



A Clean Air Strategy

for The Port of New York & New Jersey

Final – October 21, 2009



THE PORT AUTHORITY OF NY & NJ

Acknowledgement Page

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The Port Authority's tenants and community stakeholders

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List of Acronyms

AIS	Automatic Identification System
CHE	Cargo Handling Equipment
CMAQ	Congestion Mitigation Air Quality
CMV	Commercial Marine Vessel
CNG	Compressed Natural Gas
DPF	Diesel Particulate Filter
ECA	Emissions Control Area
EMS	Environmental Management System
EPA	Environmental Protection Agency
CHE	Cargo Handling Equipment
DOC	Diesel Oxidation Catalyst
GHG	Greenhouse Gases
HDDV	Heavy Duty Diesel Vehicle
IMO	International Maritime Organization
NJDEP	New Jersey Department of Environmental Protection
NYCEDC	New York City Economic Development Corporation
NYNJLINA	New York/Northern New Jersey/Long Island Non-Attainment Area
NYSA	New York Shipping Association
NYSDEC	New York State Department of Environmental Conservation
OGV	Ocean Going Vessels
PM	Particulate Matter
PANYNJ	Port Authority of New York and New Jersey
SCR	Selective Catalytic Reduction
TEU	Twenty-foot Equivalent Unit
ULSD	Ultra-low Sulfur Diesel

Introduction



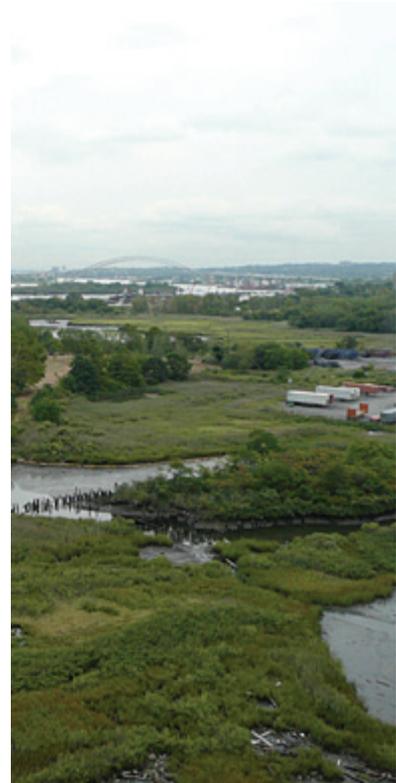
Strategy Purpose and Emission Reduction Goals

Strategy Purpose

This document is the first Clean Air Strategy (Strategy) for the Port of New York and New Jersey. The purpose of this Strategy is to define a commitment by the Port Authority of New York and New Jersey (Port Authority) and its partners to ensure that air emissions generated by mobile sources associated with marine terminal operations and activities decline even with anticipated future port growth over the next ten years. The actions identified in this ten year Strategy are meant to address three primary emissions reduction objectives:

1. Reduce maritime-related air quality impacts on human health and the environment from criteria air pollutants, especially those that come from diesel particulate emissions;
2. Reduce maritime-related contribution to greenhouse gas emissions associated with climate change; and
3. Contribute to the effort to bring the New York/Northern New Jersey/Long Island Non-Attainment Area (NYNJLINA) into attainment.¹

To remain competitive in a market with fluctuating cargo throughput and growing consumer demand, the Port Authority must meet many challenges. Investments in port facilities and related infrastructure are being made to help sustain cargo throughput, protect the harbor environment, and enhance the quality of life for those working and living in the region surrounding the Port Authority's marine terminal facilities in New York and New Jersey. This Strategy proposes a range of voluntary sector-based actions that attempt to be holistic in addressing these matters by covering technology upgrades, fuel-based strategies, operational changes, and other means, which produce demonstrable air quality improvement results. This Strategy outlines the extensive suite of current efforts led by the Port Authority and its maritime partners to reduce emissions, and then lays out future actions that push beyond the realm of those seen at the majority of other ports nationwide.



¹ EPA has designated the NYNJLINA as having levels of ozone that "persistently exceed the national ambient air quality standards." EPA likewise has determined that much of this area does not meet the national air quality standards for PM 2.5 (fine particulates of 2.5 micrometers or less in size) or ozone.

An important part of developing this Strategy was seeking and incorporating input and feedback from local and state agencies, Port Authority tenants, customers, and environmental and community stakeholders. In creating this Strategy, the Port Authority worked closely with the following partners (Partners) who have endorsed this Strategy: New Jersey Department of Environmental Protection (NJDEP), New York State Department of Environmental Conservation (NYSDEC), The City of New York (including the Mayor's Office of Long Term Planning and Sustainability and the Department of Transportation), New York City Economic Development Corporation (NYCEDC), New York Shipping Association (NYSA), United States Environmental Protection Agency (US EPA) Region 2, City of Bayonne, City of Elizabeth, City of Jersey City, and City of Newark. This group, along with the Port Authority, comprised the Strategy Group, which oversaw the development of this Strategy. Several face-to-face meetings and conference calls were held with the Strategy Group to scope, draft, and further refine the list of actions to reduce air emissions as provided within this Strategy. The municipalities of Bayonne, Elizabeth, Jersey City, and Newark joined the Strategy Group in the final stages of Strategy development and therefore did not participate in the earlier stages. Outreach to the broader range of stakeholders is defined in more detail in the Strategy Process section below.

The Port Authority and its Partners recognize that the development of this Strategy is only the first step in achieving future emissions reductions that build upon those already occurring. The key will be transitioning from the promising strategies contained herein to actual implementation of the specific actions needed to achieve further emissions reductions. For this to occur, the actions need the commitment and full cooperation of the Port Authority and its Partners, the development and deployment of technology and/or operational changes, and, in most cases, dedication of sufficient funding. To successfully monitor the actual implementation of the Strategy, each of these areas will need to be tracked, recorded, and displayed to the public. In particular, the biennial Strategy Implementation Reports will include a comprehensive list of funding sources sought, secured, and deployed throughout the Strategy in order to document progress and identify any gaps that may need to be addressed by seeking alternate and/or additional funding sources.

In addition, the Port Authority and its Partners support the desire for on-the-ground monitoring of emission reductions resulting from the actions in the Strategy, and will work to develop a monitoring program during the first few of years of implementation. Development of a credible monitoring program will begin with identifying the best entity (or entities) to conduct local monitoring, and determining if there is a scientifically-sound way of differentiating between port-related emissions and other sources of mobile emissions on a local level. Actions outlined in the Strategy will be prioritized based upon their corresponding tons of emissions reduced, cost-effectiveness, available funding, and localized area impacts. Lastly, the Port Authority and its Partners are aware that if the voluntary approach taken by the Strategy is not successful at reducing maritime-related emissions, alternate routes of securing these reductions may be considered. In light of this, the Port Authority and its Partners agree

that it is in all parties' best interests for the Strategy to be successful in reducing emissions as described in this document.



Emissions Reduction Goals

The overarching Strategy goal is an overall decrease of Port-related maritime emissions despite any Port growth in the next ten years. The Port Authority's *Statement of Principles for Improving Air Quality at the Port of New York and New Jersey*, adopted by its Board of Commissioners in November 2008, formally established the following aggressive emission reduction goals consistent with regional efforts in New York and New Jersey:^{2,3}

² Greenhouse gas reduction goals are set forth in New Jersey Executive Order No. 2007-54 (February 17, 2007), available online at: <http://www.state.nj.us/infobank/Circular/eojsc54.htm>, last visited on 10/19/09; City of New York Executive Order No. 2007-109 (October 22, 2007), not available online; City of New York Local Law 22 of 2008, New York City Administrative Code Title 24, Article 8, available online at: <http://public.leginfo.state.ny.us>, last visited on 10/19/09; and State of New York Executive Order No. 2009-02, available online at: http://www.ny.gov/governor/executive_orders/xeorders/eo_2_print.html, last visited on 10/19/09 and Executive Order No. 2009-24, available online at: http://www.ny.gov/governor/executive_orders/xeorders/eo_24.html, last visited on 10/19/09. Criteria pollutant reduction goals are set forth in the State Implementation Plans for New York and New Jersey.

³ In March 2008, the Port Authority announced the goal of carbon neutrality from its operations by 2010, through new capital investments and operational refinements, and then through regional investments in environmental technology. For more information, see <http://www.panynj.gov/abouttheportauthority/presscenter/pressreleases/PressRelease/index.php?id=1049>, last visited on 10/19/09.

1. An annual 3 percent net decrease of criteria pollutants (which for purposes of this Strategy equates to a 30% decrease from baseline 2006 levels despite any port growth over the next ten years).
2. An annual 5 percent net decrease of green house gasses (GHGs), (which for purposes of this Strategy equates to a 50% decrease from baseline 2006 levels despite any port growth over the next ten years).

These goals will be used as the **minimum acceptable levels of reduction** from which to monitor and measure Strategy success. However, the actions in this Strategy reach well beyond these framing goals, and the Port Authority and its Partners are committed to ensuring that remains the case over the ten-year lifetime of the Strategy. For example, if all six of the committed actions for Cargo Handling Equipment (CHE) are implemented, this would result in an estimated cumulative percent reduction (in tons per year) in emissions from the 2006 CHE sector baseline of 42.2% for PM, 29.7% for NO_x and 4.8% for GHGs during the first five years of Strategy implementation. While estimated emission reductions have not yet been quantified for all of the committed actions in this Strategy (see footnote 13), the Port Authority and its Partners are confident that they represent actions, which in total and over time will exceed the formal goals stated above. As implementation occurs, the biennial reports will document the actual emissions reductions that specific actions achieved to illustrate the extent to which the formal goals are met and exceeded.

These aggressive goals are appropriate while the Port continues to provide its important economic function by handling the movement of cargo that meets regional (80%) and inland (20%) market demands.⁴ The movement of these goods through the marine sector is the most cost-efficient mode to meet the regional demand, and also produces the fewest overall emissions compared to import of goods to the region by truck or rail. Nevertheless, maritime-related activities contribute to air pollutants and greenhouse GHG emissions. While less than emissions from comparable truck shipment of freight on a regional basis, these maritime emissions do affect human health and the environment, contribute to global warming, and could impact nearby communities. Accordingly, the Strategy actions go beyond the inherent efficiency of marine transportation to reduce emissions even further.

The actions listed in this Strategy address those emissions that fall within a group of six criteria pollutants regulated by the EPA.⁵ The Strategy goals and actions also target GHG emissions.⁶ The Port Authority has quantified air emissions from its maritime facilities

⁴ The term "regional" in this context means the area within 260 miles of the Port of New York and New Jersey. "Inland" refers to all United States locations outside of this region to which cargo passing through the Port of New York and New Jersey is destined.

⁵ "Criteria pollutants" refers to the following pollutants:

- Oxides of nitrogen (NO_x), an ozone precursor; Carbon monoxide (CO); Particulate matter less than 10 microns in diameter (PM₁₀); Particulate matter less than 2.5 microns in diameter (PM_{2.5}); Volatile organic compounds (VOCs), an ozone precursor; and Sulfur dioxide (SO₂).

⁶ Greenhouse gas emissions include:

- Carbon dioxide (CO₂); Nitrous oxide (N₂O); and Methane (CH₄).

and activities in several emission inventories: The Commercial Marine Vessel (CMV) Emissions Inventory of the year 2000 fleet, The CHE Emissions Inventories of the year 2002 and 2004 fleets, The Vessel Dwelling Emissions Inventory and Analysis of Alternative Reduction Measures, The Heavy Duty Diesel Vehicle (HDDV) Emissions Inventory of the year 2005 truck fleet, The Greenhouse Gas Emissions Inventory of Port Authority Facilities for the baseline year 2006 and for year 2007, and the Port Authority Port Commerce Department 2006 Baseline Multi-Facility Emissions Inventory (2006 Baseline Inventory) for CMV, CHE, HDDV and Locomotives. In addition, in February 2009, the Port Authority also completed a Drayage Truck Characterization Survey of drayage trucks serving all Port Authority marine terminals and one privately owned marine container terminal.

The following figure illustrates the percentage contribution of the Port Authority's maritime emissions in terms of tons per year to the total NYNJLINA criteria emissions from all regional emission sources. The numbers shown represent emissions information reflected in the 2006 Baseline Inventory.

Table 1: Total Criteria Emission Summary by Source Category, %

NYNJLINA Source Category	NO _x	PM ₁₀	PM _{2.5}	VOC	CO	SO ₂
PANYNJ Maritime Emissions	2%	< 1%	1%	< 1%	< 1%	2%
Stationary and Area Emissions	31%	93%	75%	2%	56%	84%
Other Mobile Emissions	23%	4%	16%	34%	17%	11%
On-Road Mobile Emission	44%	3%	8%	64%	27%	3%
Total NYNJLINA Emissions, tons per year	445,285	178,451	42,441	522,245	2,840,374	170,044

Although the Port Authority's maritime emissions are a small percentage of total regional emissions, the Port Authority acknowledges the local impacts of maritime activities occurring in and near populated areas and the need for a collaborative effort from every NYNJLINA source category in order to achieve regional reduction goals. Thus, the Port Authority has placed an importance on implementing strategies that reduce emissions from all port-related sources at its maritime facilities.



Strategy Background

Economic Growth and the Port Authority

The Port Authority operates as a landlord that leases its marine terminals to private operators in the Port of New York and New Jersey (the Port), which is the largest port on the east coast, the third largest port in the United States, and among the fifteen largest ports in the world. More than 269,000 jobs are associated with the Port's activity with \$11.2 billion⁷ in wages and over \$5 billion in tax revenue annually. In addition the Port serves an estimated 21 million consumers in the New York-New Jersey Metropolitan Area, and 100 million more within a one-day drive. The Port provides almost immediate access to one of the country's wealthiest regions and rail and truck access to half the nation. The region was first settled because of the Hudson River Valley's advantages as a harbor, and port commerce was integral in the growth of the New York metropolitan region into the economic and cultural center it is today.

One measure of port activity is the throughput of containerized cargo, commonly expressed in terms of twenty-foot equivalent units (TEUs). In 2007, 5.3 million TEUs passed through the Port, valued at almost \$166 billion. Although the throughput of containerized cargo at the Port in 2008 was flat when compared to 2007, cargo volumes are projected to grow over the next decade. To accommodate growth, significant capital investments will be required to expand port facilities and related

⁷ All monetary figures in this document are given in United States Dollars (USD).

infrastructure. This Strategy aims to ensure that the Port Authority's economic development goals can be achieved consistent with the emission reduction goals stated above. The 2006 Baseline Inventory will act as a baseline for measuring reductions in criteria pollutants and GHGs, and thus progress towards the goals. Updates to the baseline emissions inventory will enable the Port Authority to track individual sector contributions to overall reductions, at different levels and at different times over the life of this Strategy.

Strategy Process

This Strategy was developed through a commitment-based partnership, which allowed the Port Authority and its Partners to reach beyond the normal 'business as usual' approach to address air quality concerns within the Port sector under the jurisdiction of the Port Authority. It grew out of internal discussions at the Port Authority and external information exchanges with national and international ports and other stakeholders. Announced in July of 2008 at the Faster Freight Cleaner Air—East Coast conference, the development of this Strategy took place on an accelerated time schedule with finalization a little over a year later in October of 2009. In creating this Strategy, the Port Authority worked with several previously identified Partners (see page three), who collectively endorse this Strategy and agree to continue a collaborative approach to reducing air emissions. These Partners share accountability and commitment with respect to the development and implementation of specific actions as identified within this Strategy. Additionally, the following represent key areas in which Partners agree to support the implementation of this Strategy:



- Assistance in securing grants (as appropriate), providing incentives, and otherwise helping to implement activities where the Port Authority has little-to-no direct responsibility for the actions.
- Leading in the formation of a regional working group to track the measurement, monitoring, and verification of implemented actions and to share best practices which could be applied throughout the region resulting in additional emissions reduction.
- Assistance in promoting change in state and local legislation or initiatives to support emissions reduction activities from all sources associated with maritime activities.
- Assistance in the coordination of state infrastructure improvement lists prepared in conjunction with requests for federal funding and working to foster joint applications between cities, states and the Port Authority to fund emissions reduction initiatives.

- Coordination and assistance with outreach to community and environmental stakeholders to solicit grassroots ideas, develop a clear understanding of concerns, and identify potential solutions that may help to contribute further to reduce local impacts and reach the regional goal of attainment.

In addition to Strategy Group engagement, the Port Authority conducted meetings with sector-specific stakeholders to evaluate draft lists of sector-based actions for feasibility, timing, potential roadblocks that may need to be overcome, and areas where incentives would be beneficial/necessary to implement a specific activity. The Port Authority also conducted meetings with environmental and community stakeholders and local municipalities to obtain their feedback and ensure their concerns were addressed. These meetings also allowed sector stakeholders to discuss moving beyond near-term actions and engage in dialogue around long-term activities and the "the next big thing" in air quality improvement, including topics such as:

- Green construction in new development projects
- Freight mobility issues
- Short-haul rail
- Changes in operating mode
- Emerging technologies

Stakeholder meetings were held with the following groups:

- Ocean going vessel sector
- Rail sector
- Trucking sector
- Harbor craft sector
- Cargo-handling equipment sector
- Environmental and community stakeholders

To complete the comprehensive outreach efforts, the Port Authority also held a public meeting prior to finalizing the Strategy. As the Strategy is implemented, the Port Authority will continue to work with its Partners and stakeholders to implement and update the Strategy.

Strategy Scope

The scope of this Strategy includes Port Authority marine terminal facilities within the Port District, which is located within a twenty-five mile radius of the Statue of Liberty. These facilities include the Brooklyn Port Authority Marine Terminal and Howland Hook Marine Terminal in New York, and the Port Newark and Elizabeth Port Authority Marine Terminals, and former Auto Marine Terminal in New Jersey. The privately owned Global Marine Terminal in Jersey City, New Jersey, although not a Port Authority facility, is included within this scope and the baseline emissions inventory, as it is a major container terminal represented by New York Shipping Association, a Partner in the Strategy development. Also included in the scope are facilities controlled by the

Strategy Partner, New York City, including the Brooklyn and Manhattan Cruise Terminals, potential cross-harbor rail facilities, and related freight areas such as Hunts Point.⁸ This Strategy does not cover emissions tied to non-maritime Port Authority facilities, such as airports, bridges, and tunnels.

Figure 1: Port Authority of New York and New Jersey Seaport Facilities Map



There are several other marine-related facilities and operations, such as petroleum, bulk, general cargo and additional passenger terminals that are located in the Upper New York Bay and along the East River, Arthur Kill, and Kill Van Kull waterways that are not under the aegis of the Port Authority in any way, and thus are not directly included in the Strategy scope. However, the Port Authority and its Partners are committed to finding ways to work with these entities in the future, where possible, to encourage emissions reduction actions similar to those in this Strategy.

⁸ As a Port Authority owned and leased facility, the Brooklyn cruise terminal is included in the 2006 baseline emissions inventory. The Manhattan cruise terminal is not included in the baseline since it is owned by New York City; therefore emissions reductions generated from actions at this facility will not be included in overall reductions from the baseline and will be reported independently or baseline emissions will be calculated and included in the next emissions inventory update. In addition, as the Port Authority did not purchase the cross-harbor rail facilities until 2008, those facilities were not included in the 2006 baseline and will be treated similar to the Manhattan cruise terminal for reporting purposes.

Emissions Reduction Actions



Explanation of Covered Sectors (Source Categories)

Mirroring the 2006 Baseline Inventory, this Strategy lists actions for emissions reduction by source category, or sector of port operations. These four sectors are Ocean-Going Vessels, Heavy-Duty Diesel Vehicles, Railroad Locomotives, and Cargo Handling Equipment. Harbor Craft is also listed as a source sector in the Emission Inventory despite the fact that the Port Authority has little to no direct influence over that sector. The Harbor Craft sector is included in this Strategy as the Partner agencies working with the Port Authority felt that significant improvement could be made within this sector of maritime emissions, based on currently implemented programs and on-going interaction with sector stakeholders.

The actions in this section address both criteria pollutants and GHGs, in light of the overarching emissions reduction objectives stated in the Introduction. The Port Authority's small percentage of regional emission contribution shown previously in Table 1 is further broken down by Source Category in Tables 2 and 3 below to enable the Port Authority and its Partners to focus their emissions reduction efforts.⁹

Table 2: Criteria Pollutant Emission Summary by Source Category, %

Source Category	PM ₁₀	PM _{2.5}	SO ₂	NO _x	VOC	CO
Ocean-Going Vessels	65%	62%	91%	47%	40%	22%
Cargo Handling Equipment	17%	19%	6%	18%	30%	32%
Heavy-Duty Diesel Vehicles	11%	12%	1%	25%	21%	39%
Railroad Locomotives	2%	2%	1%	4%	5%	3%
Harbor Craft	5%	5%	1%	6%	4%	3%
Total PANYNJ Emissions, tons per year	537	452	3,597	7,800	413	1,434

(Columns do not all add to 100% due to rounding)

Table 3: GHG Emissions Summary by Source Category, %

Source Category	CO ₂	N ₂ O	CH ₄	CO ₂ Eq
Ocean-Going Vessels	33%	40%	49%	33%
Cargo Handling Equipment	24%	29%	23%	24%
Heavy-Duty Diesel Vehicles	36%	5%	2%	35%
Railroad Locomotives	2%	3%	3%	2%
Harbor Craft	4%	24%	24%	5%
Total PANYNJ Emissions, tons per year	586,583	13	36	591,053

(Columns do not all add to 100% due to rounding)

⁹ For graphical versions of these tables, see Appendix A.



To address emissions from building maintenance and operations, which are not included in the 2006 Baseline Inventory, the Port Authority Port Commerce Department is analyzing the environmental aspects of its activities, such as maintenance of Port Authority maritime infrastructure, through its ISO 14001 Certified Environmental Management System (EMS), and plans for continuous improvements to its future operations including continued implementation of existing policies for sustainable design and green construction, , looking for opportunities to increase energy efficiency and use renewable energy sources, and working to add and preserve greenspace on or near Port facilities, where feasible.¹⁰ These plans are in addition to requirements under NEPA and other state and local regulations associated with existing permits, such as the requirement to offset all NO_x emissions generated by the Harbor Deepening Project so that there is no net increase in NO_x in the NYNJLINA resulting from emissions caused by dredging vessels.

¹⁰ In July 2006, the Port Authority adopted a policy to "reduce adverse environmental impacts of the design, construction, operation and maintenance and occupancy or leasing of new or substantially renovated buildings and facilities, reconstruction projects and programs." The policy applies to both the Port Authority and tenant capital projects.

Link between Current and Future Activities

The actions in this report are divided into three categories for each sector:¹¹

1. Ongoing and completed emission reduction actions (Implemented Actions);
2. Actions which the Port Authority and its Partners plan on implementing within the next five years (Committed Actions); and
3. Longer-term actions for further consideration (Future Actions).

The breadth of the *Implemented Actions* captures the Port Authority and its industry Partners' ongoing commitment to air quality improvements; as part of this Strategy, the Port Authority and its Partners agree to continue and expand those current actions which have proven successful in reducing emissions.

Committed Actions are those actions that will be implemented within five years, many in advance of future regulations that might otherwise mandate their implementation. Where currently known, annual emissions reduction estimates¹² are noted for Implemented and Committed Actions.¹³ Actual reductions will be reported during the bi-annual emissions inventory updates (see the Reporting and Accountability section of this document for additional detail). The Committed Actions also include predicted implementation periods; however as implementation timelines are difficult to establish without secured funding, these timelines are subject to change. As funding is realized, additional details regarding implementation milestones and estimated emissions reductions will be announced. Lastly, as part of actively working to achieve successful implementation of the Strategy, the Strategy Partners have all committed to helping the Port Authority implement certain actions. Where specific commitments have been made they are noted with the accompanying action below.

The *Future Actions* list contains those potential actions that the Strategy Group and stakeholders felt were feasible options for achieving additional significant emissions reduction. The Port Authority, along with its Partners and stakeholders, commit to further exploring the feasibility of these actions, many of which could lead to longer-term business model, major structural or operational changes, and/or technological innovation. The Future Actions list will be assessed at each of the biennial emissions reporting intervals and those future actions which are most promising and feasible for successful implementation at the time will then become Committed Actions. In addition to the actions listed, the Port Authority and its Partners commit to continuing to support research and development of new, alternative technologies for air quality improvements in all maritime sectors. New implementation commitments will be made for future actions based on implementation success of the previous Committed Actions

¹¹ Actions in the Implemented, Committed, and Future Actions lists for all sectors are listed in no particular priority order.

¹² For NO_x, PM_{2.5}, and GHG_{eq}.

¹³ At the time this Strategy went to print, estimated emissions reductions were not yet calculated for all committed actions in the Strategy. Rather than delay the release of the Strategy, work will continue to finalize estimates for all the actions as indicated, where funds are available to do so.

and as new technologies and actions become available. Implementation of the listed activities will also include an education component, so that each sector is fully aware of the benefits of the proposed actions and additional ways to help reduce emissions.

Sector-Based Actions

Ocean-Going Vessels (OGVs)

Background

Tables 2 and 3 and the graphs in Appendix A show that OGVs are the greatest Port-related source of all criteria pollutants except CO; they are the second greatest source of CO₂ Eq. As the largest source of Port-related air emissions, the Port Authority and its Partners have committed to numerous actions for reducing emissions in the near term. Many of the Committed Actions act as a catalyst for early adoption/acceleration of the new International Maritime Organization (IMO) amendments¹⁴ and potential North American Emissions Control Area (ECA) requirements,¹⁵ mirroring the phased approach outlined in the amendments, with the goal of reaching 0.5% and 0.1% sulfur fuel content, respectively, as early as possible. These types of voluntary actions demonstrate the Port Authority and its Partners' commitment to the assessment and implementation of long-term operational changes to further reduce emissions.

Implemented Actions	Estimated Emission Reductions PM / NO _x / GHGs
OGV(a). The Port Authority is working with the Port of Rotterdam to develop an Environmental Ship Index (ESI) as a means of establishing criteria for evaluating and recognizing clean ships.	Not quantifiable

Committed Actions	Estimated Period of Implementation	Estimated ¹⁶ Emission Reductions PM / NO _x / GHGs
OGV(b). Establish a year-round vessel speed incentive program for ships approaching the harbor. <ul style="list-style-type: none"> o The Port Authority program would cover the portion of the year (May 1 through October 31) that does not fall under the National Oceanic and Atmospheric Administration 	2009 – 2012	11.6%/ 19.1%/ 6.6%

¹⁴ The IMO implementation dates for a global sulfur cap are: global sulfur cap of 3.5% by January 1, 2012 and progressively reduced to 0.5% by 2020, subject to feasibility review completed by 2018.

¹⁵ The IMO implementation dates for sulfur limits in Emission Control Areas are: Sulfur limit in Emission Control Areas reduced to 1.0% by July 1, 2010 and to 0.1% effective January 1, 2015.

¹⁶ Reductions are per year reductions calculated from the 2006 sector baseline, e.g., estimated emissions reductions for OGV activities are calculated from the 2006 OGV sector baseline. See Appendix C for correlating tons per year figures.

Committed Actions	Estimated Period of Implementation	Estimated ¹⁶ Emission Reductions PM / NO _x / GHGs
(NOAA)'s seasonal management restrictions for the mid-Atlantic area. ¹⁷		
OGV(c). Develop an incentive program for OGVs to switch to low sulfur fuel when in the Port of New York and New Jersey. This incentive would likely be funding to help cover the cost differential between the use of low sulfur fuel and conventional bunker fuel while in port. <ul style="list-style-type: none"> o Incentive payments would apply to main and auxiliary engine consumption and approximate 50% of the cost differential between heavy fuel oil and marine gas oil at 0.2% sulfur content. o To qualify for the incentive, vessels would also have to participate in the vessel speed reduction program. 	2009 – 2012	54.4%/ 11.58%/ 0.00%
OGV(d). Develop a Clean Ship/Green Flag program, using the ESI mentioned above, to recognize ships that use vessel speed reduction and clean engine technology to reduce their air emissions.	2009 – 2014	Implementation details needed prior to calculation
OGV(e). Install shore-power ("cold ironing") capability at the Brooklyn Cruise Terminal.	2009 – 2011	1.87%/ 2.58%/ 0.38%
OGV(f). Continue/expand an international partnership with the Port of Rotterdam, and other ports if opportunities exist, working to implement "clean ship" and other related programs/projects.	2009 – 2014	Not quantifiable
OGV(g). Support the establishment of a North American Emissions Control Area, led by EPA R2 helping to advance the agency work needed to submit and support the ECA application process.	2009	Not quantifiable
OGV(h). NYCEDC to seek to repeal the New York State tax exemption for bunker fuel.	2009	Not quantifiable

Future Actions
OGV(i). Install shore-power capability at the NYCEDC's Manhattan Cruise Terminal and in conjunction with all new terminal developments.
OGV(j). Implement pilot projects for bonnets and other promising new technologies.
OGV(k). Seek to establish a New York State tax exemption for low-sulfur fuel.

¹⁷ For more information on NOAA's restrictions, see: <http://www.nmfs.noaa.gov/pr/shipstrike/>, last visited on 10/19/09.

Cargo Handling Equipment (CHE)

Background

Cargo handling equipment is the second most significant source of all criteria pollutants except NO_x, for which it is the third most significant source. The Port Authority and its marine terminal tenants have already made substantial resource investments to reduce diesel exhaust emissions associated with CHE. For example, the Port Authority and its marine terminal tenants have implemented and completed actions which electrified nearly all of the diesel port quay cranes, modernized CHE equipment with new units that meet on road standards, voluntarily transitioned to the use of ultra-low sulfur fuel in all CHE, and installed active diesel particulate retrofits on yard tractors. The Port Authority and its marine terminal tenants commit to completing additional initiatives over the next five years to address the current diesel emissions associated with CHE and then move towards the assessment and implementation of longer-term operational changes.

Implemented Actions	Estimated Emission Reductions PM / NO _x / GHGs
CHE(a). Completed switchover to use of Ultra Low Sulfur Diesel (ULSD) fuel in all CHE.	9% PM / 97% SO _x
CHE(b). Installed and evaluated active diesel particulate filters (DPF) on yard tractors.	No plans to quantify
CHE(c). Currently using compressed natural gas (CNG), propane, or electric-powered forklifts in warehouses.	No plans to quantify
CHE(d). Instituted an Idle Reduction Program at all marine container terminals, restricting idling times of diesel powered cargo handling equipment through the use of automatic shutoff devices and electric plug-in technology.	25% / 25% / 25%
CHE(e). Completed installation of 39 out of 53 total electric cranes and modernization of all CHE at container terminals to models meeting EPA's 2004 on-road emissions standards. ¹⁸	30% / 30% / 30%

Committed Actions	Estimated Period of Implementation	Estimated Emission Reductions PM / NO _x / GHGs
CHE(f). Sponsor pilot projects to test hydraulic and electric hybrid yard hostlers.	2009 - 2011	26.3% / 14.6% / 4.39%

¹⁸ Note that modernization of CHE is on-going and that some equipment has already been upgraded beyond 2004 standards. Further detail on the number and types of equipment modernized through 2005 can be found in the following report: *Port Authority of New York and New Jersey Cargo Handling Equipment Emissions Inventory Update*, January 2005, prepared by Starcrest Consulting Group, LLC.

Committed Actions	Estimated Period of Implementation	Estimated Emission Reductions PM / NO _x / GHGs
CHE(g). Install new engines with DPFs on two wharf cranes the Port Authority owns at Red Hook Container Terminal in Brooklyn and on two on-road stick cranes at the ASI facility at Port Newark.	2010	2.25% / 0.76% / 0.00%
CHE(h). Accelerate modernization/ upgrade/ decommission up to 300 pieces of CHE, including 50 pieces of equipment with the oldest engines at all Port-Authority leased terminals to meet EPA's 2007 on-road standards.	2009 - 2014	10.3% / 11.8% / 0.00%
CHE(i). Replace up to one-third of the CHE fleet at all Port-Authority leased terminals with alternative powered equipment, including, but not limited to, diesel electric, hydraulic hybrid, and CNG, where technologically feasible.	2009 - 2016	26.3% / 14.6% / 0.00%
CHE(j). Determine the causes of on-terminal idling by CHE and work to strengthen the Idle Reduction Program by implementing actions which reduce or eliminate those causes, where feasible.	2009	Not quantifiable
CHE(k). Decommission or electrify eleven diesel cranes at Port Newark and Port Elizabeth. <ul style="list-style-type: none"> o Create an incentive program to retire and dismantle a minimum of two diesel powered cranes. o Install/upgrade electrical power infrastructure to support new electric wharf cranes for the remaining balance (nine cranes). 	2009 - 2014	3.5% / 2.7% / 0.38%

Future Actions
CHE(l). Install wind turbines as alternative energy source on Port Authority facilities.
CHE(m). Consider actions to address cold weather idling. Start with a pilot program to work through technical issues.
CHE(n). Replacement/upgrade of all remaining CHE not covered under CHE actions (h) and (i) above using the best available technologies at the time of replacement.

Heavy-Duty Diesel Vehicles (Trucks)

Background

Nearly eighty-five percent of all cargo coming to the Port is destined to satisfy regional consumer demand and is moved off of Port Authority facilities by truck, which is currently the most economical transportation mode to move cargo within the region.¹⁹ According to the 2005 Comprehensive Port Improvement Plan, Port trucks make up less than 4% of all trucks and less than 1% of all vehicles on the regional roadways. For the immediately adjacent areas to Port operations, however, truck emissions can have a more significant impact depending on the proximity of residential areas and truck routes. In addition, for the maritime-related emissions covered by this Strategy, trucks are the top emitters of CO and CO₂ as Tables 2 and 3 and the graphs in Appendix A show, and are thus a key target for reductions of these emissions.

In February 2009, the Port Authority completed a Drayage Truck Characterization Survey, which provided data on the age distribution and frequency of use for trucks calling (entering and exiting) Port Authority facilities. A summary of the findings is provided in Figure 2 and Table 4 below. The Drayage Truck Characterization Survey will be used to prioritize actions to address truck emissions, with the overall sector goal of phasing out the oldest, most polluting trucks first. Near term actions for this sector will focus on reducing PM emissions, while future actions will focus on stronger reduction of NO_x emissions.

The Port Authority and its marine terminal tenants have completed an initial phase of truck-related emissions reductions with a range of voluntary actions. For instance, tenant terminals have installed electronic gates, relocated gates, and extended gate hours to reduce air emissions associated with truck delays and congestion. Additional actions taken to ensure future reductions of emissions and roadway congestion include the Port Authority's implementation of a comprehensive rail expansion program to develop an on-dock rail system at all of the Port Authority's major container terminals and a marine terminal roadway enhancement program. To begin the next phase of action, the Port Authority has begun the preliminary analysis needed to assess long-term improvements in the age of trucks calling the port, and to consider structural changes in the trucking business model.

¹⁹ An additional 12% is moved by rail and 3% by barge, based on 2006 figures.

Figure 2: Model Year Distribution of Trucks Calling the Port Authority²⁰

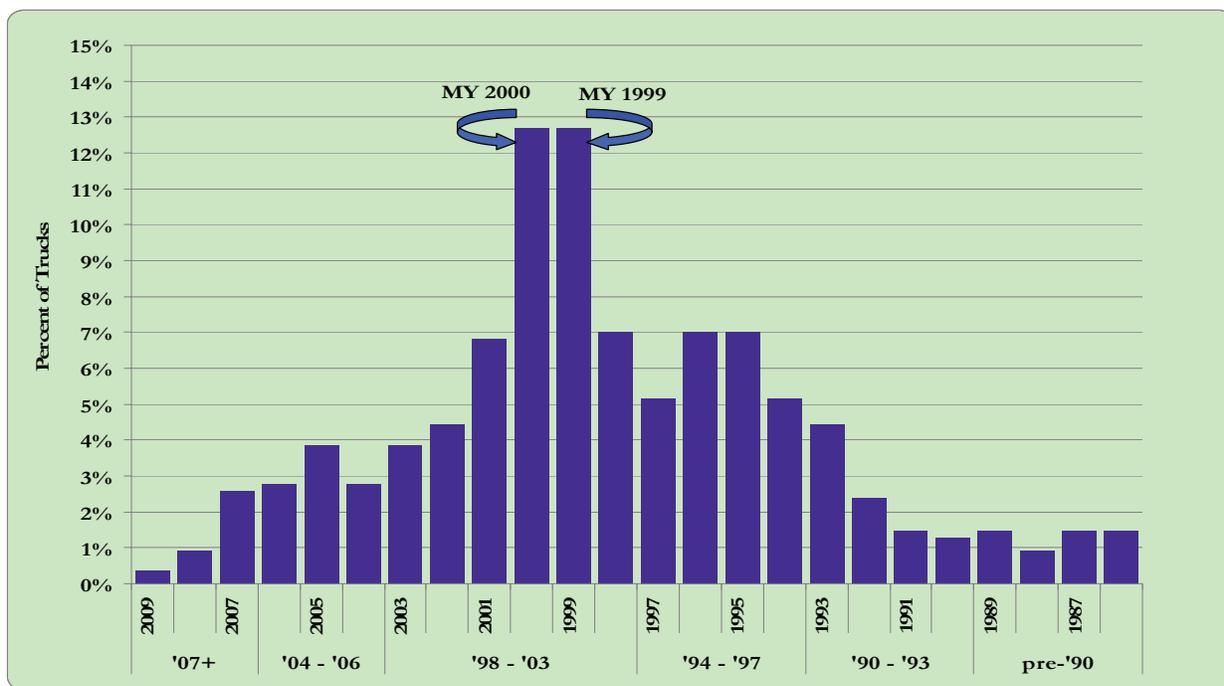


Table 4: Distribution of Trucks Calling Port Authority Terminals Most Often (on average at least once per day)²¹

Model Year Ranges	Performance Standards*	Estimated # of Trucks	Percentage of Total Trucks
2007 or newer	NO _x – 0.2, ²² PM – 0.01	140	3%
2004 – 2006	NO _x – 2.4, PM – 0.1	458	10%
1998 – 2003	NO _x – 4.0, PM – 0.1	2,116	47%
1994 – 1997	NO _x – 5.0, PM – 0.1	1,121	25%
1990 – 1993 ²³	NO _x – 5.0, PM – 0.25	346	8%
Pre-1990	NO _x – 10.7, PM – 0.6	363	8%
Totals	Not Applicable	4,544	100%

* US EPA heavy-duty engine standards, measured in grams per brake horsepower-hour (g/bhp-hr)

²⁰ Data from the “Port Authority of New York and New Jersey, Port Commerce Department, Drayage Truck Characterization Survey at the Port Authority and the Global Marine Terminals,” prepared by Starcrest Consulting Group, LLC, December 2008.

²¹ See footnote 18. Performance Standards are set by the United States Environmental Protection Agency (US EPA).

²² Phased in on a percent of sale basis as follows: 25% in 2007, 50% in 2008, 75% in 2009, and 100% in 2010.

²³ The NO_x standard was lowered from 10.7 to 6.0 in 1990. Both the NO_x and PM standards changed in 1991 to the levels listed in the table.

Implemented Actions	Estimated Emission Reductions PM / NO _x / GHGs
Trucks(a). Initiated NY/NJ Roadway enhancement program to increase roadway capacity and reduce congestion.	Not quantifiable
Trucks(b). Terminal operators installed electric gates, relocated gates, and extended gate hours at both ends, where feasible, to reduce truck congestion and idling emissions at terminals.	No plans to quantify
Trucks(c). NYCEDC negotiated a mandate in its lease with Phoenix Beverages at Pier 11 Red Hook to convert its entire fleet of trucks (100 trucks) to CNG within seven years.	To be calculated by September 2010
Trucks(d). Currently using the Portfields initiative to promote development of warehouse and distribution centers on abandoned, contaminated industrial sites located near the Port which would reduce truck vehicle miles traveled and their associated emissions.	To be calculated by September 2010

Committed Actions	Estimated Period of Implementation	Estimated Emission Reductions PM / NO _x / GHGs
Trucks(e). Create and implement a \$2M Emission Reduction Fund for port truck owners to finance acquisition of newer, lower emitting vehicles, with \$750K in Port Authority funding to match an EPA grant of \$750K combined with \$500K from a micro-lender.	2009 – 2012	1.10% / 0.00% / 0.00%
Trucks(f). Work with shippers and vessel operators to establish a SmartWay-type partnership with vessel operators and shippers that would enhance business to truckers that use vehicles equipped with SmartWay air emission and fuel efficiency upgrades. Upgrades may include the installation of diesel particulate filters (DPFs) and/or a diesel oxidation catalyst (DOC).	2009 – 2010	32.15% / 0.00% / 0.00%
Trucks(g). Develop a program to phase out older trucks serving Port Authority marine terminal facilities based on model year. To advance this action: <ul style="list-style-type: none"> o Establish a truck working group by June 2009 to work out implementation details, including funding, tracking mechanisms, and structure and timing for denying Port access. o Implement a Truck Replacement Program to provide incentives and financing to replace pre-1994 trucks with 2004 or newer vehicles. 	2010 – 2017	23.73% / 6.1% / 0.4%

Committed Actions	Estimated Period of Implementation	Estimated Emission Reductions PM / NOx / GHGs
Trucks(g). Develop an appointment system for trucks serving the terminals, including a fast lane at the gate for newer (2004 or younger) vehicles, in order to decrease total truck turnaround time.	2010	Implementation details needed prior to calculation
Trucks(h). Conduct a study of freight movement, modal splits, and short sea shipping, led by NYCEDC.	2009	Not quantifiable
Trucks(i). Develop public-private partnerships for retrofits and/or alternative fuels.	2009 – 2014	Not quantifiable

Future Actions
Trucks(k). Develop near-Port truck parking areas with plug-in electrification technology to reduce idling emissions. Consider including rest stop amenities as part of the parking area to encourage use.
Trucks(l). Assess the feasibility of creating a new exit ramp or Port-only lane off of the New Jersey Turnpike between exits 13a and 14a for Port truck traffic.
Trucks(m). Work with shipping lines to change the operating rules for chassis pool so they are more effective.
Trucks(n). Install plug-ins for refrigerated containers (reefers) at New York City marine terminals and Hunts Point, led by New York City.

Railroad Locomotives (Rail)

Background

The Rail sector contributes between 2% and 4% of criteria air pollutant and GHG emissions from Port Authority maritime activities. Currently implemented voluntary initiatives aim to reduce emissions associated with locomotive idling and include the installation of anti-idling devices for on-dock switcher locomotives and the use of a compressed air system in place of an onboard diesel generator to provide locomotives with compressed air needs. These actions present straight-forward solutions to addressing the current emissions associated with Rail and allow the Port to address its commitments to the assessment and implementation of longer-term operational actions to further reduce emissions. Near and long term actions under consideration include reconfiguring switcher locomotives to GenSet configuration²⁴ and increasing short-haul rail capabilities to reduce cargo leaving the Port by truck, respectively.

Implemented Actions	Estimated Emission Reductions PM / NO _x / GHGs
Rail (a). Invested over \$600M in ExpressRail expansion. Established on-dock rail at all container terminals. Achieved 358,000 rail lifts in 2007, displacing over 537,000 truck trips. Capacity when complete: 1.2M rail lifts/year; displacing over 1.8M truck trips.	To be calculated by April 2010
Rail (b). NYCEDC installed a Kim Hot Start anti-idling device on an on-dock switcher locomotive at New York Container Terminal.	To be calculated by April 2010
Rail (c). Currently using a ground air system in place of an on-board air compressor (which is powered by a vehicle's diesel generator) to provide locomotives' compressed air needs.	To be calculated by April 2010
Rail (d). Expanded rail capacity by extending and modernizing the Staten Island Railroad, with resource support from NYCEDC. ²⁵	To be calculated by April 2010
Rail (e). NYSA created a rail incentive program in July 2007 with investments of over \$40M to-date.	(Included in Rail (a) above)
Rail (f). NYCEDC negotiated a lease agreement at South Brooklyn Marine Terminal with Axis, which includes financial incentives for moving goods by rail or barge.	To be calculated by September 2010

²⁴ GenSet engines are computer controlled, monitoring engine idling and turning on and off on an as-needed basis, thus reducing engine idling and resulting emissions.

²⁵ This project consisted of extending track to new facilities previously not served by rail and removing outdated track geometries that prohibited certain types of rail cars (90 foot flat cars; 89 foot auto carriers) from moving over the waterfront rail lines safely, making rail a more viable option for moving cargo to and from Port facilities.

Committed Actions	Estimated Period of Implementation	Estimated Emission Reductions PM / NO _x / GHGs
Rail (g). Retrofit/replace up to three switching locomotives ²⁶ serving the Port with GenSets, particulate filters, and possibly selective catalytic reduction (SCR) technology for NO _x reduction. Administrative support by NJDEP and funding from Supplemental Environmental Project, negotiated by NJDEP.	2009 – 2011	12.7% / 10.8% / 1.7%
Rail (h). Reconfigure two switching locomotive engines with GenSets. The railways, CSX and Norfolk Southern, would provide 20% of the costs; an additional 20% would come from the Port Authority, and 60% would be provided by a grant from the Congestion Mitigation Air Quality (CMAQ) program.	2010 – 2011	9.5% / 12.99% / 1.32%
Rail (i). Implement a switch to ULSD fuel in switcher locomotives serving the Port and in cargo handling equipment at intermodal yards, prior to EPA's 2012 off-road engine standards taking effect.	2009 – 2012	2.2% / 2.2% / 0.00%
Rail (j). Implement operational procedures to shut down locomotive engines when not in use and outside temperatures permit.	2009	Implementation details needed prior to calculation
Rail (k). Extend and modernize rail lines to and in South Brooklyn Marine Terminal and the Port Jersey Peninsula to increase efficiency, led by NYCEDC. ²⁷	2009 – 2011	Not quantifiable
Rail (l). Install anti-idling technology in switcher locomotive engines not retrofitted with GenSets at the Port of Newark and Elizabeth Marine Terminal.	2009 – 2010	3.3% / 3.0% / 1.1%
Rail (m). Begin evaluation of alternative powered (hybrid, CNG or all-electric) lifting equipment at intermodal yards.	2011 – 2014	Not quantifiable

Future Actions

Rail (n). Consider a long term, operational change to increase the amount of cargo leaving the Port on rail versus truck. This includes increasing short-haul rail capabilities.

²⁶ The five switcher engines that serve the Port at any one time are pulled from a regional pool of thirty engines.

²⁷ New York City is investing \$9 million to promote the movement of goods by freight rail, including upgrades along 1st Avenue in Brooklyn, allowing modern, larger railcars to access the South Brooklyn Marine Terminal.

Future Actions

Rail (o). Implement efficiency improvements, such as the electrification of lift equipment and use of alternative powered (hybrid, CNG or all-electric) lifting equipment, at intermodal yards close to the port, where technologically feasible.

Rail (p). Reduce dependency on trucks by enhancing use of rail and barge, such as through Express Rail expansion, development of short haul rail lines, and implementation of short sea shipping.

Harbor Craft

Background

Harbor craft include private tour vessels and public and private passenger ferries, commercial vessels, tugs, and pleasure craft, all which share the waterways with Port operations. Although the Port Authority has no direct control over this sector, other Strategy Group Partners have identified opportunities for working with this sector to spur emission reduction efforts. For example, the New York City Department of Transportation (NYC DOT) identified the private ferries within this sector as stakeholders that NYC DOT has committed to working with to expand the ferry diesel engine retrofit under the Clean Air New York program, with the goal of retrofitting every private ferry running in the harbor. Although engine retrofits and replacements for ferries are the focus, additional actions are listed which could address all vessels in this sector.

Implemented Actions	Estimated Emission Reductions PM / NO _x / GHGs
HC (a). Began switchover to ULSD in all harbor craft, including Staten Island Ferries.	To be calculated by September 2010
HC (b). Completed engine retrofits on four Staten Island public ferries and engine replacements on fifteen tugs operating in the New York/New Jersey Harbor as part of the Harbor Deepening Project Air Offset Program.	18.2% NO _x ²⁸
HC (c). Currently implementing a Marine Vessel Engine Replacement Program, lead by NYC DOT, to upgrade to Tier I, II, or III marine engines.	To be calculated by September 2010

Committed Actions	Estimated Period of Implementation	Estimated Emission Reductions PM / NO _x / GHGs
HC (d). Revitalize the cross-harbor rail barge and convert the locomotive switcher engines supporting the operation to GenSet configuration and implement use of ULSD in both the locomotive and the harbor tug assigned to move the rail barge.	2009 – 2014	Implementation details needed prior to calculation
HC (e). Install diesel oxidation catalysts on private ferries, led by New York City under a federal grant.	2009 – 2014	To be calculated by April 2010

²⁸ Calculated based on emission reductions in excess of those required by the Harbor Deepening Project Air Offset Program. PM and GHG reductions are not tracked under the Program.

Committed Actions	Estimated Period of Implementation	Estimated Emission Reductions PM / NO _x / GHGs
HC (f). Accelerate the use of ULSD fuel in harbor craft in advance of EPA's 2012 non-road diesel standards. ²⁹ <ul style="list-style-type: none"> o Work with suppliers to ensure ULSD, with additives, is available. o Work with suppliers to add more fueling sites or a central fueling depot in the New York/ New Jersey Harbor. 	2009 – 2011	5.0% / 5.0% / 0.0%
HC (g). Adopt measures to increase fuel efficiency in harbor craft: <ul style="list-style-type: none"> o Vessel speed reduction; o Vessel assignment planning to reduce transit length; o Use Automatic Identification System (AIS) to monitor incoming vessel speeds and plan just in time arrival; and o Identify places—as part of NYC EDC's Phase II Maritime Support Study — where tugs can tie up and shut down engines between assignments in same general location. 	2009 – 2011	Implementation details needed prior to calculation
HC (h). Investigate and test post-combustion controls and after-treatment technologies for tugs.	2010 – 2012	Not quantifiable
HC (i). Raise awareness about reducing emissions and influence new purchases to include equipment up to highest emission standards. EPA Region 2 commitment to conduct outreach to harbor craft owners and operators via the National Clean Diesel Campaign, the Northeast Diesel Collaborative (NEDC), and the NEDC Goods Movement Workgroup.	2009 – 2010	Not quantifiable
HC (j). Expand marine vessel engine replacement or engine retrofit program (MERP) to private ferries, tugs and other harbor craft, as an effort separate from the Harbor Deepening Project Air Offset Program. Initial goal of replacing eleven engines. <ul style="list-style-type: none"> o Work to relax the requirement to stay in the harbor a large percent of the time. 	2009 – 2014	Implementation details needed prior to calculation

²⁹ For more information see EPA's Clean Air Non-road Diesel Rule at: <http://www.epa.gov/nonroad-diesel/2004fr/420f04032.htm>, last visited on 10/19/09.

Future Actions

HC (k).	Explore options for reducing the cost of cleaner/alternative fuels for harbor craft, including obtaining bulk suppliers and working to reform tax laws to waive taxes on fuel consumed in New York waters.
HC (l).	Install strong-arm dockers on ferries, which will enable them to shut off their engines while picking up or discharging passengers at dock.
HC (m).	Develop dockside electrification for tugs, where feasible.
HC (n).	Implement a hybrid ferry and tug pilot program, stemming from NYC EDC feasibility studies under development of a hybrid tug for cross-harbor rail operations.
HC (o).	Use anti-fouling hull coatings on marine vessels to reduce drag and improve fuel efficiency.

Implementation and Reporting



Approach to Implementation

In many instances, the short-term actions listed in this Strategy act as interim solutions leading up to broader changes (such as major equipment upgrades; switching to non-diesel, alternative power sources; and operational or business model shifts) in each category. The Port Authority and its Partners are working closely with other agencies and the maritime industry to share lessons learned from projects implemented outside the region and to encourage coordination of a range of demonstration projects to accelerate the availability of promising innovations. As mentioned in the Introduction, the priority of implementing the actions provided within this Strategy will be based upon their corresponding tons of emissions reduced, cost-effectiveness, available funding and localized area impacts. Those actions which appear to be most promising will be implemented first. Prioritization of actions will therefore be based on a multitude of information, including available funding. The Port Authority and its Partners commit to working within their own mandates and jurisdictions, at the local, state, and federal level, to secure sufficient funding to help realize those actions described in the Strategy.

Some of the actions in the Strategy refer to incentive-based approaches to leverage commitment to reduce emissions. These incentives, such as such as low interest loans, fuel rebates, and recognition programs, are intended to stimulate and reward those voluntarily implementing the actions outlined in the Strategy. The Port Authority and its Partners are committed to working to secure funding for incentives, where beneficial, and to define legal mechanisms and institutionalize programs to provide and manage these incentives. In addition to providing incentives, a full suite of funding options will be considered to support implementation. These include, but are not limited to, grant opportunities (such as those through the Diesel Emissions Reduction Act), Congestion Mitigation and Air Quality (CMAQ) funds, environmental fees, lease agreements, Stimulus Package funding (for alternative vehicles and transportation electrification), and highway funding.

Reporting and Accountability

In order to ensure the actions outlined in this Strategy are achieving real emissions reduction results, the Strategy Group has agreed to the following approach to measurement and reporting. Total emissions reductions for each sector will be reported via the biennial Emissions Inventory updates, starting with the 2008 update. The 2006 Baseline Inventory of all Port-related sources will act as the baseline for measuring change. Since investments in equipment upgrades, fuel switching, and changes in operational and business practices will vary year by year and sector by sector, reporting of emissions reduction achievements within these inventories will not be distributed evenly across sectors on a biennial basis, nor will the aggregate reductions be the same every year. Reductions reported within each Emission Inventory update will be based on specific actions implemented in a given bi-annum. The baseline annual emission reduction goals for criteria pollutants of 3% and GHGs of 5% provide

metrics for which to measure overall success and ensure that these emissions will continue to decrease despite anticipated Port growth; however the Port and its Partners commit to pushing emissions reduction beyond these baseline measures.

As a complement to Emissions Inventory updates, the Port Authority, working with its Partners, will draft a summary document describing progress towards the overarching objectives outlined in this Strategy (average annual emissions reductions across all sectors), as well as progress toward implementing the Strategy actions. Details on how to monitor and report on the progress of each action, such as how many trucks have been retrofitted, or how many gallons of diesel have been switched to ULSD, will be determined as the actions are implemented. In addition, details will be worked out to ensure that no “double counting” occurs for those activities implemented by Partner agencies, or for reasons other than voluntary emissions reduction (such as the Staten Island Ferry engine retrofits and harbor vessel engine replacement as offsets for the harbor deepening project, which were adopted as required mitigation through the environmental review process).

Plan Review and Updating

This Strategy will act as a living document to be updated on a biennial basis in response to implementation success, changing regulatory schemes, availability of new technologies, and the economic climate. As funding sources are identified for specific actions, the associated timeline and additional implementation details will be announced. On a biennial basis the Strategy Group will meet to review and update the document based on changes in the previous years and future emissions reduction needs. Therefore, updating of the Strategy will occur as a form of adaptive management based on previous years' reporting.

In addition, the Port Authority and its Partners will continue with stakeholder outreach throughout the ten-year lifetime of the Strategy to ensure the actions in the Strategy are comprehensive and effective and to provide a continuing degree of transparency during Strategy implementation and updating. This includes outreach to other ports along the east coast in hopes that they will see the benefits of implementing the actions in the Strategy and develop their own similar strategies, leading to reduced competitive pressures and greater regional and national emissions reduction and health benefits.

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Conclusion



A Clean Air Strategy
for The Port of New York & New Jersey

This Strategy has outlined a comprehensive approach for reducing emissions over the next ten years from maritime-related activities associated with the Port Authority of New York and New Jersey and its Strategy Group Partners. These actions aim to reduce air quality impacts on human health and the environment, reduce contributions to GHG emissions associated with climate change, and contribute to the regional effort to bring the NYNJLIA into attainment with applicable air quality standards. A suite of actions for reducing emissions are included for all five sectors of maritime activities (ocean-going vessels, cargo handling equipment, trucks, rail, and harbor craft) identified in the 2006 baseline emissions inventories.

As the Implemented Actions illustrate, this Strategy builds upon an existing strong foundation of emissions reduction activities undertaken by the Port Authority and its maritime partners. The list of Committed Actions for each sector in turn builds upon this foundation and highlights the dedication of the Port Authority and its partners to move above and beyond the current status with a range of additional actions to be implemented as quickly as possible. Future Actions then ensure that the momentum continues throughout the ten-year time horizon and allow for flexibility as new technologies and strategies become available. As a whole, the suite of actions for each sector presents an aggressive path for reducing maritime-related emissions that, when implemented, will result in emissions reductions that far surpass the existing Port Authority emissions reduction goals.

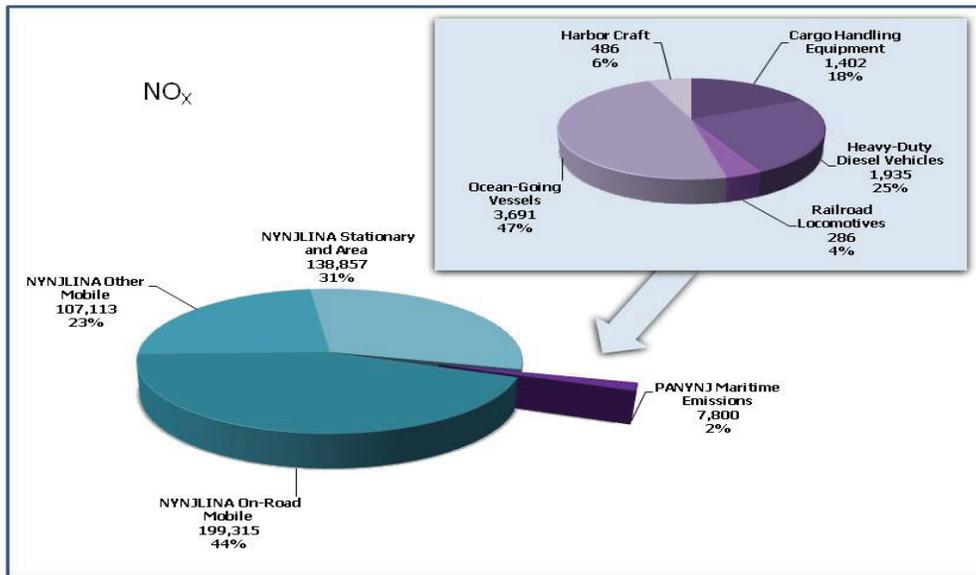
The completion of this document is the first step in ensuring an overall decrease in maritime-related emissions despite any Port growth over the next ten years. The real success of this Strategy will be demonstrated through on-the-ground implementation of the actions contained within, which in many cases depend on securing sufficient funding by, and the continued dedication of, the Port Authority's maritime partners. Transparent monitoring and reporting has been called for in the Strategy to ensure the actions in the Strategy are indeed being implemented and remain the right actions to achieve the Strategy's goals and objectives. The Port Authority and Strategy Group Partners are aware that much work remains to be completed as implementation moves forward. The opportunity to act as regional and national leaders in maritime emissions reduction is created by this Strategy and with that comes the challenge for successful implementation. The Port Authority and Strategy Group Partners have made the commitment to ensure this Strategy is a success, and look forward to working with all parties and interests that share in the desire to put the Strategy to work for the health and well-being of the people and environments it will affect.



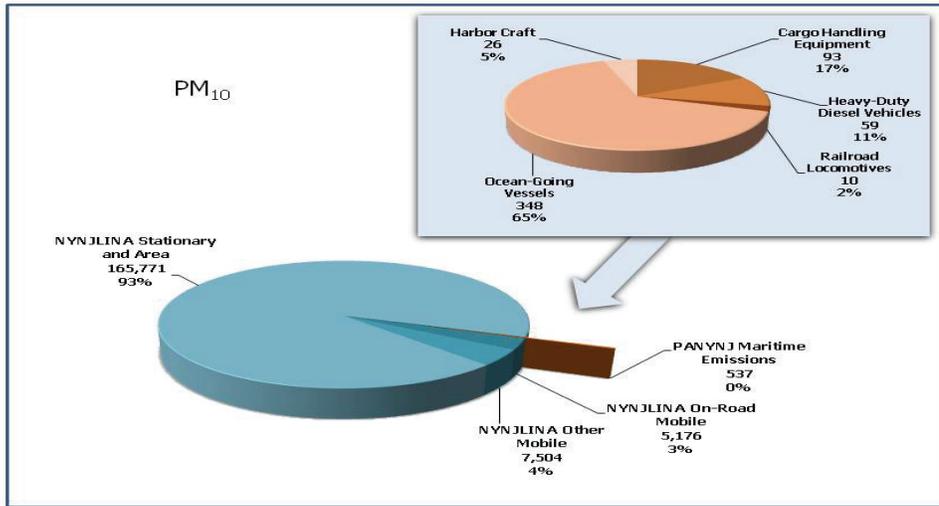
Appendix A

Following are graphical displays of the breakdown of Port-related emissions by source category for all criteria pollutants, and CO₂. For more detail and additional information, see the Port Authority of New York and New Jersey 2006 Baseline Multi-Facility Emissions Inventory.

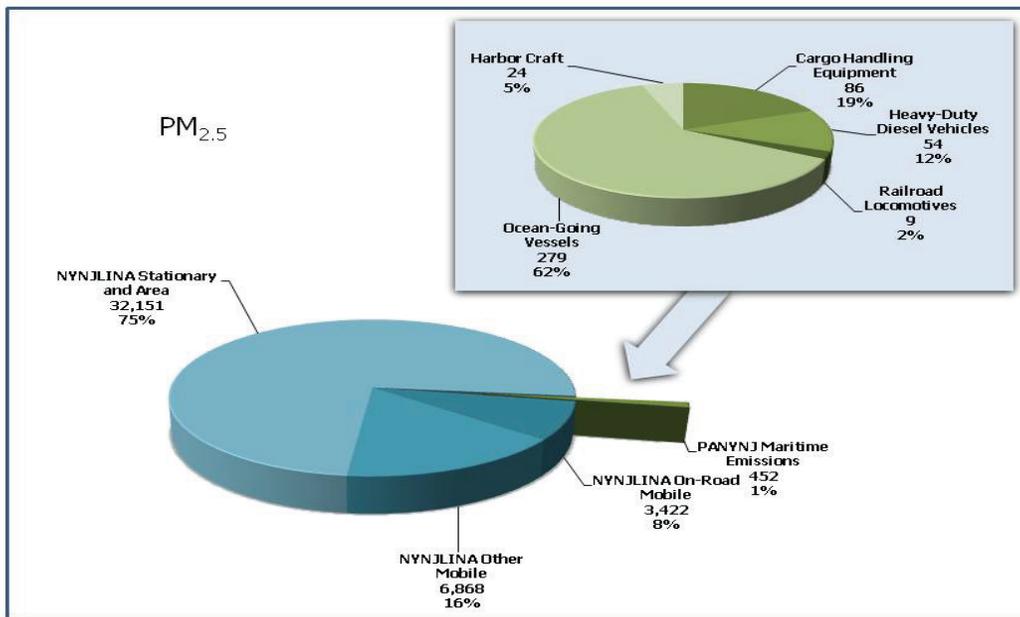
Distribution of NO_x Emissions by Source Category



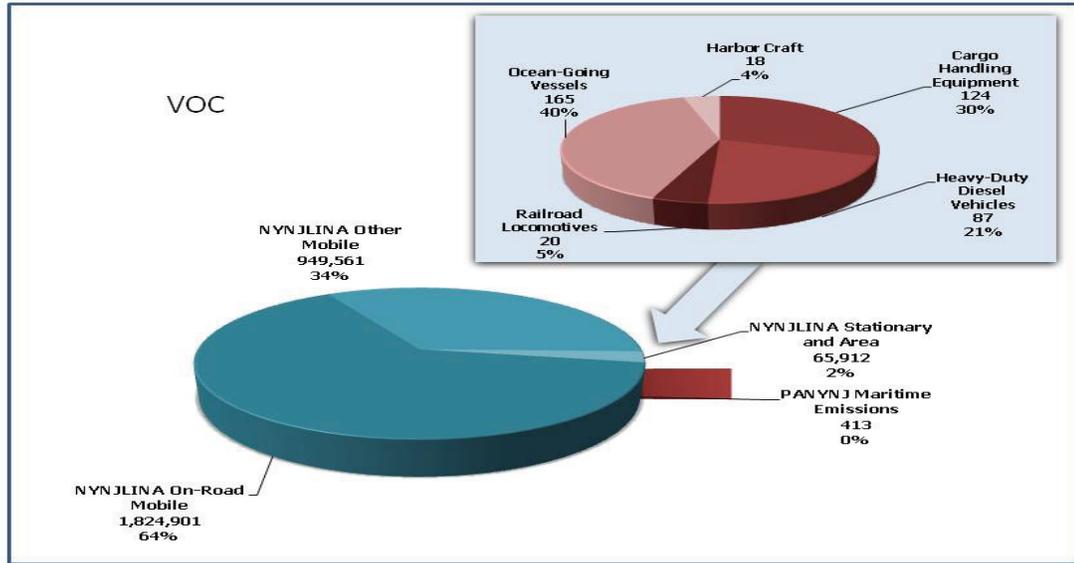
Distribution of PM₁₀ Emissions by Source Category



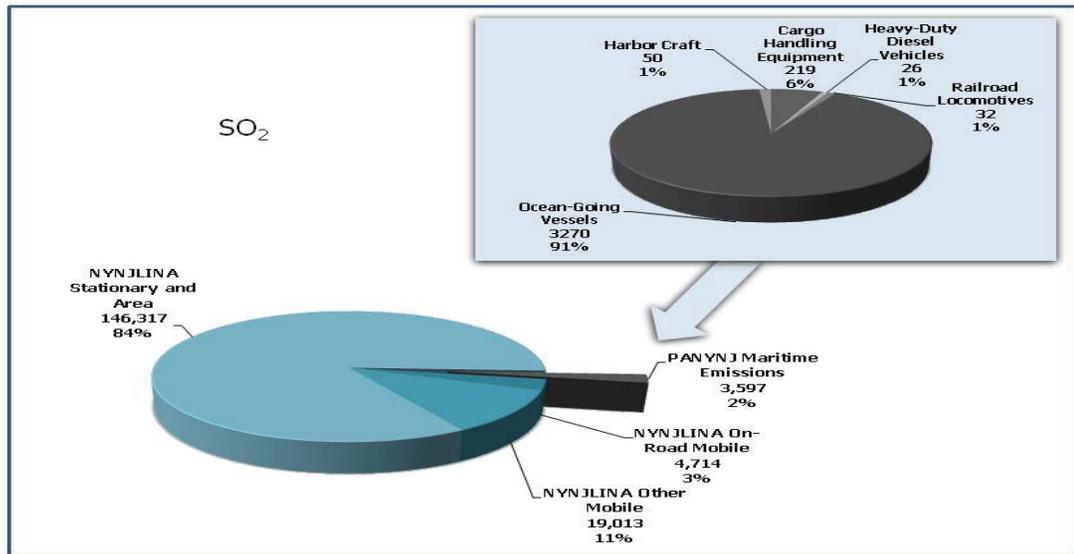
Distribution of PM_{2.5} Emissions by Source Category



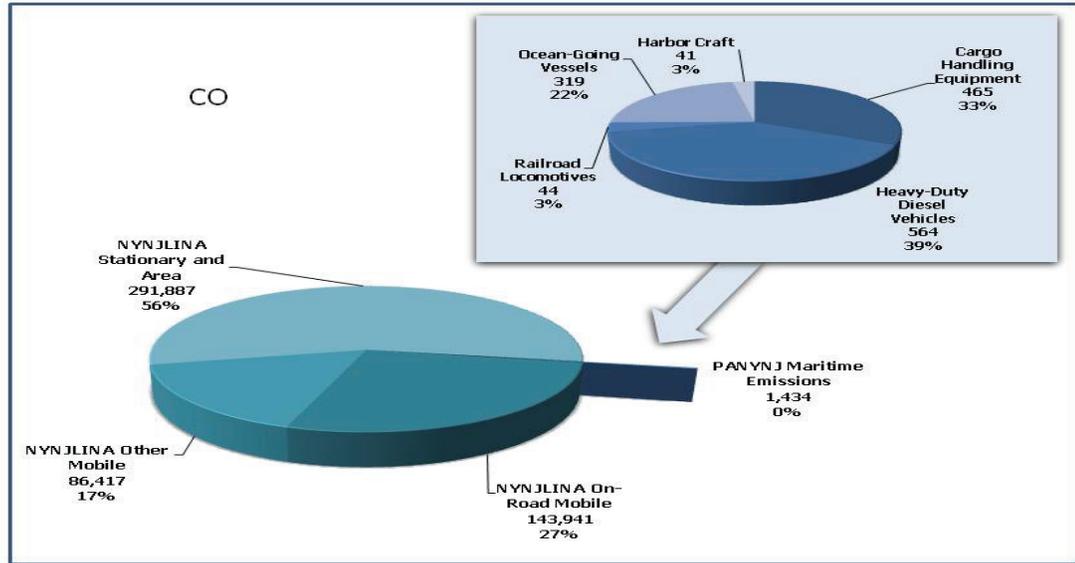
Distribution of VOC Emissions by Source Category



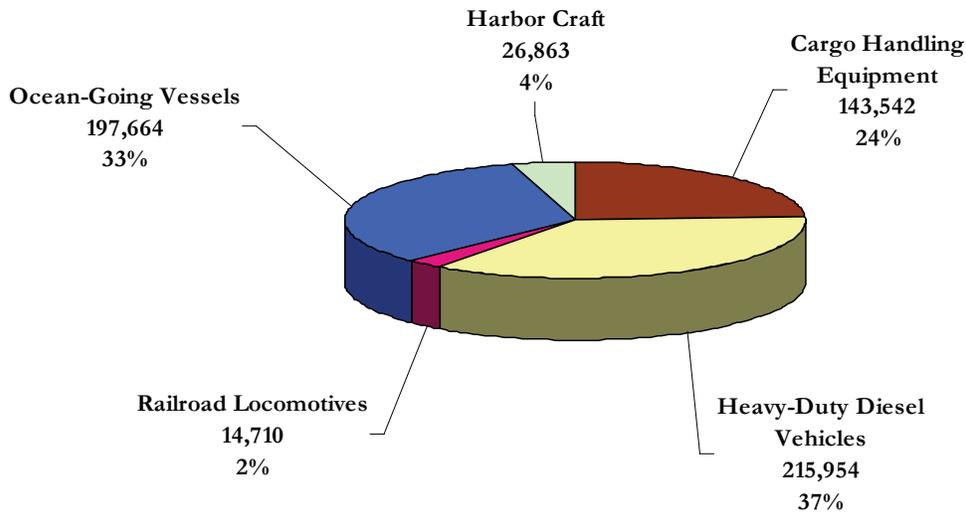
Distribution of SO₂ Emissions by Source Category



Distribution of CO Emissions by Source Category



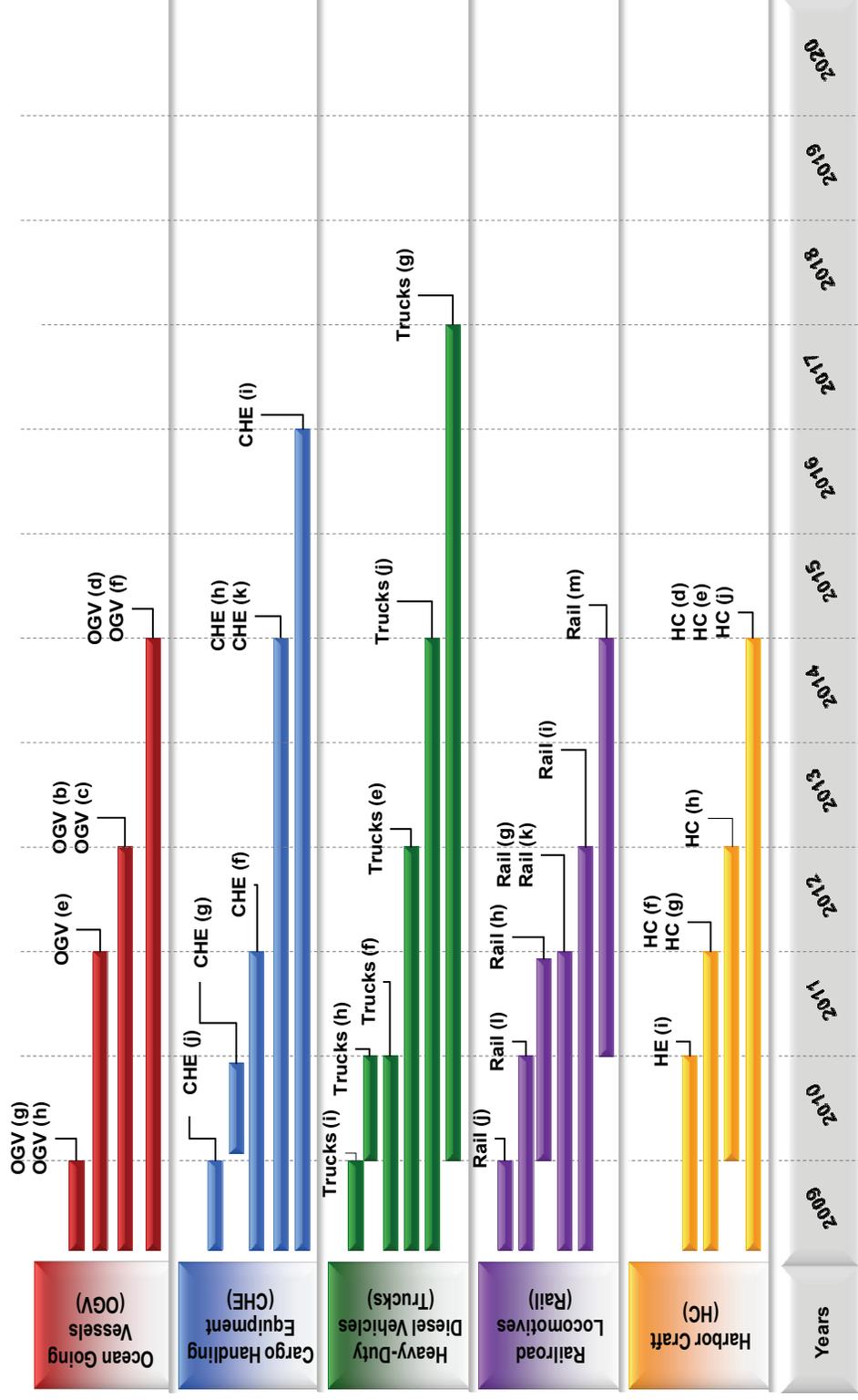
Distribution of CO₂ Equivalent Emissions by Source Category



This figure does not show the relationship with overall emissions in the NYNJLINA because county-level (and area-level) emission estimates have not been prepared by the state agencies responsible for preparing the statewide inventories, or by EPA.

Appendix B

The following timeline provides approximate implementation periods for each committed action as identified in the body of this Strategy. Each action is labeled with the corresponding sector specific committed action. For example, “OGV(b)” corresponds with committed action “b” of the Ocean Going Vessel sector.



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Appendix C

The following table depicts sector based committed actions and their associated percent and tons-per-year (TPY) emissions reductions estimates from the 2006 baseline for each sector. Each action is labeled with the corresponding sector specific committed action. For example, "OGV(b)" corresponds with committed action "b" of the Ocean Going Vessel sector as outlined in the body of this Strategy. **It should be noted that the following table only includes those committed actions for which estimates are currently available** (see footnote 13 on page 14).

Committed Actions	Estimated Percent Emission Reductions PM / NO _x / GHG	Estimated TPY Emission Reductions PM / NO _x / GHG
OGV (b).	11.6% / 19.1% / 6.6%	40.25 / 705 / 25,831
OGV(c).	54.4% / 11.58% / 0.00%	189.3 / 427.6 / 0.0
OGV (e).	1.87% / 2.58% / 0.38%	6.5 / 95.3 / 1,487
CHE (f).	26.3% / 14.6% / 4.39%	24.5 / 204 / 12,551
CHE (g).	2.25% / 0.76% / 0.00%	2.1 / 10.6 / 0.0
CHE (h).	10.3% / 11.8% / 0.00%	9.6 / 164.6 / 0.0
CHE (i).	26.3% / 14.6% / 0.00%	24.5 / 204 / 0.0
CHE (k).	3.5% / 2.7% / 0.38%	3.2 / 37.8 / 1,082
Trucks (e).	1.10% / 0.00% / 0.00%	0.65 / 0.0 / 0.0
Trucks (f).	32.15% / 0.00% / 0.00%	19.0 / 0.0 / 0.0
Trucks (g).	23.73% / 6.1.% / 0.4%	14 / 118 / 1,675
Rail (g).	12.7% / 10.8% / 1.7%	1.3 / 31.0 / 499
Rail (h).	9.5% / 12.99% / 1.32%	0.95 / 37.14 / 387
Rail (i).	2.2% / 2.2% / 0.00%	0.2 / 6.4 / 0.0
Rail (l).	3.3% / 3.0% / 1.1%	0.3 / 8.5 / 333
HC (b).	-- / 18.2% / --%	-- / 88.35 / --
HC (f).	5.0% / 5.0% / 0.0%	1.3 / 24.3 / 0.0

