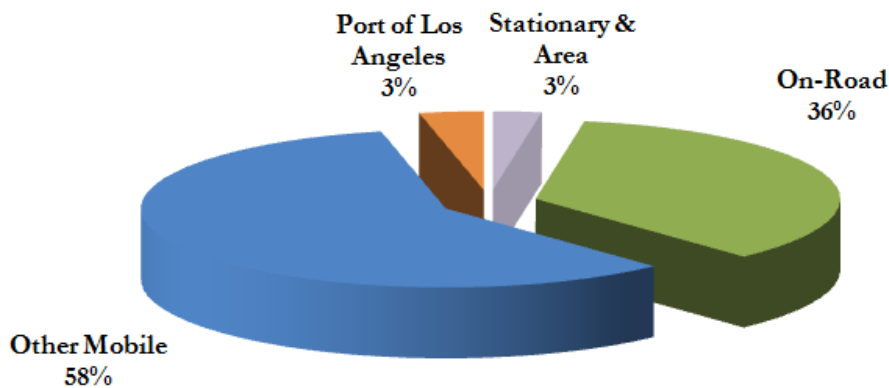


As various CAAP measures and regulatory initiatives have been implemented since 2005, the ocean-going vessels' contribution to total port-related emissions continues to increase. The successful implementation of the Clean Truck Program was a priority source control measure and has significantly reduced the contribution of trucks to port-related DPM and NO<sub>x</sub> emissions. While the CAAP focuses on DPM, NO<sub>x</sub>, and SO<sub>x</sub>, trucks continue to play a significant role relating to greenhouse gases. Ships continue to be a significant category for all port-related emissions, hence the development and implementation of two new measures in the 2010 CAAP Update relating to reducing ship-related emissions – OGV5 and OGV6.

## 2011 REGIONAL EMISSIONS CONTRIBUTION

The 2011 pollutant contributions to the South Coast Air Basin from POLA-related emission sources are presented in the figures below.

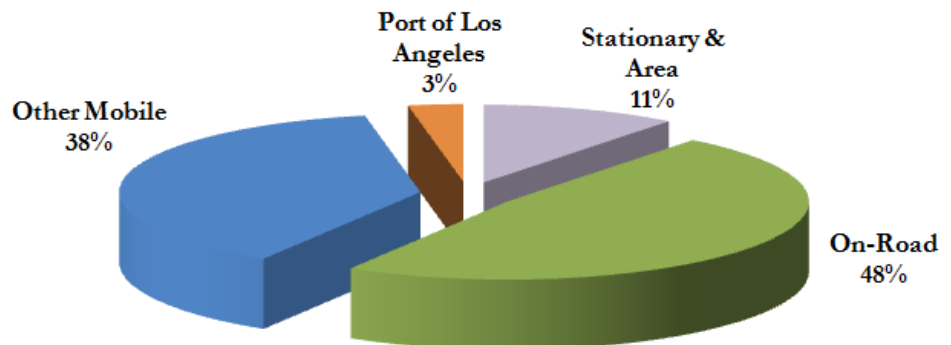
### 2011 Port DPM Emissions Contribution in the South Coast Air Basin



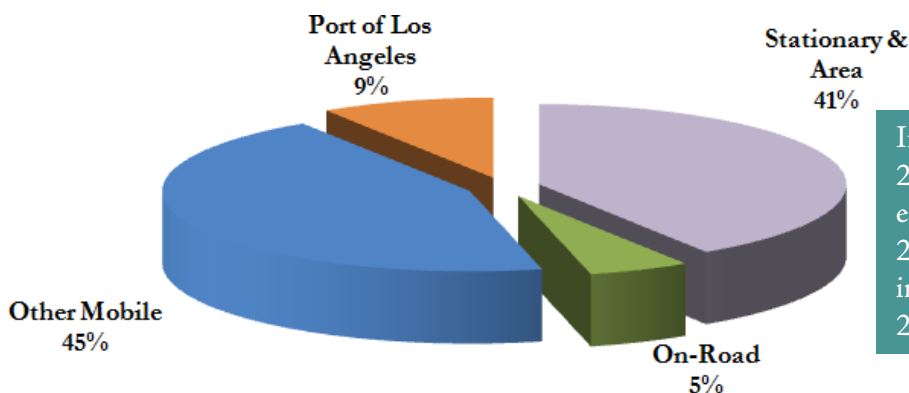
In 2005, port-related emissions contributed 10% of the total basin-wide DPM emissions and 3% contribution in 2011. This represents a 70% reduction in basin-wide DPM contribution since 2005.

### 2011 Port NOx Emissions Contribution in the South Coast Air Basin

In 2005, port-related emissions contributed 5% of the total basin-wide NOx emissions and 3% contribution in 2011. This represents a 40% reduction in basin-wide NOx contribution since 2005.



### 2011 Port SOx Emissions Contribution in the South Coast Air Basin



In 2005, port-related emissions were 25% of the total basin-wide SOx emissions and 9% contribution in 2011. This represents a 64% reduction in basin-wide SOx contribution since 2005.

7 The CAAP, agency regulations, and proactive industry efforts continue to keep POLA-related emissions from significantly increasing when compared to all the other emissions sources in the South Coast Air Basin. The results through 2011 have demonstrated significantly lower emissions and a reduction in health risks compared to similar cargo levels in 2005. The speed at which these reductions were realized since 2005 is unprecedented. Future progress will continue to be tracked through annual emissions inventory updates and by continuous air monitoring of the ambient air in and around the port area.

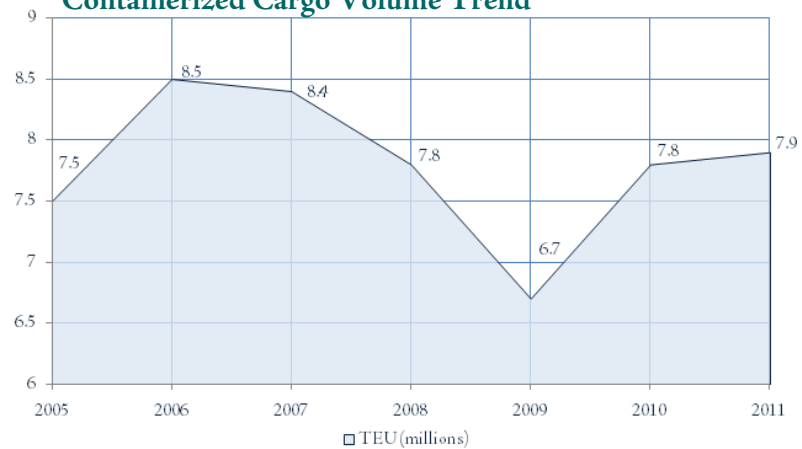
## 2005-2011 ACTIVITY & CARGO GROWTH

Activity and cargo growth from 2005 to 2011 provide context for the changes in emissions over time. The following figure presents the changes in cargo-related activity from 2005 to 2011 in millions of containers (measured in twenty foot equivalent units or TEUs) annually. As can be seen in the trends figure, cargo peaked in 2006 and then dropped off significantly in the 2008-2009 period. From 2009 to 2011 TEUs recovered beyond 2005 levels.

Over the same period of time, vessel call distributions changed showing a shifting of the deployed fleet over time. Events relating to the financial crisis that began in 2008 have resulted in significant changes to the fleets calling POLA, as shipping lines adjust their fleets in response to the changes in cargo volumes and box rates. Container ship call data shows definite size-related trends as the fleet

transitions; generally the changes have had a positive effect on ship-related emissions.

Containerized Cargo Volume Trend



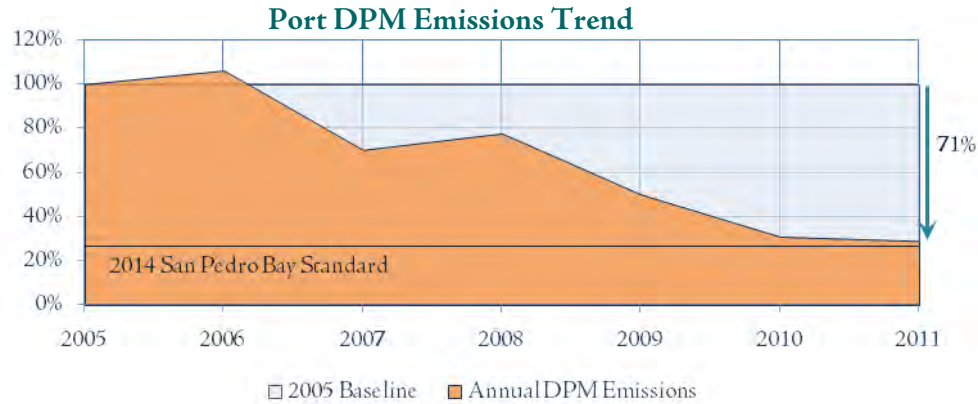
Generally smaller sized containerships under 4,000 TEUs show significant reduction in calls and appear to be phasing out of service at the Port. Larger containerships between 5,000 to 9,000 TEUs show the highest overall growth.



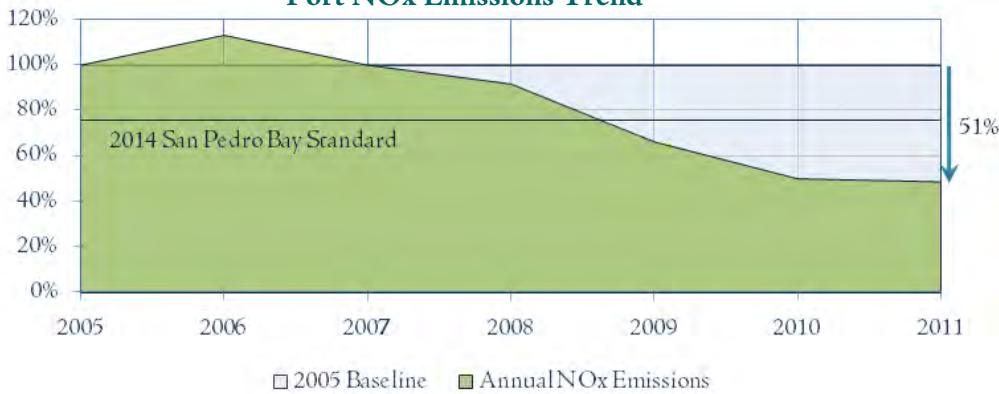
## 2005-2011 PORT-RELATED EMISSIONS TRENDS

Cargo activities and emissions have diverged paths since 2006 with emissions reductions far exceeding recent reductions in cargo volume. This decoupling occurred due to the implementation of the CAAP and various CARB/EPA regulations. The figures below show the port-related trends for DPM, NO<sub>x</sub>, SO<sub>x</sub>, and CO<sub>2</sub>e.

Port-related DPM emissions have decreased 71% since 2005. These reductions were led by vessel speed reduction, vessel fuel switching, Alternative Maritime Power, and the Clean Truck Program, which all contributed to significant reductions in DPM emissions through 2011.

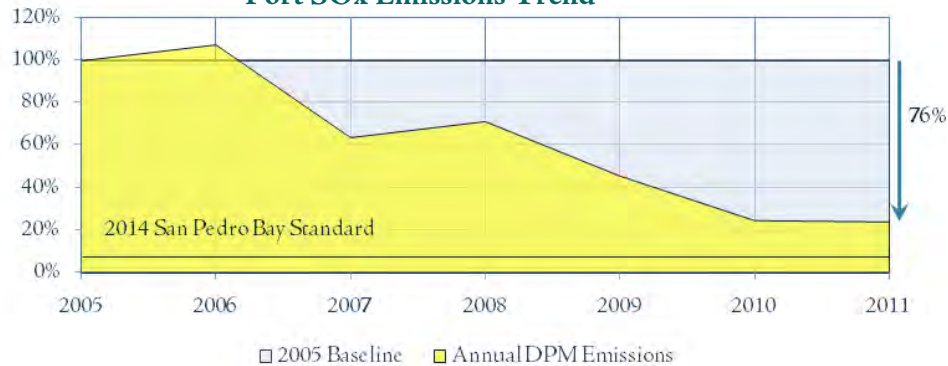


### Port NO<sub>x</sub> Emissions Trend



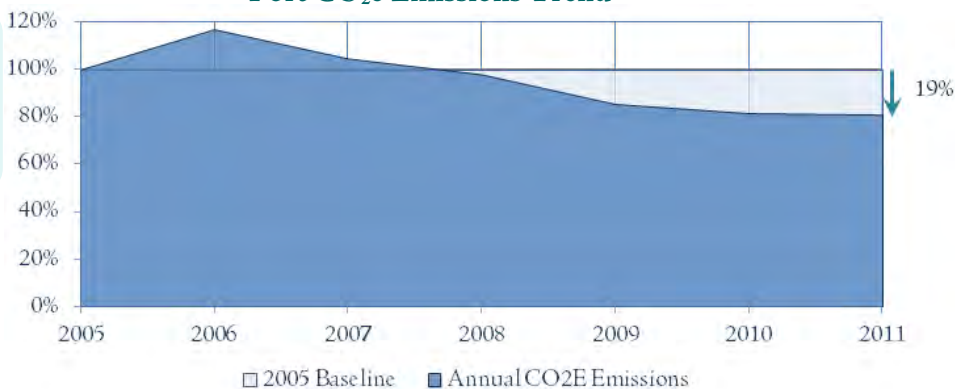
Port-related NO<sub>x</sub> emissions have decreased 51% since 2005. These reductions were led by the Clean Truck Program, CARB cargo handling equipment-related regulations, vessel speed reduction, and rail fleet modernization.

### Port SO<sub>x</sub> Emissions Trend



Port-related SO<sub>x</sub> emissions have decreased 76% since 2005. These reductions were led by CARB vessel fuel switching regulation and ultra low sulfur diesel for use by on-road and off-road vehicles, vessel speed reduction, and Alternative Maritime Power.

### Port CO<sub>2</sub>e Emissions Trend



Since 2005, port-related greenhouse gas emissions have also been reduced as a result of “co-benefits” from the implementation of CAAP measures, such as vessel speed reduction and Alternative Maritime Power™ (AMP).

## 2005-2011 PORT-RELATED EFFICIENCY TRENDS

Port-related efficiency improvements track well with total port-related emissions trends. The following illustrates the efficiency improvements on a twenty-foot equivalent units (TEUs) container basis. This is an important metric to normalize emissions reductions and accurately present real progress in light of fluctuating cargo volume.



Port-wide DPM efficiencies have continued to improve since 2005 with a 73% reduction from 1.19 to 0.32 tons/10,000 TEUs.



Port-wide NO<sub>x</sub> efficiencies have continued to improve since 2005 with a 54% reduction from 21.89 to 10.06 tons/10,000 TEUs.



Port-wide SO<sub>x</sub> efficiencies have continued to improve since 2005 with a 77% reduction from 7.11 to 1.62 tons/10,000 TEUs.



Port-wide CO<sub>2e</sub> efficiencies have continued to improve since 2005 with a 24% reduction from 1,398 to 1,067 tons/10,000 TEUs.





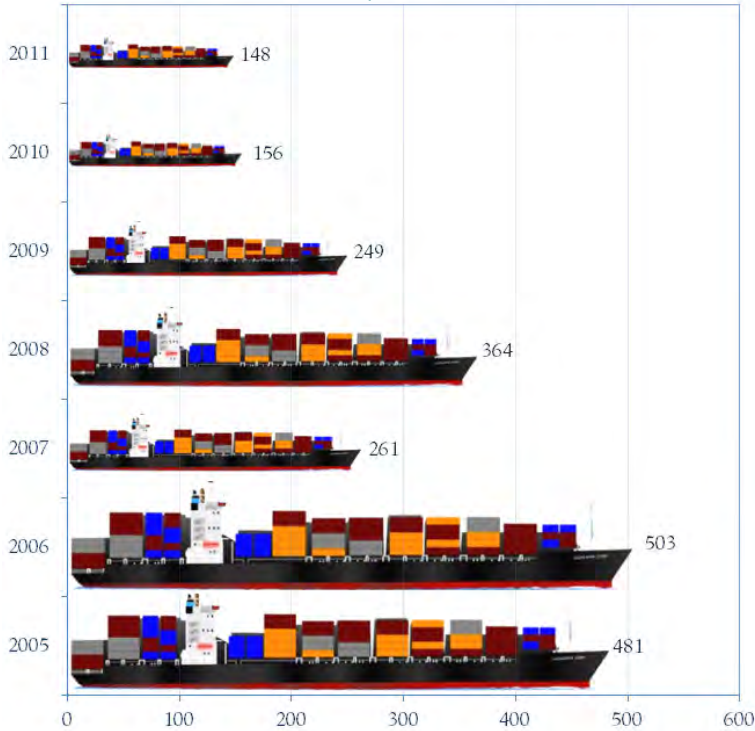
The Los Angeles Lighthouse renovation is another example of the Port providing community benefits beyond cleaner air. The historic Los Angeles Lighthouse, also known as the Angel's Gate Lighthouse, has welcomed ships into the Port of Los Angeles since 1913. In 2011, the Cabrillo Beach Boosters launched a project to restore the lighthouse. With support from the Port Community Advisory Committee, the Boosters secured \$1.8 million in community mitigation funds from the POLA, and completed the restoration in May 2012.

# SOURCE CATEGORY HIGHLIGHTS

## Ocean-going vessels

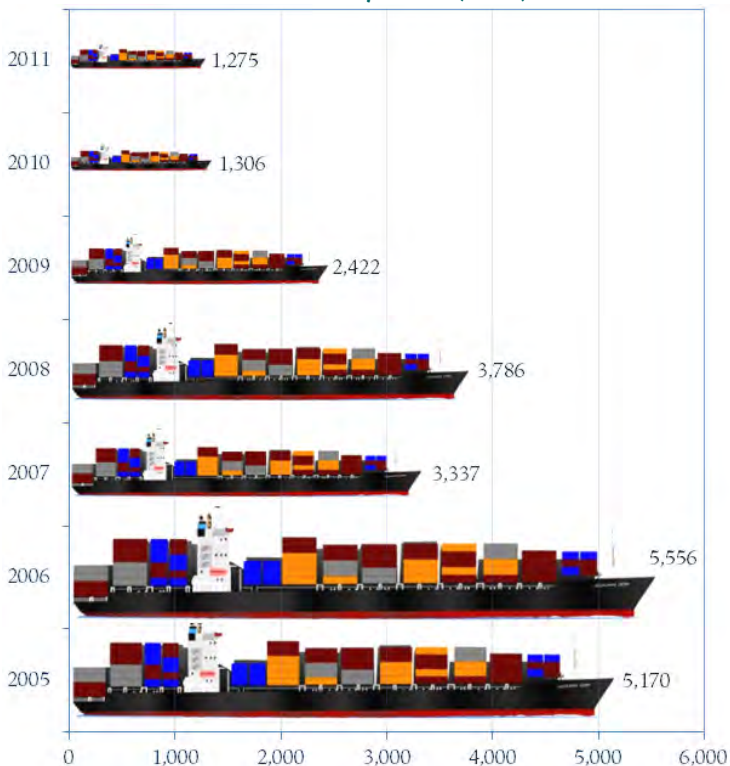
Emission trends are presented for ships since 2005.

### DPM Emission by Year (tons)



Significant reductions have been made since the start of the CAAP even though ship calls have exceeded 2005 levels.

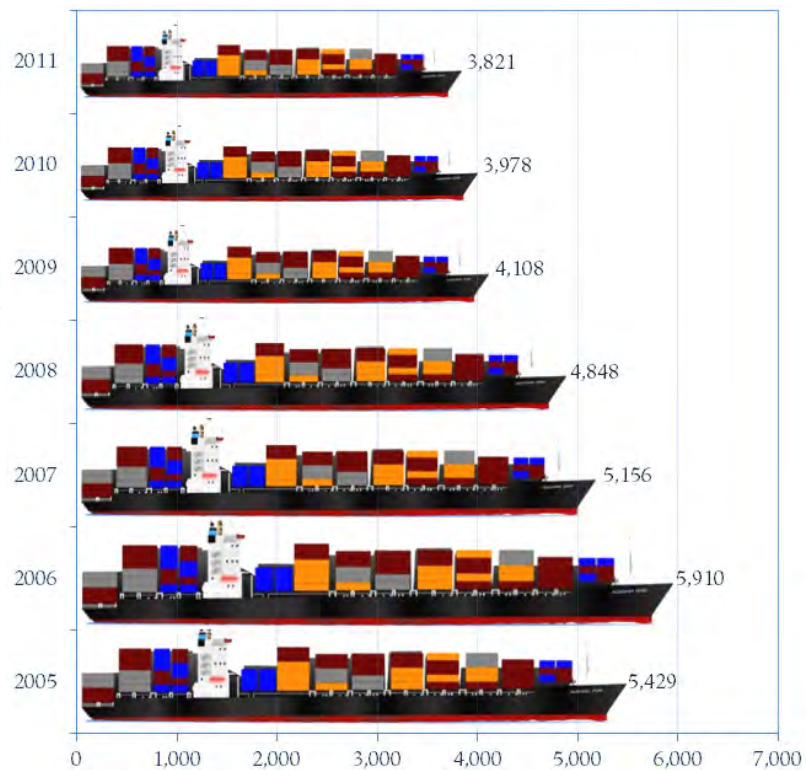
### SOx Emission by Year (tons)



Ship-related emissions continue to show reductions in 2011 due to successful implementation of CAAP measures and fuel-based regulations. Highlights include:

- High compliance rates with the voluntary vessel speed reduction (VSR) program
  - 92% compliance within 20 nautical miles (nm)
  - 70% compliance between 20-40 nm
- CARB clean marine fuel regulation
- Increasing AMP infrastructure installations and use

### NOx Emission by Year (tons)



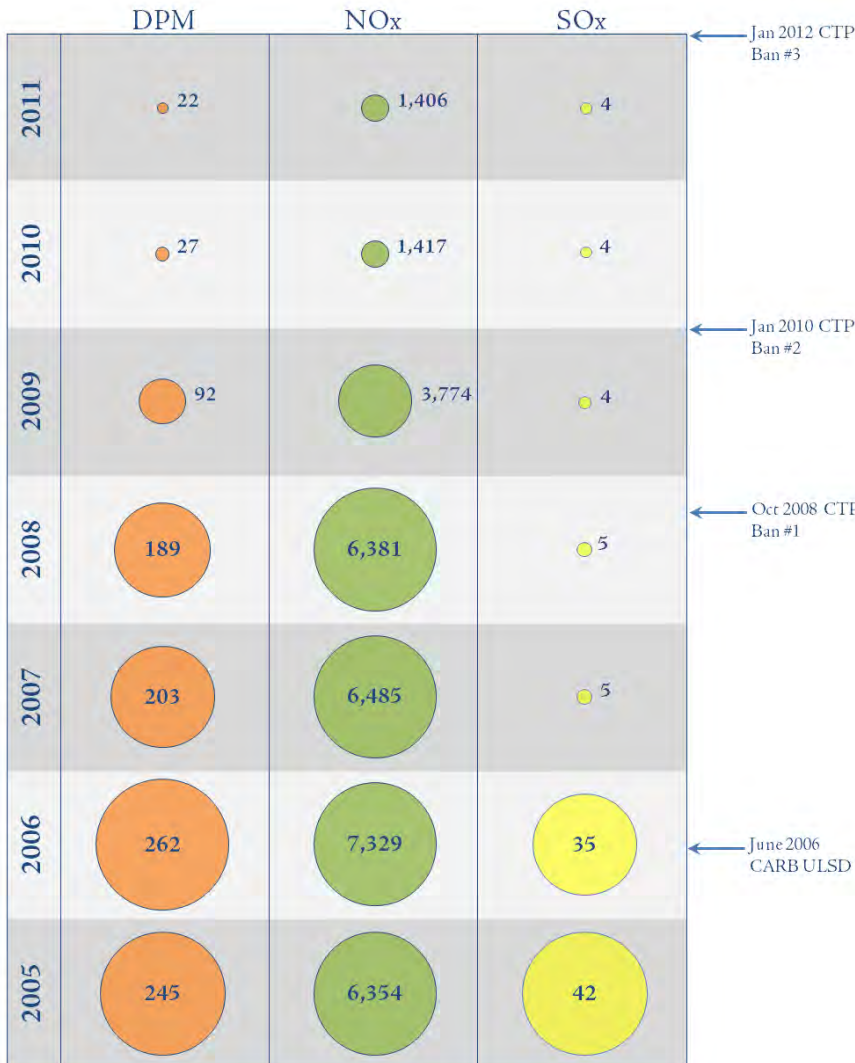
Utilizing AMP for one container or cruise ship call reduces ~1 ton of NOx generated onboard the ship. City of Los Angeles' Department of Water & Power generates the same energy at 96% fewer NOx emissions. The resulting NOx reduction per call is the equivalent of taking 295 cars off the road for a year.

In 2011, total AMP reductions were equivalent to taking over 24,000 autos off the road for the same year. This benefit will increase with the number of AMP calls and as Los Angeles Department of Water and Power generation portfolio achieves its 30% renewable target.

# SOURCE CATEGORY HIGHLIGHTS

## Trucks

### Emission by Year (tons)



The development and implementation of the Clean Truck Program (CTP) is a true success story of the CAAP. The first program of its kind for port-related trucks, it continues to accelerate the benefits from EPA cleaner engine standards by banning older model year trucks from access to port facilities. The figure on the left presents DPM, NOx, and SOx emissions by year starting with 2005 on the bottom. Moving up towards 2011, the effect of the CTP and the mandate of ultra low sulfur diesel (ULSD) have had significant positive benefits on annual emissions. The CARB ULSD rule came into effect in June 2006 which dramatically reduced truck-related SOx emissions.

As part of the CTP implementation, the following three incremental truck model year bans at port facilities have been implemented:

- Ban #1 - October 1, 2008: All pre-1989 trucks were banned
- Ban #2 - January 1, 2010: All 1989-1993 trucks were banned in addition to 1994-2003 trucks that had not been retrofitted
- Ban #3 - January 1, 2012: All trucks not meeting 2007 EPA clean truck standards were banned.

The 2012 ban's full effect will be shown in the 2012 annual inventory. Truck emissions reductions not only assist in reaching and maintaining CAAP mass emission reduction standards, but also have a significant effect on reaching the CAAP health-risk reduction standard as trucks operate in close proximity to surrounding communities.

The CTP has been so successful that ports along the West, Gulf, and East coasts are implementing similar versions of the program.



In 2005, 99% of the trucks servicing POLA terminals were older than 2004 and 50% of those were older than 1994. By 2011, fewer than 5% of calls were made by trucks older than 2004, and over 90% of truck calls were made by model year 2007 and newer.



## SOURCE CATEGORY HIGHLIGHTS

### Rail

There are two types of railroad services associated with port-related cargo movements: switching and line haul. Switching services are related to the building and organizing of unit trains, railcar pickup and delivery to the various terminals, and related yard work. Line haul services are related to the interstate movement of trains for nationwide cargo distribution.

The Pacific Harbor Line, Inc. (PHL) is the primary company providing switching services

at POLA. PHL currently operates 22 locomotives in and around the port areas. In 2005, the PHL fleet consisted of switching locomotives built from the 1950s to the 1970s, which is typical for the industry. Over the past several years, with assistance from POLA, POLB, AQMD, and CARB, PHL has replaced all of their aging locomotives with a modern fleet of advanced low-emission locomotives using Tier 3 or better engines; the full benefit from this latest advancement will be seen in 2012.



From 2005 to 2011, PHL made significant changes in their locomotive fleet moving them from Tier 0 to Tier 3 by the end of 2011. In addition, the implementation of the CARB ULSD rule for switch engines has nearly eliminated SOx emissions. The resulting annual emissions reductions compared to 2005 were realized:

- 73% reduction in DPM
- 72% reduction in NOx
- 96% reduction in SOx



ZEM  
上海船

hook 75T x 65m  
hook 100T x 55m  
spreader 65T x 65m

YT-123

## SOURCE CATEGORY HIGHLIGHTS

### Cargo Handling Equipment

Efforts to reduce emissions associated with cargo handling equipment (CHE) were among the earliest emission reduction control measures implemented at POLA, including several that predate the CAAP. DPM and NOx emissions have been reduced through a combination of regulations, emissions reduction projects/grants, installation of emissions control devices, and the use of on-road engines in CHE. SOx emissions have been significantly reduced through the CARB ULSD mandate in 2006. The figure presents CHE emissions starting with 2005 at the bottom through 2011 at the top.

Cargo handling equipment emissions were significantly reduced since 2005. The combination of terminal efficiency improvements, cleaner engine standards, grant project funding, and efforts by terminal operators to reduce fuel consumption and emissions are the reasons for the reductions in annual emissions.

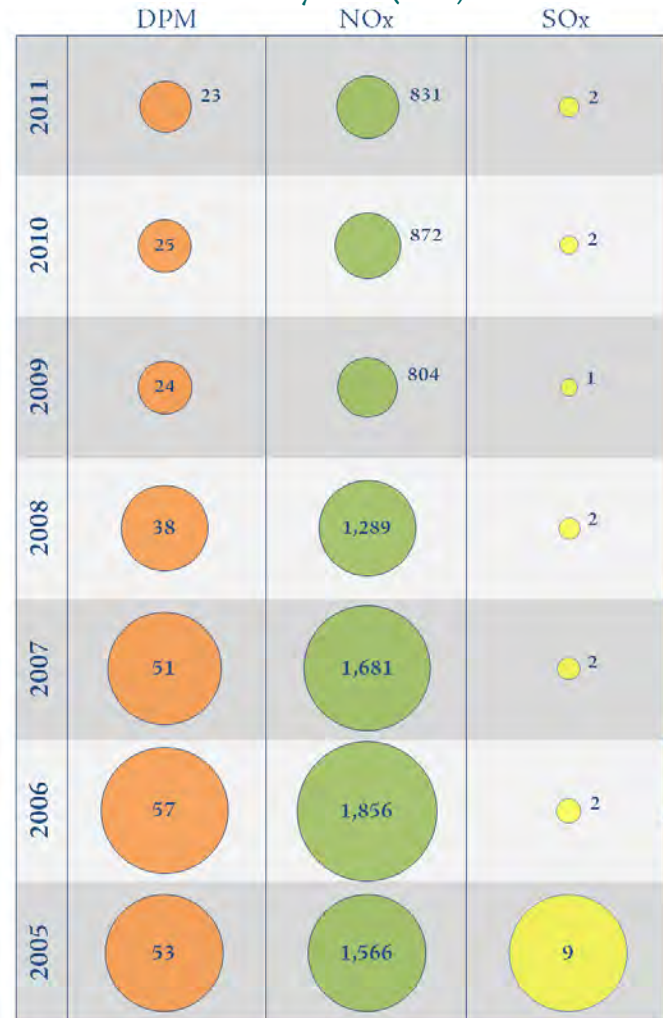
- DPM has been reduced 56% since 2005
- NOx has been reduced 47% since 2005
- SOx has been reduced 83% since 2005

### Harbor Craft

Most of the emissions reductions associated with harbor craft have been achieved through grant funding by POLA through AQMIP and AQMD/CARB programs for replacing older vessel engines with newer, cleaner engines. These efforts continue to reduce DPM and NOx annual emissions. SOx was reduced in 2006 by CARB's ULSD fuel rule which significantly reduced the harbor craft contribution to total port-related sulfur emissions.

Since 2006, POLA's Air Quality Mitigation Incentive Program (AQMIP) and CARB's Carl Moyer Program have provided grant co-funding opportunities (50%-85%) for vessel owners to replace their older engines with either Tier 2 or Tier 3 engines. By the end of 2011, 97 propulsion engines and 68 auxiliary engines had been replaced since 2005 by vessel owners using either the grant program or replacing the engines at their own expense. This represents a modernization of 24% of harbor craft with at least one engine upgraded.

CHE Emission by Year (tons)



Harbor craft emissions have decreased significantly since 2005. A combination of engine repowers, CARB regulations, and innovative solutions from vessel owners/operators are responsible for the reductions in annual emissions.

- DPM has been reduced 33% since 2005
- NOx has been reduced 36% since 2005
- SOx has been reduced 91% since 2005

In 2011, Foss introduced the *Carolyn Dorothy*, the world's first hybrid assist tug that was co-funded and demonstrated through the Technology Advancement Program. Hybrid tugs reduce DPM emissions by 73%, NOx emissions by 51%, CO2 emissions by 27% and fuel consumption by 20-30%. Foss has now developed a second generation hybrid retrofit with great potential for future emissions reductions.

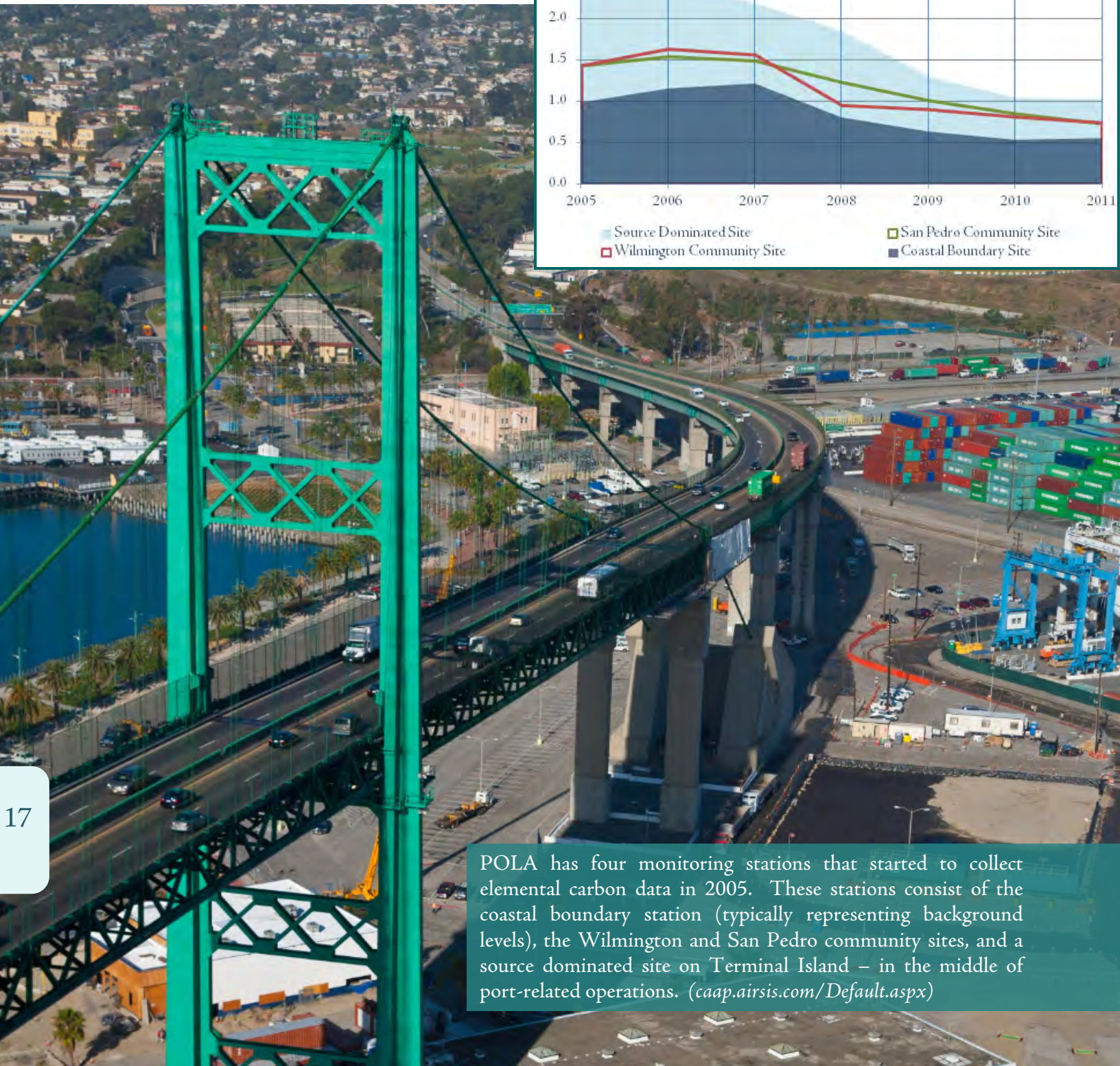
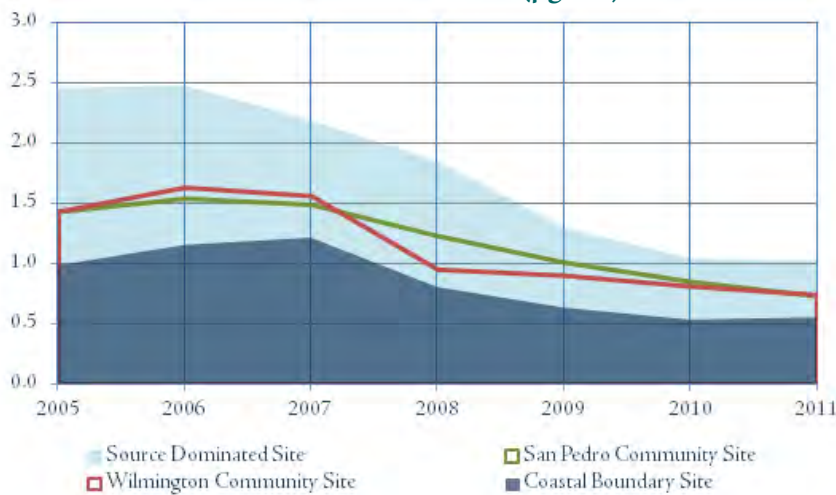
## AIR MONITORING HIGHLIGHTS

### Air Quality Monitoring Trend

In addition to developing and publishing the annual emissions inventory as a means of tracking progress, the Port operates four air monitoring stations at locations around POLA. Elemental carbon is monitored as a surrogate for diesel-related emissions. The figure shows how the measured annual average elemental carbon concentrations have been reduced by 50-60%, commensurate with the NO<sub>x</sub> emissions inventory numbers over the same period.

Air monitoring provides for another “real world” metric in addition to the inventories to measure the Port’s progress in reducing its mass emissions and health-risk related impacts.

2005-2011 Annual Average Elemental Carbon Concentrations ( $\mu\text{g}/\text{m}^3$ )



POLA has four monitoring stations that started to collect elemental carbon data in 2005. These stations consist of the coastal boundary station (typically representing background levels), the Wilmington and San Pedro community sites, and a source dominated site on Terminal Island – in the middle of port-related operations. ([caap.airsis.com/Default.aspx](http://caap.airsis.com/Default.aspx))

## LOOKING AHEAD

### 2012 & Beyond

With eyes on the future, looking for innovative methods to sustaining emissions reductions while accommodating growth, POLA continues to look for emission reduction and efficiency opportunities. Through the Technology Advancement Program or TAP ([www.cleanairactionplan.org/programs/tap/default.asp](http://www.cleanairactionplan.org/programs/tap/default.asp)), POLA is evaluating tomorrow's technologies today.

In 2011, both San Pedro Bay ports introduced their Zero-Emissions Technology Roadmap, which is targeted at meeting the challenges of sustained green growth. In 2012, work will include operational and durability testing of all electric on-road drayage and cargo handling equipment. ([www.cleanairactionplan.org/](http://www.cleanairactionplan.org/))

In 2012, POLA will continue to focus on reducing ship-related emissions through continuation of the Vessel Speed Reduction program, expansion of AMP calls and infrastructure, the implementation of the Environmental Ship Index (ESI) incentive program to reward and recognize the top performing cleanest vessels.

In 2006, POLA started a Pan-Pacific outreach effort known as the Pacific Ports Clean Air Collaborative (PPCAC) to engage regional stake holders from the entire Pacific Region. The PPCAC Conference serves as a venue for ports, shipping lines, terminal operators, equipment manufacturers, regulatory agencies, environmental groups, and others involved in trade along the Pacific Rim to share best practices, exchange ideas, and work together. There have been three conferences to date, including December 2006 in Los Angeles, November 2008 in Shanghai, and February 2012 in Los Angeles. As an example of the cooperative spirit of PPCAC, the Ports of Los Angeles and Shanghai have been sharing their experiences with improving environmental quality in and around the ports since 2006 through technical information and staff exchanges. ([www.ppcac.org/index.htm](http://www.ppcac.org/index.htm))

ESI is an international indexing system for clean ships and was developed under the International Association of Ports & Harbors, World Ports Climate Initiative (WPCI). POLA is the first Pacific Rim and Western Hemisphere port to join the index. ([esi.wpci.nl/Public/Home](http://esi.wpci.nl/Public/Home))

POLA is a founding member of the World Port Climate Initiative (WPCI) of the International Association of Ports and Harbors (IAPH). Approximately 60 of the world's key ports, acknowledging their unique capacity as key hubs in global supply chains, have come together in a commitment to reduce their greenhouse gas emissions while continuing their role as transportation and economic centers. POLA hosted the formation of the WPCI in November 2008 and has been the lead port for the IAPH Tool Box and Carbon Footprinting working groups. In 2012, POLA joined the WPCI Environmental Ship Index (ESI) as it looks to continue to reduce emissions from ships.

([wpci.iaphworldports.org/index.html](http://wpci.iaphworldports.org/index.html))

Further advancement in clean technologies and deployment of cleaner equipment is anticipated in 2012. There will be an increasing number of 2010 or newer trucks into the fleet serving POLA, the full effect of the third CTP truck ban, an increase in the use of alternative fuels, and further development and deployment of electric trucks and cargo handling equipment.

Alternative Maritime Power™, or "AMP™," is a one-of-a-kind air quality program that focuses on reducing emissions from container vessels docked at the POLA. Instead of running on diesel power while at berth, AMP-equipped ships "plug in" to shore side electrical power – literally as an alternative power source for oceangoing vessels. By 2014 there will be a total of 24 AMP berths at POLA.



