

Port of Charleston Baseline Air Emissions Inventory: An Overview

Why was the inventory conducted?

While Charleston's air currently meets federal quality standards, the South Carolina State Ports Authority (SCSPA) recognizes that air quality is of great importance to public health. The SCSPA has adopted a port-wide environmental initiative, the **Pledge for Growth**, which includes broad and diverse efforts to improve and enhance air quality, water quality, land conservation and the overall community.

This **first-in-the-Southeast port air emissions study** is one of many commitments the SCSPA made to improve air quality in the greater Charleston region. Additional emissions-reduction measures are completed, on-going or planned through a voluntary partnership with South Carolina Department of Health and Environmental Control (SCDHEC).

What is the air emissions inventory?

The Port of Charleston Baseline Air Emissions Inventory identifies and quantifies air pollutants from port-related diesel equipment operating within the tri-county region, including ships, trucks, stacking equipment and other sources. It was conducted **voluntarily and proactively**, outside of any mandate.

Specifically, the Baseline Air Emissions Inventory will:

- Allow the community to more accurately understand emissions sources related to port activities, including their **relative contribution to overall regional emissions**;
- Establish a **baseline of emissions** so that the SCSPA and the community can track **progress over time** as new technology and efficiency improvements are implemented; and
- Help the port, its customers and other transportation companies **target future emissions reduction efforts**.

Moffatt & Nichol of Long Beach, Calif. assembled the emissions inventory. The methodology used to prepare the inventory is consistent with EPA best practices.

What does the inventory measure?

The inventory quantifies tons per year of emissions from both **on-terminal** port operations and **off-terminal** port-related activities within Berkeley, Charleston and Dorchester counties for the base year 2005.

The survey area **spans approximately 2,500 square miles**, extending from the sea buoy (12 nautical miles from the entrance jetties into Charleston Harbor) to the boundaries of the county lines of Berkeley, Charleston and Dorchester counties.

The air emissions inventory measures **emission levels for five pollutants**: oxides of nitrogen (NO_x), carbon monoxide (CO), total organic gases (TOG), particulate matter smaller than 10

microns (PM10) and the subset of particulate matter smaller than 2.5 microns (PM2.5), and sulfur dioxide (SO2).

For each pollutant, tons of emissions were calculated for the following port sources:

- Ocean-going vessels (OGV)
- Harbor craft (HC), including tug operations
- Cargo handling equipment (CHE)
- Heavy duty vehicles (HDV) and on-road trucks
- Rail locomotives (RL)

What are the findings?

The data show that, in 2005, **trucks and ships** constituted the majority of each pollutant related to port operations.

Total emissions by port-related source for 2005 are as follows:

Port of Charleston 2005 Air Emissions (Tons)						
Pollutant	Source					Total
	OGV	HC	CHE	HDV	RL	
NOx	1,492.0	133.9	284.5	1,512.3	54.1	3,476.8
CO	145.3	25.7	119.4	510.8	6.4	807.7
SO2	1,076.0	6.5	36.2	36.3	2.9	1,157.9
TOG	103.4	3.0	21.6	67.9	2.0	197.9
PM10	116.8	3.1	18.2	53.5	1.2	192.8
PM2.5	101.9	3.0	17.7	51.9	1.2	175.6

When calculated as percentages, the sources for each pollutant are as follows:

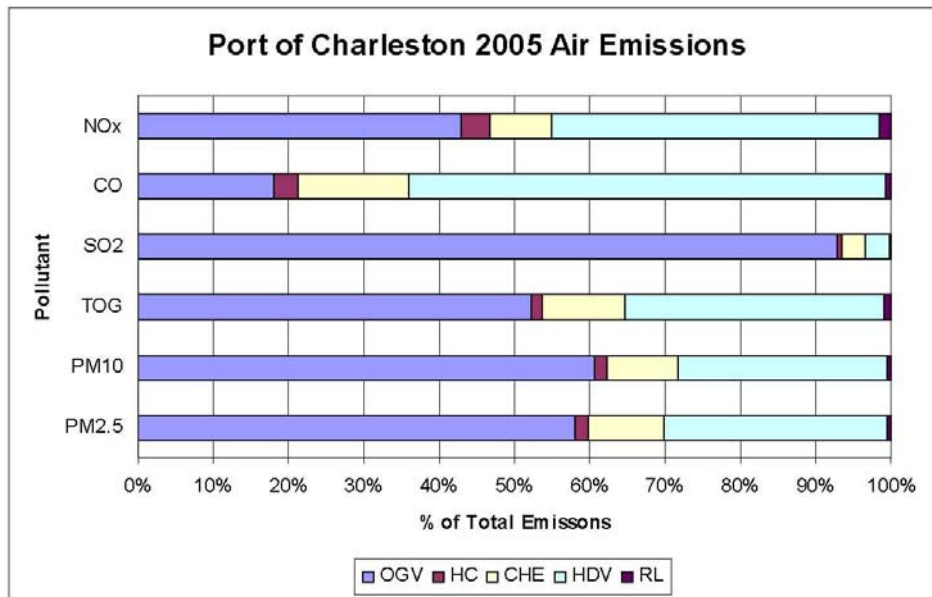


Figure ES-2: Percent Contribution to Emissions by Pollutant and Source

Regional Air Emissions

While the latest available inventories for the region indicate that **port-related emissions account for 5% or less of total pollutants** in the tri-county area, the SCSPA is moving ahead with additional measures to reduce emissions.

How is the Port of Charleston reducing its air impacts?

Port-related emissions today are already lower than the report's findings. Since 2005, the SCSPA has taken a number of **steps to reduce port-related air emissions**. The SCSPA has **replaced diesel-fueled cranes and equipment** with electric cranes and cleaner fuels. In spring of 2008, four diesel container cranes left the port after being replaced by all-electric models. In the fall of 2007, the SCSPA switched all of its on-terminal handling equipment to **ultra-low sulfur diesel (ULSD)**, and now seven on-terminal tenants have also switched to ULSD.

To help reduce air impacts by over-the-road trucks, the Port of Charleston has established **world-class productivity** in its operations, meaning trucks spend less time idling on port facilities to pick up cargo. Currently, truck turn times average about 21 minutes. Also, the SCSPA, collaborating with the Charleston Motor Carriers Association, South Carolina Trucking Association and others, has been selected to receive **EPA grant funding** to retrofit trucks with fuel-saving and emissions-reducing technology. The two-year, **\$1.7 million** grant will also help fund the **replacement of 21 engines** that power the SCSPA's rubber-tired gantry cranes with cleaner Tier 3 diesel engines.

There has also been progress toward reducing air emissions by ocean-going vessels. In early 2008, the U.S. Congress passed MARPOL Annex VI, which would enact more **stringent emissions standards by international ships** calling U.S. ports. The SCSPA has taken a leadership role in supporting these new standards.

Technical Approach

The emissions inventory was developed using actual 2005 data provided by the SCSPA, supplemented by cargo-based projections of activity where appropriate. The methods applied were consistent with the EPA guidelines for best practices, as outlined in the publication *Current Methodologies and Best Practices in Preparing Port Emission Inventories* (2006).

For more information on air quality and port operations, or to view the entire report, please visit www.PledgeForGrowth.com.