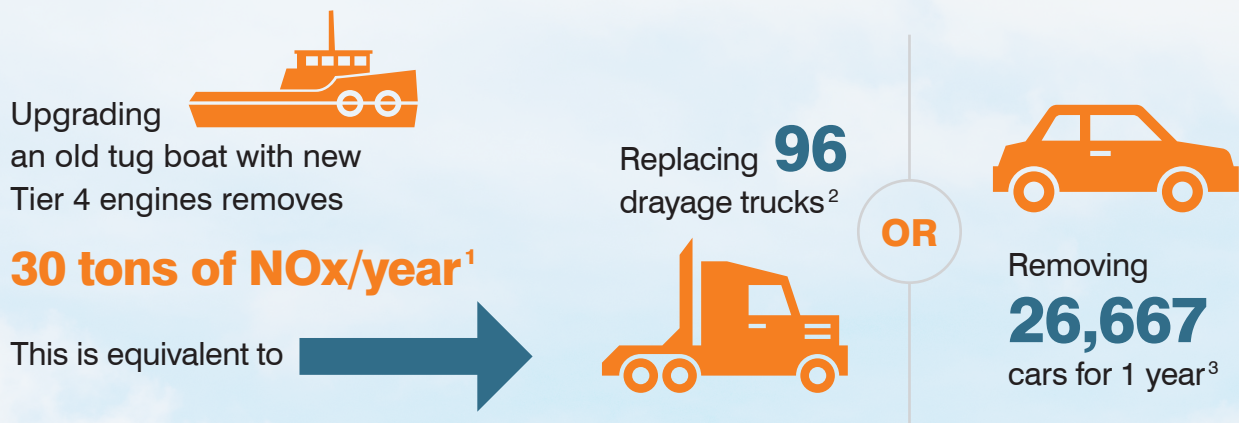


# The most cost-effective upgrades make the biggest health impact

## New Tier 4 engines for tug boats reduce NOx emissions by 91%

The \$2.9 billion VW Environmental Mitigation Trust provides funding to upgrade older vehicles and equipment to rapidly reduce nitrogen oxide (NOx) emissions, which contribute to hazardous smog pollution. Upgrading just one of the oldest, dirtiest tug boats is like taking tens of thousands

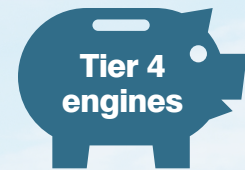
of passenger vehicles off the road per year, bringing substantial health benefits to at-risk communities. With states now deciding how to invest these funds, repowering these older vessels with cleaner Tier 4 engines is a game-changer for delivering immediate and cost-effective air quality benefits.



## Upgrading old engines means cleaner air for all

EPA estimates that by 2020, only 3% of tug boats will be replaced with cleaner Tier 4 engines. The VW Environmental Mitigation Trust provides a rare opportunity to retire the oldest diesel engines still in operation, which can last 50 years or longer. Tier 4 or Tier 3 engines will deliver cleaner, healthier air faster to at-risk communities. These new engines also improve fuel efficiency, which reduces CO<sub>2</sub> and black carbon emissions, two important greenhouse gas pollutants.

## Tug projects are a better value



### 1 ton of NOx reduction costs



1. Ramboll, 2018, Emission reductions and cost effectiveness for marine and locomotive projects
2. EPA, 2016, National Port Strategy Assessment
3. Tier 2 car driven 15,000 miles per year
4. FHWA, 2015 CMAQ Cost-Effectiveness Report

