



TOOL BOX FOR PORT CLEAN AIR PROGRAMS ***Improving Air Quality While Promoting Business Development***

EFFECTIVE STRATEGIES TO REDUCE EMISSIONS FROM HEAVY DUTY VEHICLES - TRUCKS

STRATEGIES

Here are some effective strategies that can be applied to address emissions from Heavy-Duty Vehicles – Trucks:

Equipment Replacement

Strategy – Maximize emission reductions by replacing frequent and semi-frequent caller older trucks that service the port with newer trucks that meet cleaner engine standards. For example, the San Pedro Bay Ports Clean Air Action Plan is encouraging trucks with model years 1992 and older to meet cleaner on-road emission standards (0.01 g/bhp-hr for PM) and the cleanest available NO_x technology at time of replacement.

Technical Considerations – Retire older equipment that has visible dark soot coming from the exhaust. Sometimes the color of the exhaust can depict several operational conditions that are of concern such as the need for filter replacement, oil changes, and engine upgrades. Frequent maintenance of newer trucks is very important to maintain clean operation in addition to extending sustainable use of vehicle.

Options for Implementation – Implementation strategies may include; lease requirements, tariffs, and incentives.

Pros and Cons – Positive emission reduction benefits for PM. Consider NO_x reduction technologies such as SCRs or Lean NO_x Catalyst (LNC). The costs of replacing engines and/or vehicles may be prohibitive.

Operational Improvements

Strategy – Repower frequent to semi-frequent caller trucks with cleaner on-road engines. Redevelop infrastructure and use technology, such as radio frequency identification (RFID) and optical character readers (OCR), to enhance the efficiency of gates and terminals, relieve congestion and reduce emissions. Extended/off-peak terminal hours and moving more cargo to rail and water (via short sea shipping) where feasible can also reduce congestion and air pollution.

Technical Considerations – Ensure technical feasibility. Cost of technology versus benefit achieved should be a consideration in assessing potential improvements

Options for Implementation – Implementation through voluntary programs, incentives, and/or lease renewals/re negotiations.

Pros and Cons – Some of these options involve capital investment; others could increase terminal operating costs. However, if designed and planned properly, can result in a significant return on investment due to enhanced operational efficiencies.



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Clean Fuels

Strategy – Implement the use of cleaner fuels. Cleaner fuels include; ultra low sulfur diesel fuel, emulsified diesel fuels, oxygenated fuel (O2 diesel fuel), and biodiesel. Additional clean fuel options for trucks include LNG and CNG.

Technical Considerations – Work with ports and fuel suppliers on the availability and supply of clean fuels. Depending on the type of clean fuel used, cleaning of the fuel tank may be required in order to avoid fuel contamination.

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. The use of biodiesel may present a slight increase in NO_x. Challenges may arise with fuel availability depending on international location. Cleaner fuels tend to be more costly.

Emission Control Technologies

Strategy – Retrofit model years 1993 to 2003 and newer with emission control technologies that are less polluting. Consider technologies that have demonstrated a history of effectiveness and durability. Emission control technologies may include but are not limited to; diesel particulate filters (active and passive), diesel oxidation catalyst (50% PM reduction or more), selective catalytic reduction (SCR), Lean NO_x Catalyst (LNC), Gas Recirculation (EGR), closed crankcase ventilation systems (CCV) and or a combination of the above.

Technical Considerations – Operational and feasibility testing is required to ensure the function and applicability of an emissions control technology on the truck. 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. Considerations must include duty cycle, exhaust temperatures, and preventative maintenance schedules. 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 trucks. The Technology Advancement Program would consider use of newer technologies.

Pros and Cons – Positive PM, NO_x, HC and CO emission reduction benefits. Challenges may occur while assessing appropriate technologies. Some technologies such as DPFs have strict exhaust temperature requirements. Retrofitting may include exhaust reconfiguration and cutting of the exhaust pipe. DPFs require annual cleaning depending on the technology and can be costly. SCRs require urea dosing units and may acquire an increase in fuel cost with urea + diesel. Emission control technologies and/or vehicles vary in cost and can be expensive..



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Idle-Reduction Technologies

Strategy – Reduce idling emissions by using idle-reduction technologies. Stationary idle-reduction technologies include shore power for trucks also known as “Truck-Stop-Electrification” (TSE). TSE provides cab power for the truck while a truck is stationed in an area for a period of time. Mobile idle-reduction technologies include; automatic shut down and start up systems, battery power, auxiliary power units, and diesel driven heating systems. These mobile idle-reduction technologies are on-board technologies that help provide power to the cab of the truck. These technologies could also be used for reefer trucks.

Technical Considerations – Test feasibility of idle-reduction technology.

Options for Implementation – Implement strategy through lease requirements, tariff charges, and incentives.

Pros and Cons – Eliminating idling time by using an idle-reduction technology greatly reduces emissions that would be generated from idling. International availability may create a challenge for some ports.