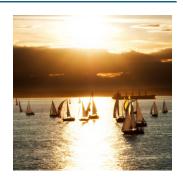
# 2011 Puget Sound Maritime Air Emissions Inventory



# Air Emissions Update

The inventory was funded by the Puget Sound Maritime Air Forum, a voluntary association of private and public maritime organizations, ports, air agencies, environmental and public health advocacy groups, and other parties with operational or regulatory responsibilities related to the maritime industry.

The Forum is committed to accurately quantifying and voluntarily reducing air emissions associated with maritime related freight, vehicles and passengers in the Puget Sound airshed.



# Members of the Puget Sound Maritime Air Forum

American Lung Association of the Mountain Pacific • BNSF Railway Company • United States Environmental Protection Agency Northwest Clean Air Agency • Northwest and Canada Cruise Ship Association • Pacific Merchant Shipping Association Port of Anacortes • Port of Everett • Port of Olympia • Port of Seattle • Port of Tacoma • Puget Sound Clean Air Agency Washington State Department of Ecology • Washington State Department of Transportation-Ferries • Western States Petroleum Association

► For more details: www.pugetsoundmaritimeairforum.org

#### **Defined Pollutants**

CO ..... Carbon Monoxide, an EPA pollutant

CO<sub>2</sub>e.. Carbon dioxide equivalents, a greenhouse gas

DPM .. Diesel Particulate Matter, a particulate component of combustion that is directly emitted from diesel engines.

NOx ... Oxides of Nitrogen, an EPA pollutant

SO2.... Sulfur Dioxide, an EPA pollutant

VOC ... Volatile Organic Compound, a very broad term used to describe the entire set of vapor-phase atmospheric organic chemicals

ships, tankers

carriers, yard trucks, forklifts

Trucks...On-road heavy duty trucks that move in and out of terminals

Locomotives.... Train operations

# **Ocean Going Vessel**

Pollutant	CY 2005-2011			
Tollutarit	%	tons/yr		
DPM	-16%	-131		
SO <sub>2</sub>	-9%	-1,215		
CO <sub>2</sub> e	-9%	-74,751		

# **Commercial Harbor Vessel**

Pollutant	CY 2005-2011			
Pollutarit	%	tons/yr		
DPM	+2%	+6		
SO <sub>2</sub>	-99%	-375		
CO <sub>2</sub> e	+4%	+16,761		

#### Locomotives

**Emission** 

de

Sound-wi

**Puget** 

of

Summary

Pollutant	CY 2005-2011				
Fullulani	%	tons/yr			
DPM	-24%	-14			
S0 <sub>2</sub>	-94%	-158			
CO <sub>2</sub> e	-24%	-23,206			

# **Cargo-Handling Equipment**

Pollutant	CY 2005-2011			
Tollularit	%	tons/yr		
DPM	-40%	-22		
SO <sub>2</sub>	-99%	-61		
CO <sub>2</sub> e	-19%	-15,306		

## **Trucks**

Pollutant	CY 2005-2011				
Tollataire	%	tons/yr			
DPM	-52%	-59			
S0 <sub>2</sub>	-96%	-83			
CO <sub>2</sub> e	-3%	-12,775			

## **Emission Sources**

OGV... Ocean-Going Vessel that can operate in the open oceanic waters - cargo and cruise

CHV... Commercial harbor vessels, government (non-military) vessels

CHE ... Cargo-Handing Equipment: cranes, straddle



The 2011 Puget Sound Maritime Air Emissions Inventory shows significa reductions in pollutant emissions from the Port of Seattle.

<b>Emission</b>			
Changes			
2005 - 2011			











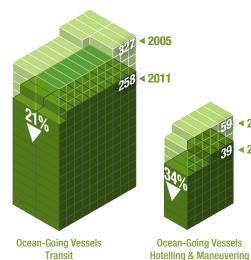




	Pollutant	OGV Hotelling	OGV Transit	CHV	Locomotives	CHE	Trucks	Overall	Normalized*
ant	CO	-8%	-21%	-14%	-15%	-74%	-16%	-38%	-43%
	CO <sub>2</sub> e	-10%	-11%	-16%	-13%	-9%	+8%	-5%	-14%
	DPM	-34%	-21%	-27%	-14%	-39%	-53%	-27%	-34%
	NOx	-13%	-27%	-22%	-34%	-27%	-16%	-25%	-32%
	S0 <sub>2</sub>	-39%	-11%	-100%	-93%	-99%	-96%	-21%	-28%
	VOC	-7%	-20%	-8%	-19%	-64%	+10%	-29%	-27%

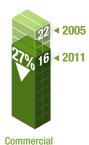
\*per 10,000 tonnes of cargo



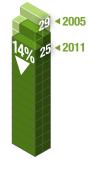


Transit





**Harbor Vessels** 

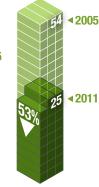


Locomotives



Cargo-Handling

Equipment



**Trucks**