



Ocean Going Vessels

- Vessel Speed Reduction
- Operational Improvements
- Clean Fuels
- Emission Control Technologies
- Shore Power

Strategies

Here are some effective strategies that can be applied to address emissions from Ocean-Going Vessels (OGV):

Vessel Speed Reduction (VSR)

Strategy – A VSR program is aimed to reduce NO_x from OGVs by slowing vessel speeds as OGVs approach a port. This would include a speed reduction possibly down to 12 knots or lower when OGVs are within the coastal waters of a port or within the port area.

Technical Consideration – No operational changes are required of the engine. Technical considerations may include updating existing radars and communication devices to communicate with local navigation and communication centers. Vessel speed at which emissions are lowest is based on limited data and likely to vary with engine.

Options for Implementation – Assure compliance through tariff reduction incentives, lease requirements for renewed lease agreements, or voluntary programs. Create a memorandum of understanding with shipping companies, ports and regulatory agencies.

Pros and Cons – VSR has many benefits. In addition to NO_x, PM and GHGs are also reduced. There may also be a fuel economy benefit but there can be additional operational costs. Some VSR programs have been put in place on the East Coast of the United States to protect endangered species.

Operational Improvements

Strategy - Reconfigure existing terminals, deepen channels and berths and improve inland access by rail and barge; install infrastructure to support electric-regenerative cranes; significantly enhance on-dock and regional rail capabilities; invest in gate improvements; and speed up vessel loading and unloading time. The latter further enhances air quality by reducing vessel dwelling time.



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Technical Considerations – Design must be incorporated that will provide a reasonable return on investment through operational efficiencies.

Options for Implementation – Appropriate design will support a business case, and thus, voluntary action.

Pros and Cons – If designed properly to support the business case, the result is higher efficiency and lower emissions, a win-win scenario.

Clean Fuels

Strategy – Require the use of lower sulfur distillate fuels in auxiliary and/or propulsion engines of OGVs within the coastal waters of a port. A substantial reduction in DPM can be achieved if OGVs use distillate fuels that have a sulfur content of < 0.2 S.

Technical Considerations – Consider an on-board fuel tank for lower sulfur fuels. Work with ports, fuel suppliers, shipping lines, and others to ensure low sulfur fuel availability.

Options for Implementation – Implementation strategies may include the use of lease requirements and tariff changes.

Pros and Cons – Positive emission reduction benefits for NO_x, PM and GHGs. Challenges may arise with low sulfur fuel availability and putting in place an on-board tank/fueling station. Fuel contamination may be another drawback. Fuel tank cleaning may be required for ultra-low sulfur diesel fuels.

Emission Control Technologies

Strategy – Improvements to main and auxiliary engines help reduce DPM, NO_x and SO_x emissions. Measures for main engine improvements may include; slide valves, seawater scrubbing as well and engine upgrades. Measures for auxiliary engines include; Selective Catalytic Reduction (SCR) and engine upgrades or repowers.

Technical Considerations – Operational and feasibility testing is required to ensure the function and appropriateness of an emissions control technology on marine applications. In particular, many ECTs require exhaust gas temperature analysis by conducting exhaust gas temperature datalogging to measure exhaust gas temperatures. Many ECTs have exhaust temperature thresholds that are required for the operation and effectiveness of the technology. Emission control technologies which have been certified or verified by regulatory agencies (such as those programs at the US Environmental Protection Agency and the California Air Resources Board) are most likely to deliver the claimed benefits

Options for Implementation – Implement strategy through lease requirements, tariff charges, and incentives. Design a Technology Advancement Program that would demonstrate feasibility of ECTs on marine applications. The Technology Advancement Program would consider use of newer technologies.



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Pros and Cons – Positive emission reduction benefits. Challenges may occur with technology feasibility.

Shore Power

Strategy – Shore Power focuses on reducing dwelling (hotelling) emissions from OGVs while at berth. This strategy has two approaches 1) shore-power (transferring the electrical generation needs for OGVs while at berth – power generated by regulated/controlled stationary sources) and 2) hotelling emissions reduction requirements through alternative technologies for ships that do not fit the shore power model. Shore power is best for OGVs that make multiple calls at a particular terminal for multiple years. The best candidates for shore power are container ships, reefer ships, and cruise ships.

Technical Considerations – Provide shore power infrastructure on-dock and on-board vessels. Determine necessary power needed and ensure adaptability. It is important to consider the local power company that is providing the electrical power to the terminal. Some power companies operate coal-burning power plants without the use of scrubbers and other types of emission control technologies. Ensure that the local power company is using a cleaner source of energy with use of emission control technologies. In some cases, it may be better not to use shore power if the local power company has dirty polluting power plants.

Options for Implementation – Implementation strategies include lease requirements, incentives, tariff changes and capital funding.

Pros and Cons – Positive emission reduction benefits while at port with shore power. Challenges occur with infrastructure cost and shore power hook up. Shore power requires extensive infrastructure improvements. Additionally, shore power only addresses local port emission reduction benefits only during the period when the vessel is at berth and does not address OGV voyage emissions.