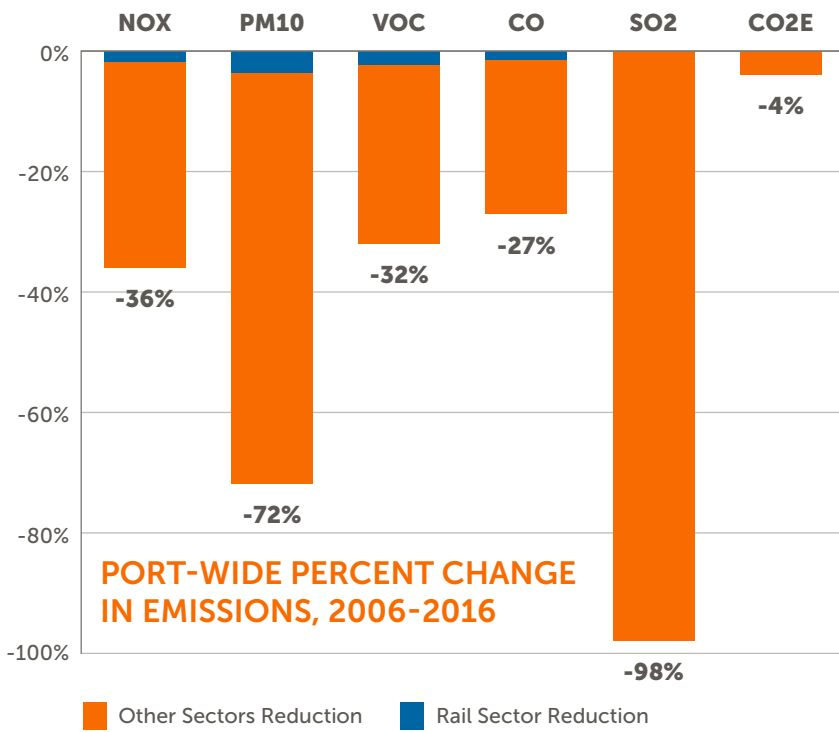


RAILROAD LOCOMOTIVES

LINE-HAUL LOCOMOTIVES • SWITCH LOCOMOTIVES

PROGRESS



Switcher Locomotive Retrofit Program

- Retrofitted four switching locomotives to a Tier 3 GenSet configuration with funding from the New Jersey Department of Environmental Protection
- Three of the four locomotives received Diesel Particulate Filters to meet Tier 4 standards for PM emission (99% reduction)
- In 2012, Class I railroad partnered with North Jersey Transportation Planning Authority, New Jersey Department of Transportation, and the Port Authority to repower a switch locomotive with low emission GenSet technology reducing 16.5 tons of NOx, 0.42 tons of PM, and 170 tons of CO2 annually
- In 2016, Class I railroad repowered another locomotive with GenSet technology to meet EPA Tier 3 Line Haul/Tier 2 Switcher standards

Deployed Anti-idling Operational Procedures and Technologies

- Both Class II railroads operating in PONYNJ have rules that prevent prolonged idling
- All new engines of a Class II railroad have automatic start and stop technology

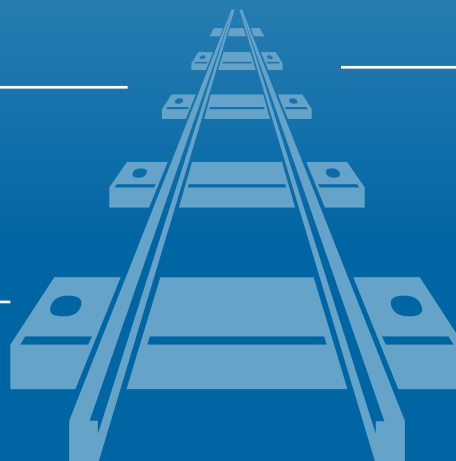
Switched to Ultra-low Sulfur Diesel Fuel Ahead of EPA's 2012 Off-road Engine Standard

54% 
INCREASE IN CARGO MOVED BY RAIL

OPPORTUNITIES

Replace or rebuild older locomotives to Tier 4 (both line-haul and switch)

Apply aftertreatment controls (Selective Catalytic Reduction (SCR) and diesel oxidation catalyst (DOC)) to Tier 4 line-haul locomotives

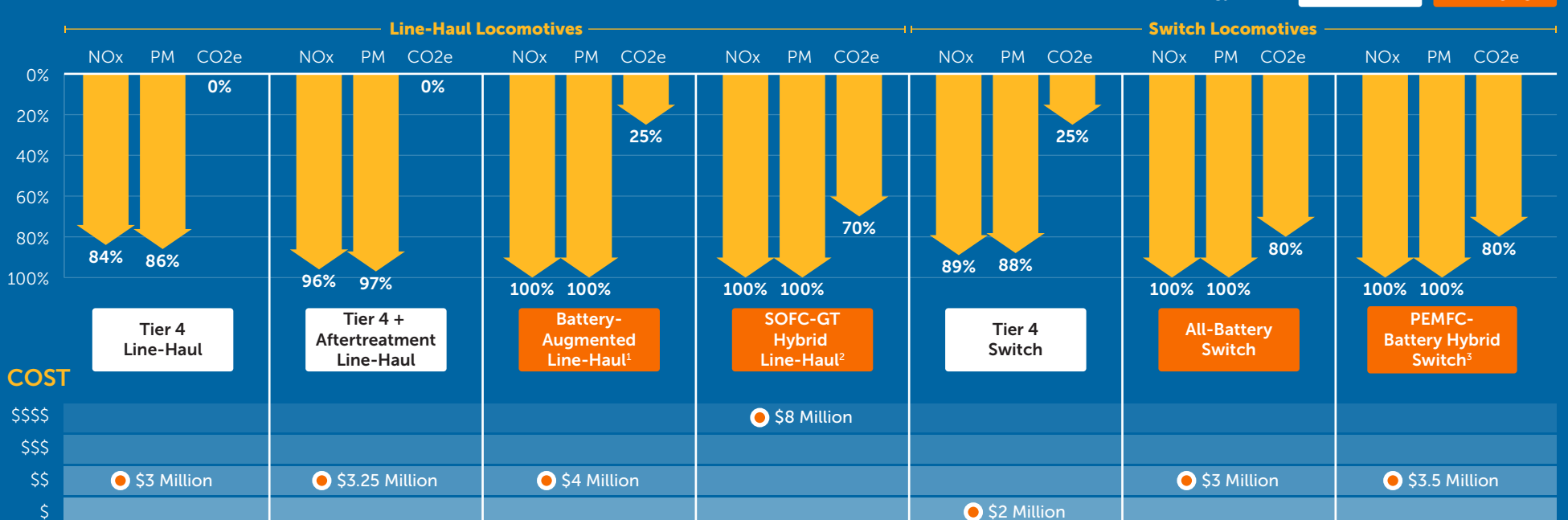


Convert to battery-augmented line-haul locomotives

Convert to all-battery switch locomotives

Use hybrid hydrogen fuel cell-powered locomotives

EMISSIONS REDUCTION POTENTIAL FROM TIER 0 BASELINE



¹ On-board batteries have the capacity for zero emission operation in designated areas
² SOFC-GT: Solid Oxide Fuel Cell and Gas Turbine
³ PEMFC: Proton-exchange membrane fuel cells

SOURCES

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