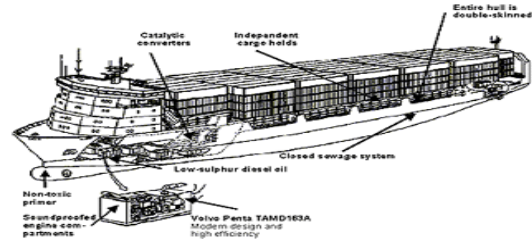


SHIPPING SOLUTIONS

Burning cleaner diesel fuels in port can significantly reduce air emissions from ships. Turning off the engines and hooking up to shoreside power and the electrical grid when docked reduces smokestack emissions by nearly 100 percent. New engine technologies can also make ships far, far cleaner than today's engines. Ultimately, a new generation of clean ships with closed systems such as the Eco-ship conceived by the Swedish Maritime Administration and the North Sea Foundation's Clean Ship concept will offer the best long-term solution to ship pollution.



MARINE FUELS

- New marine fuels standards need to be set to significantly reduce sulfur content and contaminants.
- A worldwide cap of 1.5 for all marine fuels at sea and .2 percent sulfur or less while in port and coastal waters out to 200 miles should become the standard.
- Ships should begin using alternative, renewable fuels and power sources such as biodiesel, wind power and solar panels as soon as possible for propulsion and on-board electricity.

SHORESIDE POWER

- International voltage and infrastructure standards for ship and port electrification should be set as soon as possible.
- All new ships and port terminals should be equipped for cold-ironing and shoreside power.
- International timelines and thresholds should be set so that 70 to 80 percent of ship calls are cold-ironed by 2025 or before.
- The IMO should conduct an international feasibility and cost effectiveness study on reducing hoteling emissions from ships, including a human health assessment.

CLEANER ENGINES AND TECHNOLOGIES

- New engine and air pollution control technologies are now available that can drastically cut ship emissions once implemented
- Humid Air Motor technology can reduce nitrogen oxide emissions by 75 to 85 percent.
- Selective Catalytic Reduction control technology reduced nitrogen oxides by 80 to 90 percent.
- Direct Water Injection reduces nitrogen oxides by 50 percent.
- Slide valve, common rail and other engine technologies are also achieving significant reductions.