

Advanced Marine Emission Control Systems for Controlling OGV Hoteling Emissions

Ken Adler

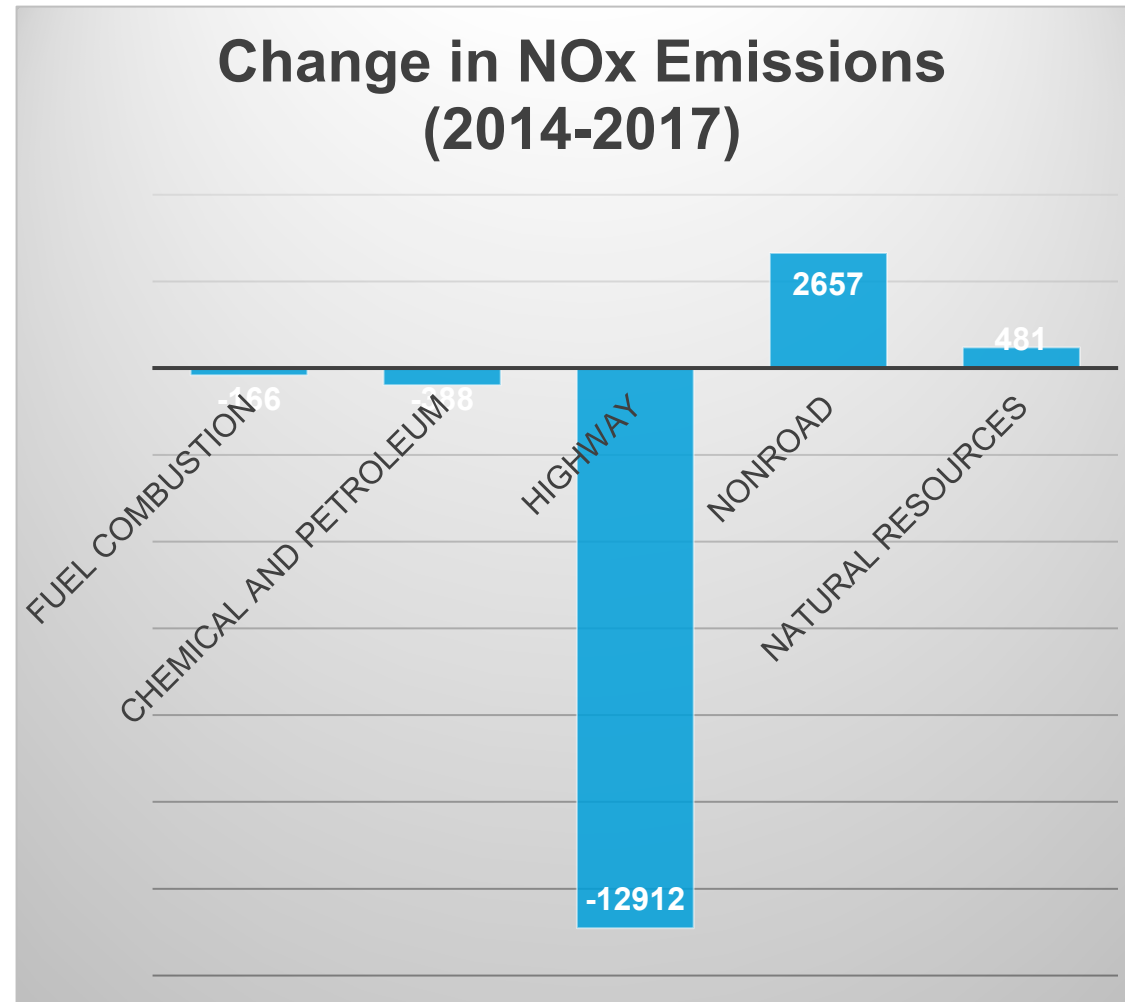
Regional Air Quality Planning Advisory Committee
Houston Galveston Area Council
February 25, 2021



Environmental Defense Fund's mission is to preserve the natural systems on which all life depends. EDF links science, economics, law and innovative private-sector partnerships.

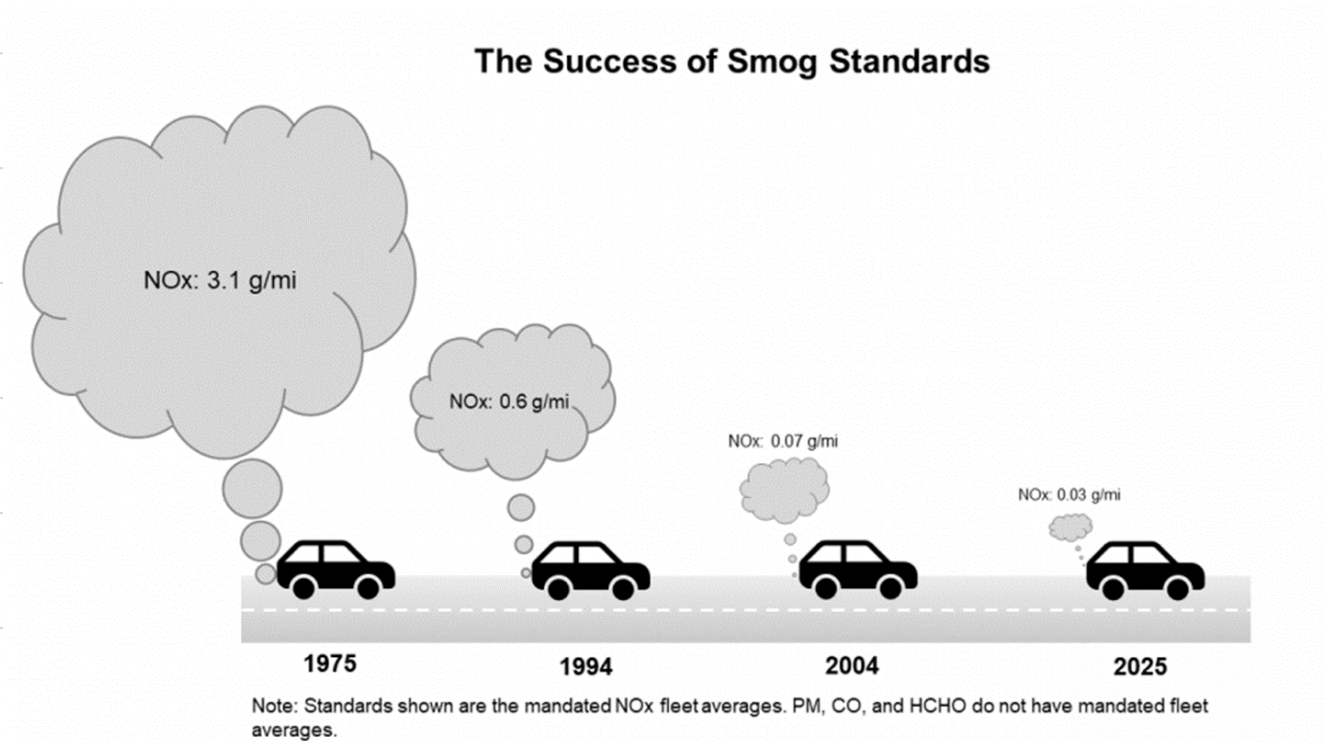
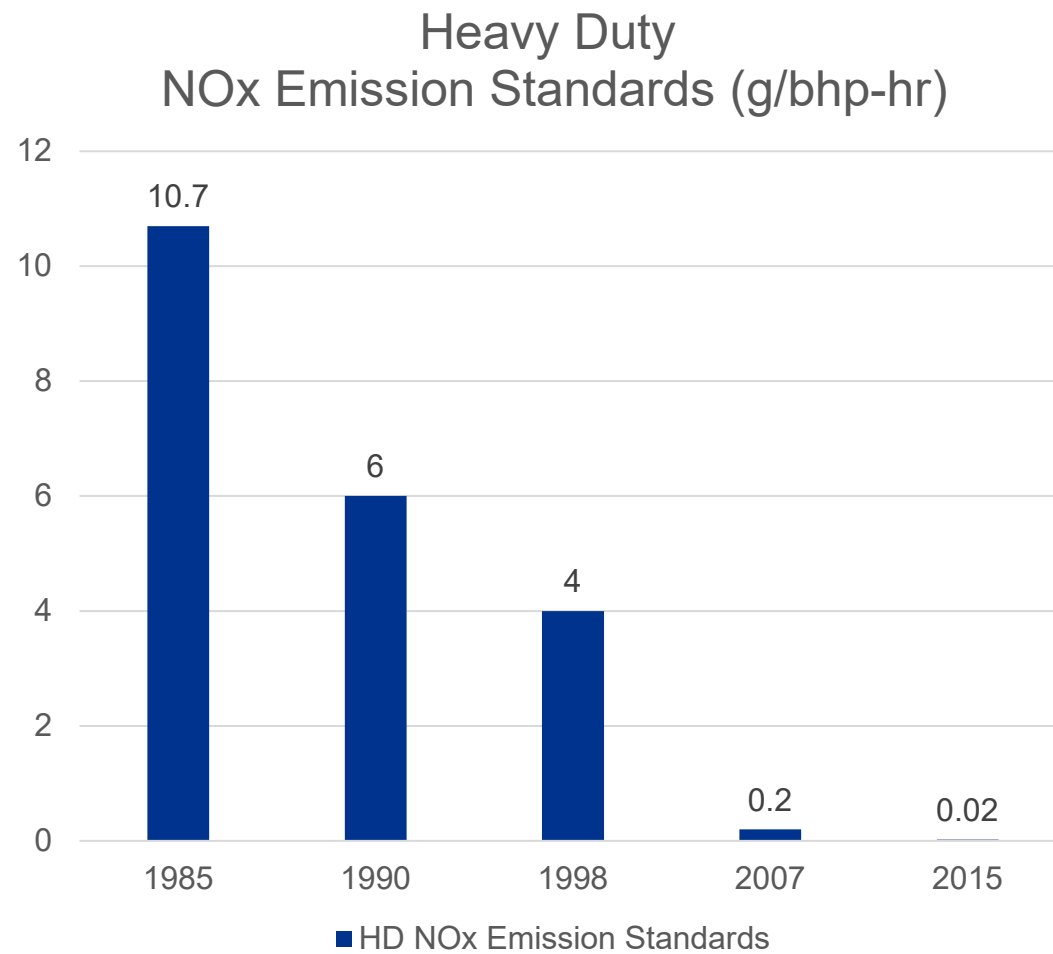


Houston NOx Emissions

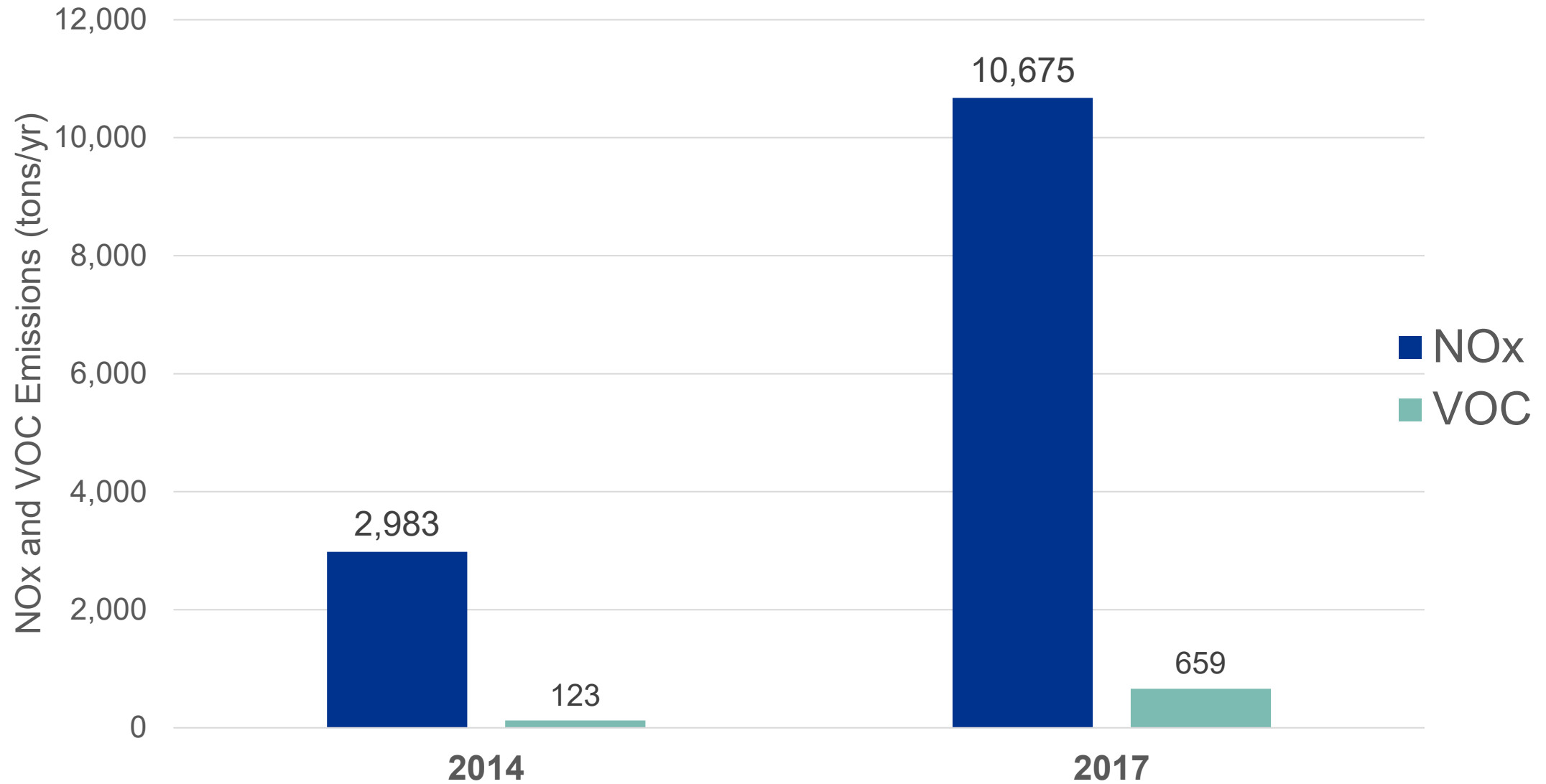


Source: EPA, [National Emissions Inventory](#).

Diminishing Reductions from Highway Vehicles



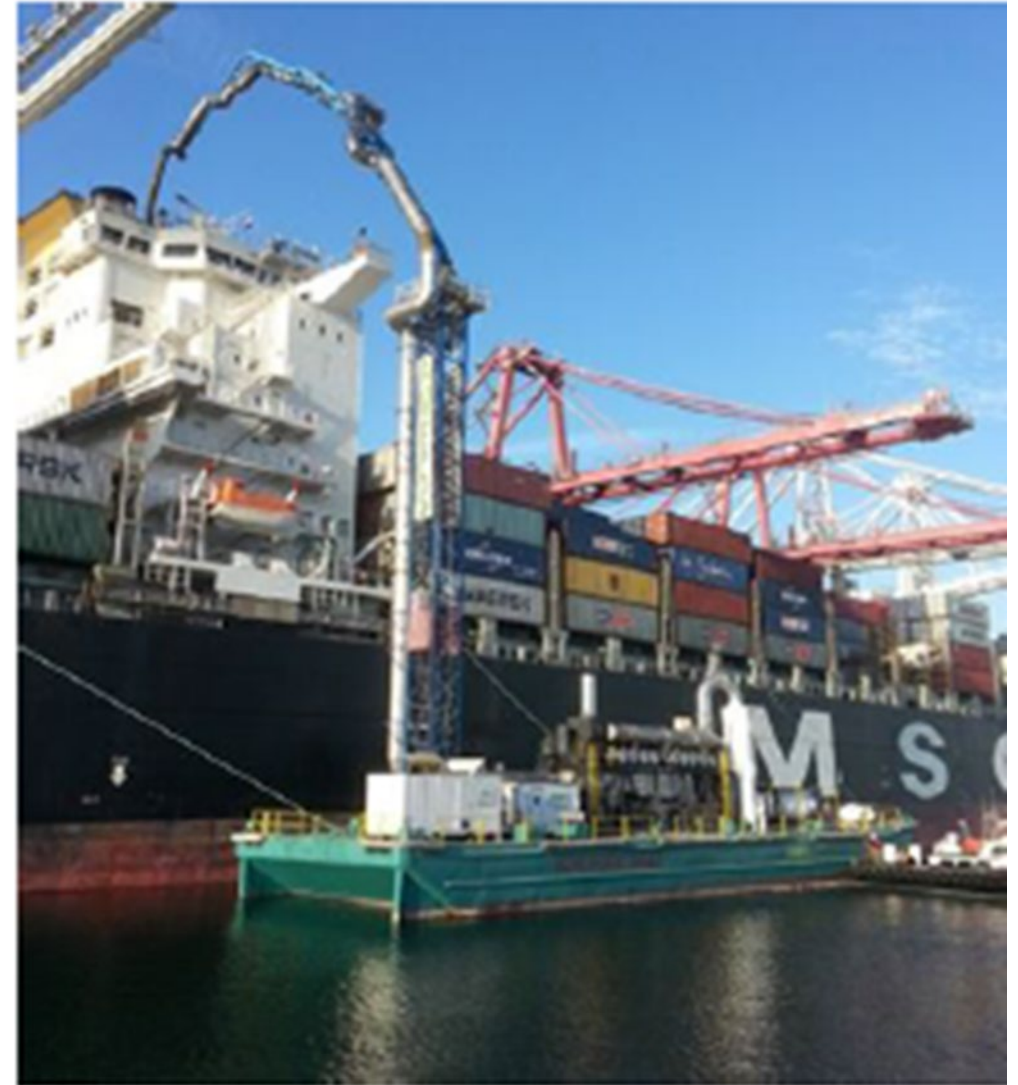
Substantial Increase in Marine Vessel Emission



Source: EPA, [National Emissions Inventory](#).

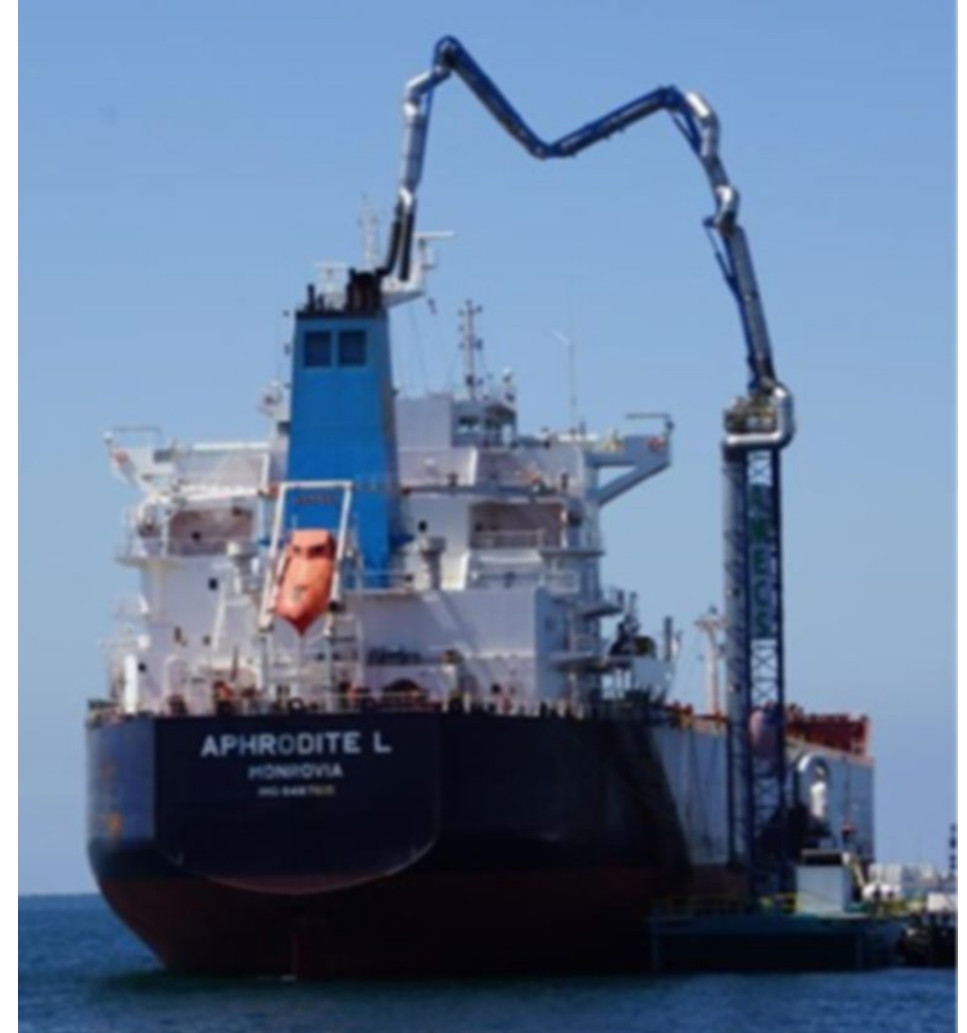
Advanced Marine Control Systems

- Control up to 90% of at-berth NOx and PM2.5 emissions
- Works by attaching bonnet to exhaust stack
- Emissions treatment system removes NOx, VOC and PM2.5 pollution
- Emissions are from the boilers and auxiliary generators



Advanced Marine Control Systems

- EPA estimates 2805 tons of NOx from OGV hoteling (2017)
- >10 years of operating experience in California
- 3 AMECS under construction in CA--\$7.3 to \$13.4 million each
- Operating costs are ~\$1 mil./yr
- Required by CARB regulations



AMECS Examples



AMECS Examples



AMECS and TERP

- According to EPA, AMECS can reduce:
 - 941 lbs of NOx and 18 lbs of PM2.5 per containership vessel call
 - 1,026 lbs of NOx and 20 lbs of PM2.5 per oil tanker vessel call
- Based on TERP's methodology and EPA's emission assumptions, AMECS cost-effectiveness is \$14,020 per ton of NOx, which is well below
- TCEQ needs more lower cost projects as average TERP project cost-effectiveness increases.

Financing AMECS Projects with TERP Funds

- Unlike diesel trucks or tugboats, AMECS do not generate an income to pay for their operation
- Instead of lump sum payment, we propose TERP pay a quarterly payment based on tons of NOx removed.
- For example, an AMECS could reduce 127.5 tons of NOx from 250 vessels in 1 year. If TERP paid \$14,020 per ton of NOx, it would generate \$1,787,550 for the AMECS owner.
- AMECS include data systems for auditing purposes.



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