Ports

Sector At-a-Glance	
Number of Port Authorities:	82*
Value of Shipments:	$5.3 Billion**
Number of Employees:	58,000**

*Source: AAPA, 2004[1]
**Source: U.S. Census Bureau, 2001[2]

Profile

The public port sector[3] consists of port authorities and agencies located along the coasts and around the Great Lakes. Typically established by enactments of state government, ports develop, manage, and promote the flow of waterborne commerce.

Ports on the coasts and inland waterways provide more than 3,000 berths for deep draft ships and transfer cargo and passengers through about 2,000 public and private marine terminals.[4] Deep water ports accommodate more than 95% by weight, and 75% by value, of all U.S. overseas trade.[5]

The port sector is facing increased pressure to develop newer, larger, and more efficient facilities to accommodate increased water trade carried by larger and larger vessels. U.S. international waterborne freight is forecast to triple by 2020.[6] In response to the increase in trade, ports spent $2.8 billion on capital improvements in 2001-2002.[7] In addition, cruise ships and other waterborne passenger services are increasingly using commercial port facilities.

Port Operations Public ports develop and maintain the shoreside facilities for the intermodal transfer of cargo between ships, barges, trucks and railroads. Ports also build and maintain cruise terminals for the cruise passenger industry. While port authorities directly operate many marine terminals, they also serve as landlords to many tenant operations. Port authority operations may also include other entities, such as airports, bridges, and railroads. Additionally, the U.S. military depends on numerous ports to serve as bases of operation and to deploy troops and equipment during national emergencies.

Partnership The American Association of Port Authorities (AAPA) has formed a partnership with EPA's Sector Strategies Program to improve the environmental performance of deep water public ports.[8] The intent is to focus on the ports where there is the greatest opportunity and capacity to make environmental improvements and then transfer tools and lessons to other ports, private shipping terminals, and related industries.

Key Environmental Opportunities The port sector is working with EPA to improve performance by:

- Reducing air emissions;
- Improving water quality;
- Minimizing impacts of growth; and
- Promoting environmental management systems.

Reducing Air Emissions

Marine vessels, land-based cargo-handling equipment, trucks, and trains all contribute to air emissions at ports. Common air pollutants from this transportation equipment include particulate matter (PM), nitrogen oxides (NO_X), and sulfur oxides (SO_X).

Port authorities typically only have direct control over a limited number of these sources, so a collaborative approach with tenants and others is the only way to get substantial reductions in emissions over the long term.

Ports are making progress in reducing air emissions by increasing the use of cleaner fuels and streamlining operations. For example:

- Most major ports have switched, or are switching, from diesel fuel to electric or hybrid power for on-dock cranes.
- The use of on-dock rail and barges, in lieu of trucks, has increased.
- Turn-around times for trucks dropping off and picking up loads at ports have decreased, resulting in a decrease in truck idling and emissions from diesel engines.

Case Study: Reducing Air Emissions at NY/NJ Port Authority

The Port Authority of New York and New Jersey and the Army Corp of Engineers are in the process of deepening critical waterways in the New York/New Jersey Harbor. Heavy machinery will be used for the deepening operations and will increase air emissions in the harbor area.

To offset these emissions, the Port Authority is exploring ways to reduce emissions associated with other port maritime activities. For example:

- *The port is retrofitting the diesel engine of one of the Staten Island Ferries with a selective catalytic reduction system in order to reduce NO_X emissions. The port is also transitioning the ferry to ultra-low sulfur fuel to reduce SO_X and PM emissions. If the test is successful, the port will make similar changes to all of its ferries, for an expected reduction of 400 to 800 tons per year of NO_X emissions.*
- *The port is replacing the diesel engine used by one of the small tugboats in the harbor with a new low-emissions diesel engine. If the initial test is successful, a larger tug will be re-powered and tested.*[9]

Improving Water Quality

Ports can improve the quality of surrounding waters by enhancing stormwater management and exploring new technologies to reduce the impact of invasive species.

Stormwater Management

Stormwater management is increasingly important in improving water quality near port facilities. Most large ports have hundreds of acres of paved waterfront property for cargo handling, where stormwater runoff may pick up various pollutants before entering waterways. Existing state stormwater regulations and new Total Maximum Daily Load (TMDL) requirements, which specify the maximum amount of pollutants that each water body can receive, are driving improvements. Voluntary efforts to improve stormwater management are also underway at some ports.

Case Study: Stormwater Management at the Port of Tampa

The Port of Tampa, FL, is in the process of redeveloping Port Ybor, a former U.S. Department of Defense facility. The port has served many industrial roles throughout its history, leaving it contaminated with petroleum products, solvents, and metals. In partnership with federal and state agencies, the Port of Tampa is cleaning up the site to make it suitable for industrial applications. The port installed an advanced stormwater system to help reduce the pollutant load into Ybor Channel, which leads to Tampa Bay. This system utilizes collection basins and baffle boxes that are capable of removing sediments and other suspended particles from stormwater so that they will not enter Ybor Channel.[10]

Invasive Species

Ships must carry ballast water for stability and ease of steering and propulsion. This ballast water often originates from ports and other coastal regions, rich in marine organisms. Ballast water is typically released in a different geographic area than where it was taken in, resulting in the introduction of non-native or invasive species to the area. Invasive species may cause both economic and environmental detriment by crowding out commercially viable species, affecting water related activities such as swimming, and impacting waterborne transportation.

To minimize the impact of invasive species, ships typically exchange ballast water in the open ocean rather than in shallow bay and harbor areas. New ballast water treatment technologies may help to further reduce the impact of invasive species. EPA's Environmental Technology Program is currently developing protocols to verify the performance of these new technologies.[11]

Minimizing Impacts of Growth

To accommodate increased water trade carried by larger vessels, many ports must increase their capacity and dredge deeper channels and harbors. While port capacity can be increased somewhat through improvements in technology and operational efficiency, many ports also require physical expansion. Surrounding communities are increasingly interested in the positive and negative impacts of port expansion, so ports must consider how best to minimize and compensate for wetland or habitat loss, properly handle sediment from dredging operations, and address other impacts of port growth.

Case Study: Natural Resource Assessment at the Port of Portland

The Port of Portland, OR, has developed a Natural Resource Assessment and Management Plan (NRAMP), the first comprehensive environmental data system of its kind, in an effort to establish a proactive policy for long-term environmental planning.

Through NRAMP, the port has created ecological maps of all port-owned properties, which can be used to identify the natural resources and wildlife habitats present in these areas. Having access to this up-to-date information will help the port to:

- *Evaluate the potential ecological effects of future projects before they begin;*
- *Avert projects with a significant negative impact to overall environmental quality; and*
- *Effectively communicate different management and development alternatives with the community.*

The system will also decrease planning costs for future development by reducing the amount of data that has to be collected for each new project and helping to avoid delays during land development.[12]

Promoting Environmental Management Systems

One way ports are proactively addressing their environmental responsibilities is through the development of environmental management systems (EMS). Although only a few ports currently have an EMS, many other ports are beginning to develop EMS in order to show leadership in environmental protection, reduce costs and improve efficiency, increase staff involvement and morale, and integrate other objectives, such as safety and security, with environmental activities.

Eleven ports are now participating in an EMS Assistance Project co-sponsored by the Sector Strategies Program and AAPA.[13] Each of the selected ports is committed to developing performance measures and sharing results with stakeholders and other interested parties. Upon completion of the project, each port will be ready to pursue certification to the ISO 14001 standard.

Case Study: EMS at the Port of Houston

The Port of Houston Authority (PHA), which manages one of the largest ports in the world, adopted an EMS at its Barbours Cut Terminal and Central Maintenance facilities in 2002. Later that year PHA became the first port in the country to receive ISO 14001 certification at any of its facilities.

Through its EMS, PHA identified six performance improvement objectives:

- *Reduce NO_X emissions;*
- *Reduce stormwater impacts;*
- *Reduce the generation of solid wastes;*
- *Increase recycling efforts;*
- *Reduce energy consumption; and*
- *Participate in the Texas Natural Resource Conservation Commission's Clean Texas Program.*

To date, PHA has reduced NO_X emissions by almost 25% through the purchase of new, cleaner engines and the use of a lower emission diesel fuel called PuriNO_X. PHA has also been accepted into the Clean Texas Program. By 2005, PHA expects to reduce energy consumption by 5% by making building modifications and re-powering crane engines.[14]

Case Study: EMS at the Port of Boston

In December 2003, the Port of Boston, MA, Conley Container Terminal received ISO 14001 certification, becoming the second certified U.S. public port facility. As part of its EMS, the terminal has set performance improvement objectives in eight areas: hazardous waste, wastewater, stormwater, construction waste, resource use, air emissions, spills, and noise. Initial targets include establishing baselines from which to measure progress, performing evaluations, and conducting outreach efforts. Much effort has been made to help employees understand how to minimize their environmental impact at the port.[15]