



# THE PROBLEMS OF EMISSIONS IN PORTS

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The ports industry is one of the most competitive in the world, a crucial part of keeping our economy thriving, it employs thousands of people around the globe. There will always be a need for ports: every single day they transport cargo, breakbulk, and people around the world. But all this success does come with downsides, one of them being the problem of emissions that are increasing at an alarming rate.

Emissions in ports cause a lot of environmental and public health problems. The EPA estimates that around 39 million people in the US live near ports, which means they are at a high risk of air pollution from diesel engines. Studies have shown that CO<sub>2</sub> emissions from shipping account for about 2-3% of total global emissions, 5-10% of SO<sub>x</sub> emissions, and 17-31% for NO<sub>x</sub> emissions. These figures are only going up, so now is the time to act and fix this problem.

When you look at the port as a whole, shipping emissions are the cause of most concern. NO<sub>2</sub> and CO<sub>2</sub> emissions in ports have been correlated to bronchitis symptoms and SO<sub>2</sub> emissions have been

related to respiratory issues and premature births. Furthermore, it is estimated that particulate matter emissions from ships are to blame for 60,000 cardiopulmonary and lung cancer deaths each year. Europe, East Asia, and South Asia are some of the countries with the highest death rates, but luckily there is a lot of headway being made to improve these environmental and public health problems.

## THE IMPETUS FOR IMPROVING AIR QUALITY IN PORTS

Not only can public health be improved by reducing emissions in ports, but also environmental problems such as climate change, which doesn't just impact one aspect of life, it is having a negative effect on air and water quality, weather patterns, sea levels, human health, ecosystems, crop yields, and critical infrastructure. Research also indicates that these effects are expected to continue if we do not make substantial changes. Luckily, this motivation has created a legal obligation as well as a community obligation to find sustainable solutions to improve air quality.

The California Air Resources Board (CARB) is the clean air agency of the government of California, which sets strict rules and regulations that ports must comply with. CARB and other agencies like the Air Quality Management District have created grant and funding opportunities for ports, which has given them an even greater incentive to find solutions to improve air quality.

The Port of Los Angeles and Long Beach have served as a model to other ports and countries for taking drastic measures to improve air quality. Back in 2006, both ports agreed on the San Pedro Bay Ports Clean Air Action plan, a strategy to reduce air pollution and health risks. Within the plan they vowed to reduce pollution by at least 45% within five years, using in part a Technology Advancement Program to reduce emissions, which has created many successful "green" technologies.

Ocean-going vessels are the biggest source of Southern California goods movement emissions and make up half of all air emissions related to the port. To help improve this problem, the Port of Los

Angeles has a voluntary Environmental Ship Index Program that rewards ships for going above and beyond compliance by using new and environmentally friendly technologies on their vessels. One particularly effective technology has been the Marine Exhaust Treatment System (METS-1).

**AN EXPLANATION OF THE INSTALLATION OF THE SYSTEM AT THE PORT OF LOS ANGELES**

Clean Air Engineering-Maritime (CAE-M) has created METS-1, a sustainable alternative solution to “plugging in” to shore-side power for ocean going vessels that cannot or choose not to use shore power, which captures at-berth vessel emissions without plugging in. CAE-M tested ceramic filters on diesel exhaust and worked with Tri-Mer Corporation to utilise the ceramic filters in a pollution control system, which captures and processes emissions such as PM, NOx, and SOx. The treatment system is mounted on a barge and the exhaust from a container ship’s auxiliary generator is captured using a capture device mounted through the boom of a crane. The METS employs a two-person crew.

The Marine Exhaust Treatment System received a \$1.5 million grant from TraPac, LLC, through the Port of Los Angeles’s Technology Advancement Program and is the first California Air Resources Board approved Alternative Maritime Power in the port. The Air Resources Board approved the METS-1 on June 25, 2015, and it is currently the only commercial operation of a barge-based diesel emissions treatment system.

**SHOREKAT AND PASHA STEVEDORING AND TERMINALS L.P.**

CAE-M has also been awarded \$3.7 million grant to launch the ShoreKat technology, the next generation of the METS-1 and has the capability to capture over 90% of emissions, including NOx, SOx and PM emissions, from berthed ships at the terminal. The shore-based, multi-pollutant treatment system is specifically designed to reduce diesel particulate matter (PM) and nitrogen oxides (NOx) from the exhaust of shipboard auxiliary engines. Pasha Stevedoring and Terminals has partnered with the Port of Los Angeles on their Green Omni Terminal Demonstration Project. The project will demonstrate the use of zero and near-zero emission technologies, one of these technologies being the ShoreKat Marine Exhaust Treatment System.

**SUCCESS STORY**

With the METS-1 being approved by CARB and tested at TraPac, it has already demonstrated the success it has on ocean



going vessels. The system can capture and treat up to a ton of NOx emissions per vessel per 24-hour period. With these outstanding results, the METS is now being used at multiple terminals at the Port of Los Angeles and Long Beach.

The South Coast Air Quality Management District (AQMD) is an air pollution control agency for the areas of Los Angeles, Riverside, San Bernardino, and Orange County, which protects human health while keeping businesses in mind. AQMD’s 28th annual Clean Air Awards Program awarded CAE-M with an Innovative Clean Air Technology award. According to AQMD, “The award is presented for an extraordinary contribution to the development and application of a new and innovative technology to reduce emissions.”

In addition to gaining approval and recognition from agencies like CARB and AQMD, CAE-M technologies are more cost effective and environmentally friendly than Alternative Maritime Power. With the rules and regulations becoming harsher both domestically and internationally, it is foreseeable that CAE-M technology will go above and beyond in meeting the global environment and port industry’s needs.

**CONCLUSION**

The shipping industry has become a crucial element of the world’s economy; with well over 90% of global trade travelling via the sea. Since vessel’s engines require fossil fuel to operate, the industry produces a great amount of greenhouse gases as well as non- GHG emissions. With shipping emissions expected to double by 2050, the social and environmental effects will also worsen. Our world is finally starting to feel the repercussions of these emissions, and regulators are ready to find a solution.

Regulators like the International Maritime Organization (IMO) and the European Union (EU) have shed light on our environmental

and social problems due to ship emissions. Thus, they have created strict rules that will cut emissions and increase energy efficiency. One of the biggest changes we will see is the 2020 global sulphur cap, which will the proportion of sulphur in marine fuel reduced from 3.5% to 0.5%, cutting SO2 emissions in the shipping industry by 85% compared with today’s levels. This new regulation may seem strict, but it is necessary to achieve an improvement in air quality. More strict rules and regulations are expected to come into play soon to help pave the way to a sustainable shipping industry.

**ABOUT THE AUTHOR**

Nicholas Tonsich: Attorney (1988 – present); Principal in Clean Air Engineering – Maritime, Inc. LA Harbor Commission President (2001 to 2005); Owner, Ocean Terminal Services, Inc. (maintenance and repair company employs 105 ILWU mechanics for repair of terminal equipment and quayside cranes in Los Angeles/Long Beach (2008 – present)

**ABOUT THE COMPANY**

With minimal contact with the ship, Clean Air Engineering-Maritime captures and treats emissions from ocean-going vessels while at berth in your port. The exclusive CAE-M/Tri-Mer emissions treatment unit provides the greenest solution for treating ship exhaust and related equipment sources with minimal environmental impact. Byproducts of the treatment are completely dry, non- RCRA and non-hazardous. There are no liquid waste disposal issues.

**ENQUIRIES**

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