Harbor Craft

- Engine Replacement with Engines Meeting Cleaner Standards
- Clean Fuels
- Emission Control Technologies
- Electrification (including Shore Power and Hybridization

Strategies
Here are some effective strategies that can be applied to address emissions from Harbor Craft (HC). Some of the strategies can also apply to dredging equipment.

Engine Replacement

Strategy – Repower HC main and auxiliary engine with cleaner engines that meet newest national air quality standards. For example, the United States has diesel engines that meet U.S. EPA Tier II and Tier III engine standards. Replacing a Tier 0 engine with a Tier II engine will reduce NOx up to 47%. Tier III engines will reduce NOx and PM up to 90%. The European Commission has an equivalent engine that meets Stage IIIA engine standards.

Technical Considerations – Ensure technical feasibility. Strategy will involve the careful removal of the original engine and replacing it with a newer, cleaner engine.

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

Pros and Cons – Replacing main-propulsion engines with cleaner engines will provide great emission benefits. Cleaner engines are costly and may cause an economic burden. Technology availability may also be a concern. Destroying old engines may increase costs. Ideally, engines should be rendered inoperable so they are not able to continue to pollute.

Clean Fuels

Strategy – Implement the use of cleaner fuels with low sulfur content. Cleaner fuels include; low and ultra low sulfur diesel fuel, emulsified diesel fuels, oxygenated fuel (O2 diesel fuel), and biodiesel.

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 NOx, PM and GHGs. The use of biodiesel may present a slight increase in NOx. Challenges may arise with fuel availability.

Emission Control Technologies

Strategy – Retrofit HC with the best available engine controls, fuel additives and aftertreatment emission control technologies (ECTs). Depending on the appropriate application of ECT, ECTs can include exhaust aftertreatment devices such as; diesel oxidation catalyst (DOC), diesel particulate filter (DPF), or selective catalytic reduction (SCR) or engine and fuel efficiency technologies such as modern injectors, computer controls and software upgrades, which result in more efficient engine air fuel mixtures and fuel savings. The engine manufacturers and distributors of emission control technologies can provide technical guidance to HC owners and operators in the selection of appropriate ETCs for their vessel. While evaluating different emission control technologies, consider ECTs that have had proven success with HC similar to the HC under evaluation. To further improve emission reductions from auxiliary engines, retrofit cleaner engines with ECTs.

Technical Considerations – Operational and feasibility testing is required to ensure the function and applicability 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 and effectiveness (this comment should be included in all of the sections which discuss emission control technologies) of ECTs on marine applications. The Technology Advancement Program would consider use of newer technologies.

Pros and Cons – Applying ECTs prove to have positive emission benefits in reducing particulate matter (PM), Oxides of Nitrogen (NOx), carbon monoxide (CO) and hydrocarbon (HC). Not all ECTs reduce all pollutants. Retrofitting HC with ECTs can be challenging, careful evaluation and analysis is a must.

Electrification (including Shore Power and Hybridization)

Strategy – Reduce harbor craft hotelling emissions by hybridization and providing shore power hook up . Similar to OGV, HC can utilize shore-power by transferring the electrical generation needs for HC while at berth to power generated by regulated/controlled stationary sources. can be utilized by HC at berth. Hybridization is best for HC that are in constant transit mode.

Technical Considerations – Provide shore power infrastructure on-dock and on-board HC. Determine necessary power needed and ensure adaptability. Again, 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 along with emission control technologies. In some cases, it is better not to use shore power if the local power company has dirty polluting power plants. Evaluate the HC engine and duty cycles to determine whether the vessel is a good candidate for hybridization which is currently being developed and used on tugboats and ferries. Substantial fuel savings can be realized in addition to lowering emissions by use of hybrid technology

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.