Reducing diesel emissions and greenhouse gases in ports

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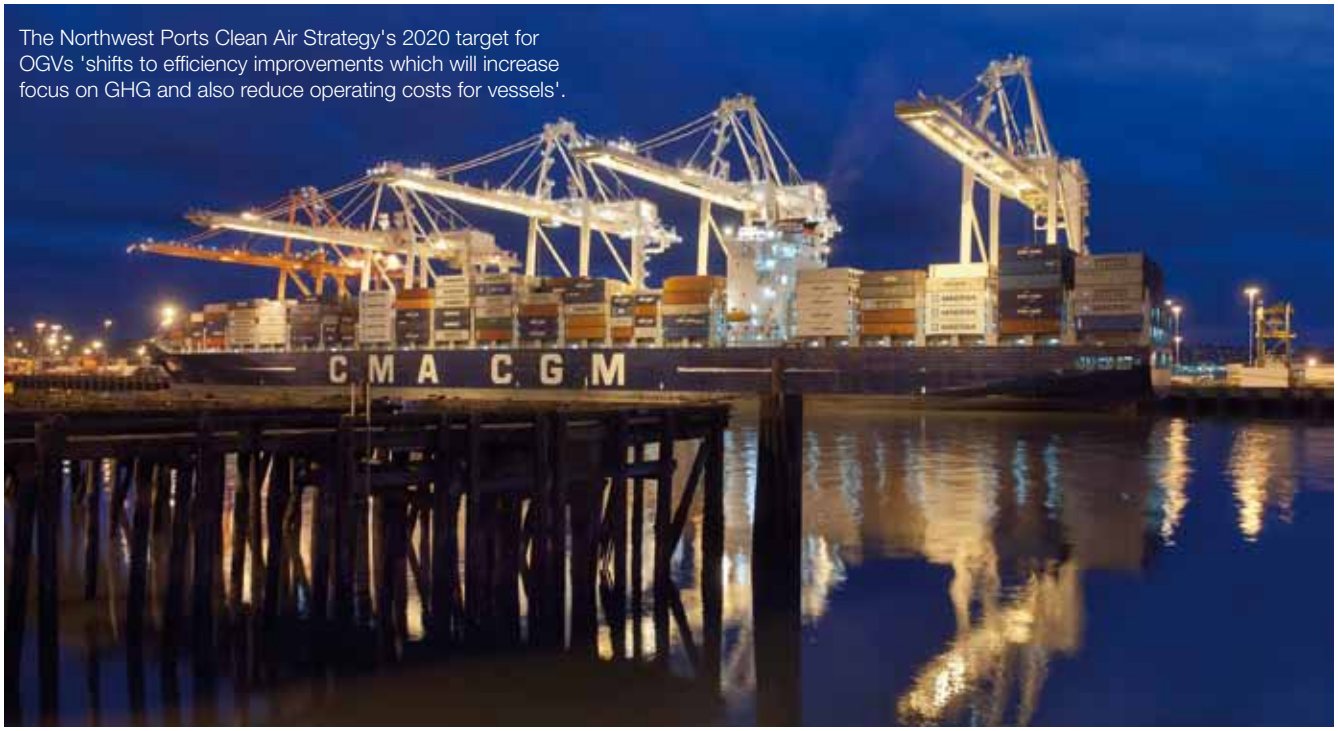
The Port of Seattle, Port of Tacoma, and Port Metro Vancouver are continuing their collaborative efforts on the Northwest Ports Clean Air Strategy to reduce emissions from shipping and port operations in the Georgia Basin–Puget Sound air shed. In developing and implementing the 2007 strategy and likewise its draft 2013 strategy update, the three ports have focused on ensuring that policies are based on a solid scientific foundation, in collaboration and consistent with their long term commitments. The ports partnered with government agencies including: Environment Canada, Metro Vancouver in Canada, the US Environmental Protection Agency, Washington State Department of Ecology, and Puget Sound Clean Air Agency in the United States. Collectively, the ports and government agencies are referred to as the strategy partners. The core group of this collaboration has worked together for over five years and based its work on detailed, robust maritime emission inventories conducted in both countries.

The voluntary actions in this strategy update are intended to complement regulations and, together with the regulations, achieve the following emission reductions, relative to a 2005 baseline. The reduction of diesel particulate matter (DPM) emissions per tonne of cargo by 75 percent by 2015 and 80 percent by 2020 and also the reduction of greenhouse gas (GHG) emissions per tonne of cargo by 10 percent by 2015 and 15 percent by 2020.

The ports developed inventories of port-related air emissions in 2005 and updated their emissions inventories in 2010 and 2011. The recent inventories show considerable progress in reducing emissions since 2005, and they provide data to identify areas for continued improvement going forward. The emissions inventories and the strategy update cover the following sectors of port-related operations.

Ocean-going vessels

The existing performance measure for 2015, set in 2007, is to meet IMO standards for sulphur content in fuel.



The Northwest Ports Clean Air Strategy's 2020 target for OGVs 'shifts to efficiency improvements which will increase focus on GHG and also reduce operating costs for vessels'.

The strategy's revised target is for vessels to 'surpass the ECA requirements by burning even lower sulphur content fuel while at berth'.

The Port of Seattle, Washington, United States.

Since these standards are now regulatory requirements that established the North American Emission Control Area (ECA), the strategy's revised target is for vessels to surpass the ECA requirements by burning even lower sulphur content fuel while at berth. The Port of Seattle's At-Berth Clean Fuels (ABC) programme has been incentivising the burning of cleaner fuels by container carriers and cruise lines since 2009. The use of shore power by cruise vessels also achieves this emission reduction target. In 2015, the second phase of ECA goes into effect which will require the use of fuel with no more than 0.1 percent sulphur content, resulting in the anticipated sunset of the ABC Fuels program. The ECA will make a dramatic impact on DPM emissions.

The 2020 target for ocean-going vessels (OGV) shifts to efficiency improvements which will increase focus on GHG and also reduce operating costs for vessels. The target is for port and OGV carriers to participate in port-designed or third party certification programs that promote continuous improvement, such as the Environmental Ship Index (ESI), Green Marine and the Clean Cargo Working Group. It is anticipated that the ports will encourage participation by providing incentives to shipping lines that take part.

Harbour vessels

For purposes of the strategy, this sector is limited to harbour vessels that have port-related functions. The ports have not been directly involved in harbour vessel-related projects to date. The strategy update calls for both ports and harbour vessels to participate in port-designed or third party certification programs, such as those listed previously. In Seattle, the Puget Sound Clean Air Agency will take the lead in conducting annual outreaches to port-related harbour vessel companies in an effort to achieve strategy update targets that promote engine upgrades and best practices.

Cargo-handling equipment

Prior performance measures have focused on the use of cleaner fuels and upgrading, repowering or retrofitting existing pieces of equipment with cleaner engines or exhaust controls. This effort has been funded primarily through grants. The terminal operators have provided in-kind contributions for project oversight, implementation and maintenance costs associated with the updated equipment. Outreach to the port's marine terminal operators (MTO) resulted in feedback that the strategy should not put undue requirements or costs on them; consequently continuing support through grant funding assistance seems to be the most effective approach.

A new strategy target for cargo handling equipment is for ports and terminals to develop and implement fuel-use reduction plans that promote continuous improvement. In addition to reducing DPM and GHG emissions, implementation of these plans will reduce fuel costs for the MTO. An example of a fuel-saving initiative is a grant funded programme that is currently underway at Port of Seattle terminals to install idle-reduction equipment on some pieces of cargo handling equipment, with the added benefit of reducing fuel costs and reducing air emissions.

Heavy trucks

The three ports achieved the 2010 target for heavy-duty trucks calling at marine terminals to meet the 1994 model year engines emissions standard or equivalent. In 2009 the port partnered with the Puget Sound Clean Air Agency to implement the 'Scrappage and Retrofits for Air in Puget Sound' (ScRAPS) programme. This was a buy-back, scrap, and replacement programme for pre-1994 model year engine trucks. ScRAPS provided a US$5,000 (or blue-book value, whichever was greater) incentive to scrap pre-1994 model year trucks that perform drayage at the Port of Seattle. ScRAPS successfully removed 280 pre-1994 model year trucks. Through this programme and other fleet turnover, all pre-1994 trucks were eliminated from the drayage fleet on schedule. The port also adopted a requirement for trucks entering container terminals to be enrolled on the Drayage Truck Registry which documents that trucks meet the emissions requirements and is shown with a sticker placed on each registered truck. As of April 1st 2013, the stickers have been replaced with radio frequency identification (RFID) tags.

Regarding the 2015 target, the strategy partners have recommended that there is no change to the existing 2015 interim target for 80 percent of trucks calling at terminals to meet EPA emission standards for 2007 model year engines or equivalent, with 100 percent of trucks meeting those standards by 2017.

The strategy update does not include a post-2007 model year engine for the year 2020. Emission standards for new engines do not significantly reduce DPM emissions; instead, starting with model year 2014 engines, they will ratchet down GHG emissions and improve fuel efficiency. A potential future target may be for trucks entering ports to meet the 2014 emission standards however, the ports have concluded

that it is premature to set a post-2007 engine year requirement at this time. The strategy update sets a target for ports, terminals and trucks to have fuel-use reduction plans in place that promote continuous improvement, eg. the EPA SmartWay programme.

Locomotives

The ports have not been directly involved in locomotive projects to date. The Puget Sound Clean Air Agency and Washington State Department of Ecology have conducted several grant-funded projects to reduce locomotive emissions. The strategy update set targets for switcher locomotives to participate in an efficiency programme such as the EPA SmartWay programme, to reduce fuel and emissions, and for upgraded engines on switcher locomotives.

Port administration

This sector covers sources that are operated or governed directly by the ports such as port-owned vehicles and vessels, office buildings, support facilities, and employee functions. The strategy update focuses on several specific categories of port administration: increasing the use of cleaner vehicles and equipment; applying clean construction standards to engines used on port-led construction projects; and conducting energy studies and energy conservation measures at port-operated and tenant facilities. The port already has most of these items underway, but these targets will encourage more rigorous programmes and continuous improvement.

Pilot projects

The strategy update calls for pilot studies and demonstration projects designed to advance emission-reduction technologies for the maritime and port industry. Each port will evaluate or engage in at least one pilot study or demonstration project per year, and will share findings with stakeholders and strategy partners. Staff at the port believe that this is attainable and are currently working with the Puget Sound Clean Air Agency, to assess alternative technologies to meet the strategy's truck target to move to 2007 model year engine emission standards. The ports are currently considering comments received during the public review period and hope to adopt a final update in early 2014.

About the author

Stephanie Jones Stebbins is the director of seaport environmental and planning programs at the Port of Seattle. Her responsibilities include overseeing environmental and planning programs for the Port of Seattle Seaport. These include programs in air and water quality, cleanup of contaminated sediments and upland sites, environmental review and permitting for port development projects and facility and land use planning.

About the port

The Port of Seattle plays a key role in bringing international trade, transportation and travel to the Pacific Northwest. State-of-the-art cargo handling facilities helped rank Seattle as the nation's seventh busiest port, serving 22 international steamship lines moving more than 1.9 million TEU in 2012. Our tagline, "Where a sustainable world is headed" communicates our goal to be a national leader in sustainable port operations, and the port's many award-winning environmental programs provide measurable benefits to the community and a competitive edge for our customers, making us the 'Green Gateway' for shipping goods from Asia to the heartland of the United States.

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