

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

COCarbon Monoxide, an EPA pollutant
CO₂eCarbon 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
VOCVolatile Organic Compound, a very broad term used to describe the entire set of vapor-phase atmospheric organic chemicals

Emission Sources

OGVOcean-Going Vessel that can operate in the open oceanic waters - cargo and cruise ships, tankers
CHV.....Commercial harbor vessels, government (non-military) vessels
CHE.....Cargo-Handling Equipment: cranes, straddle 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 | |
|-------------------|--------------|---------|
| | % | tons/yr |
| DPM | -16% | -131 |
| SO ₂ | -9% | -1,215 |
| CO ₂ e | -9% | -74,751 |

Commercial Harbor Vessel

| Pollutant | CY 2005-2011 | |
|-------------------|--------------|---------|
| | % | tons/yr |
| DPM | +7% | +18 |
| SO ₂ | -99% | -375 |
| CO ₂ e | +7% | +30,989 |

Locomotives

| Pollutant | CY 2005-2011 | |
|-------------------|--------------|---------|
| | % | tons/yr |
| DPM | -24% | -14 |
| SO ₂ | -94% | -158 |
| CO ₂ e | -24% | -23,206 |

Cargo-Handling Equipment

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

Trucks

| Pollutant | CY 2005-2011 | |
|-------------------|--------------|---------|
| | % | tons/yr |
| DPM | -52% | -59 |
| SO ₂ | -96% | -83 |
| CO ₂ e | -3% | -12,775 |

Summary of Puget Sound-wide Emission Changes 2005-2011

Air Emissions Update

► For more details: www.pugetsoundmaritimeairforum.org



Emission Changes 2005 - 2011



| Pollutant | OGV Hotelling | OGV Transit | CHV | Locomotives | CHE | Trucks | Overall | Normalized* |
|-------------------|---------------|-------------|------|-------------|------|--------|---------|-------------|
| CO | -41% | -15% | +17% | -37% | -45% | -39% | -30% | -18% |
| CO ₂ e | -36% | -8% | +11% | -35% | -42% | -16% | -18% | -3% |
| DPM | -38% | -13% | -3% | -35% | -57% | -63% | -26% | -12% |
| NO _x | -42% | -20% | 4% | -50% | -44% | -32% | -28% | -15% |
| SO ₂ | -39% | -6% | -99% | -95% | -96% | -97% | -16% | -1% |
| VOC | -41% | -15% | +64% | -36% | -51% | -20% | -23% | -9% |

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

*per 10,000 tonnes of cargo

Airshed Reduction in tons/year diesel particulate matter (Port of Tacoma) 2005 - 2011 per category

