

Staff Recommendations to Provide Further Locomotive and Railyard Emission Reductions

BNSF Hobart – Intermodal Railyard



Public Workshop – City of Commerce

September 15 , 2009

California Environmental Protection Agency



Air Resources Board

BACKGROUND

- 18 railyard health risk assessments
- 18 railyard mitigation plans
- Board directed staff to develop a plan
- ARB technical report with 37 options
- ARB recommendations report
 - Released report on September 9, 2009

Railyard Health Risk Assessments and Mitigation Plans

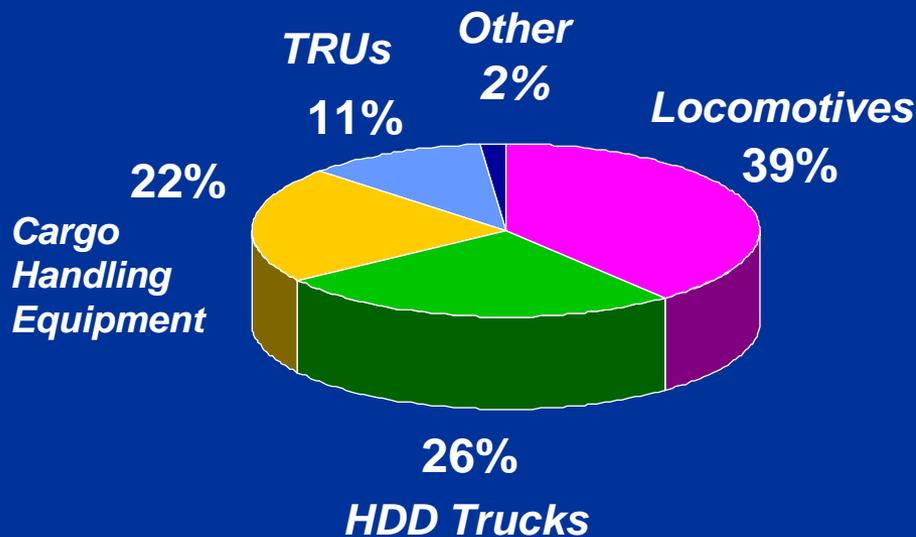
FINDINGS



UP Roseville
Classification Railyard

Distribution of Railyard Diesel PM Emissions Intermodal vs. Classification by Source Category

8 Intermodal Railyards DPM
Emission Inventory (2005)



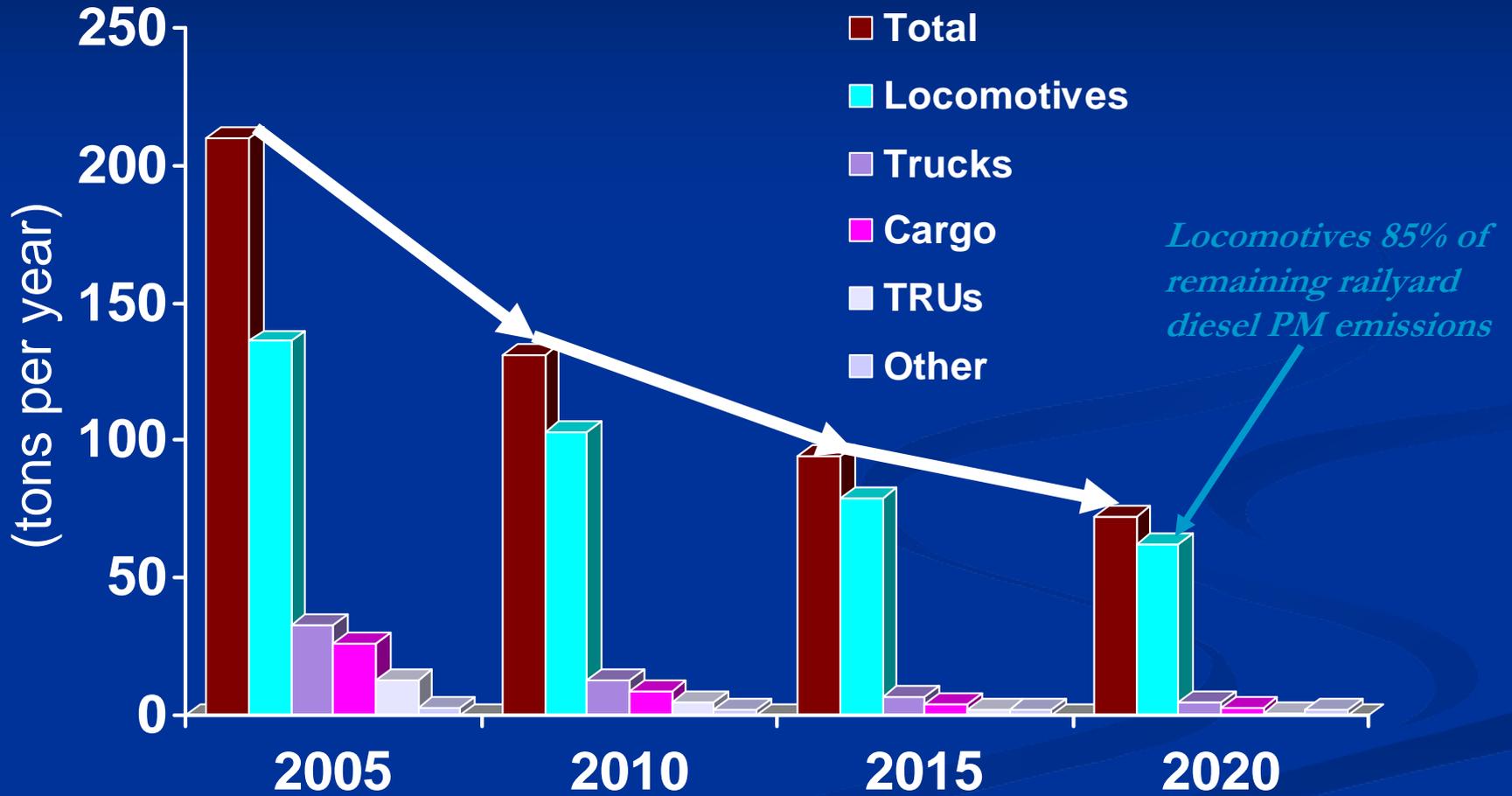
10 Classification Railyards DPM
Emission Inventory (2005)



Total 18 Railyard Diesel PM Emissions (2005) = 210 tons per year

18 Major Railyards

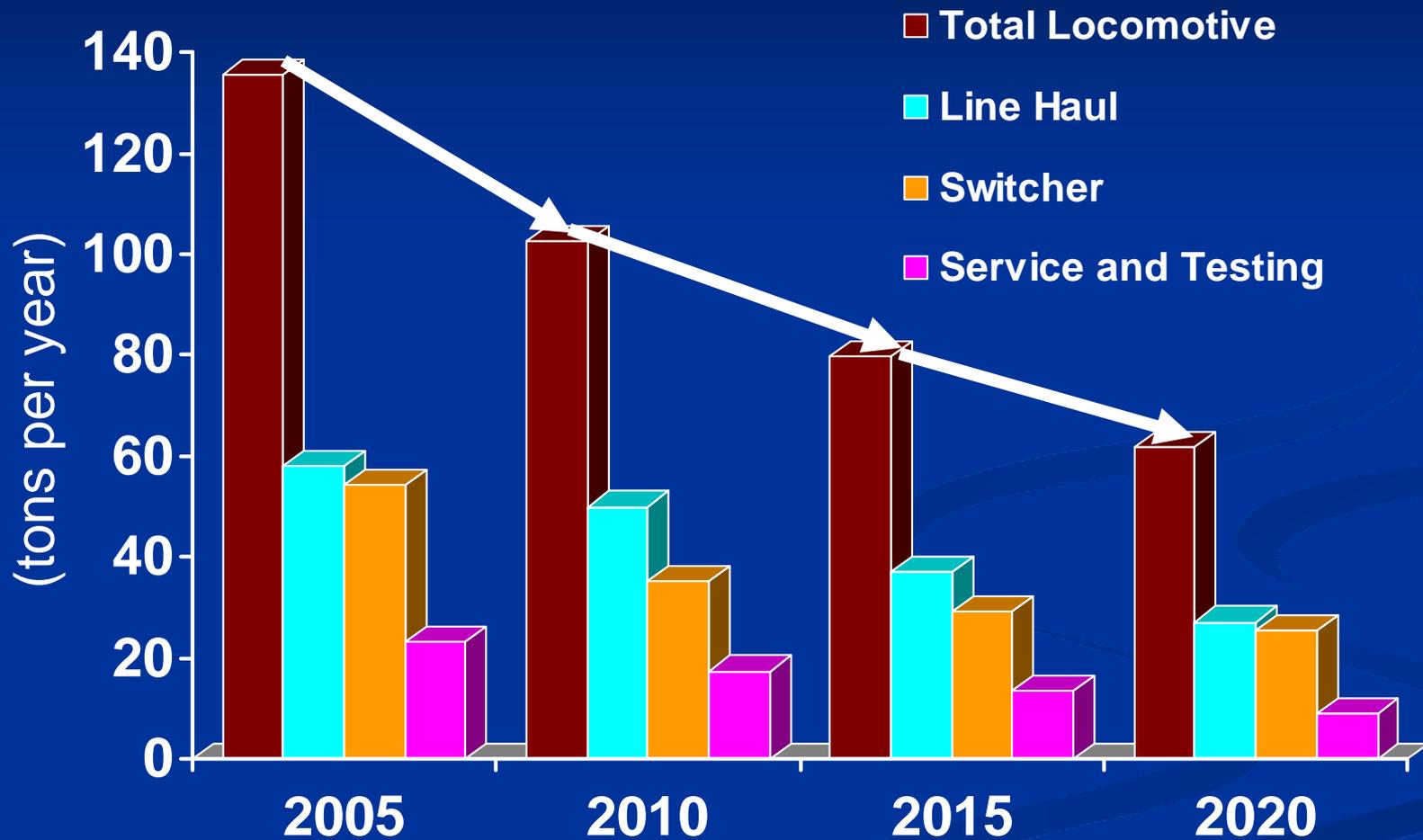
Total Diesel PM Emissions



Estimated Emissions Reductions: 37 percent 55 percent 66 percent

18 Major Railyards

Locomotive Diesel PM Emissions

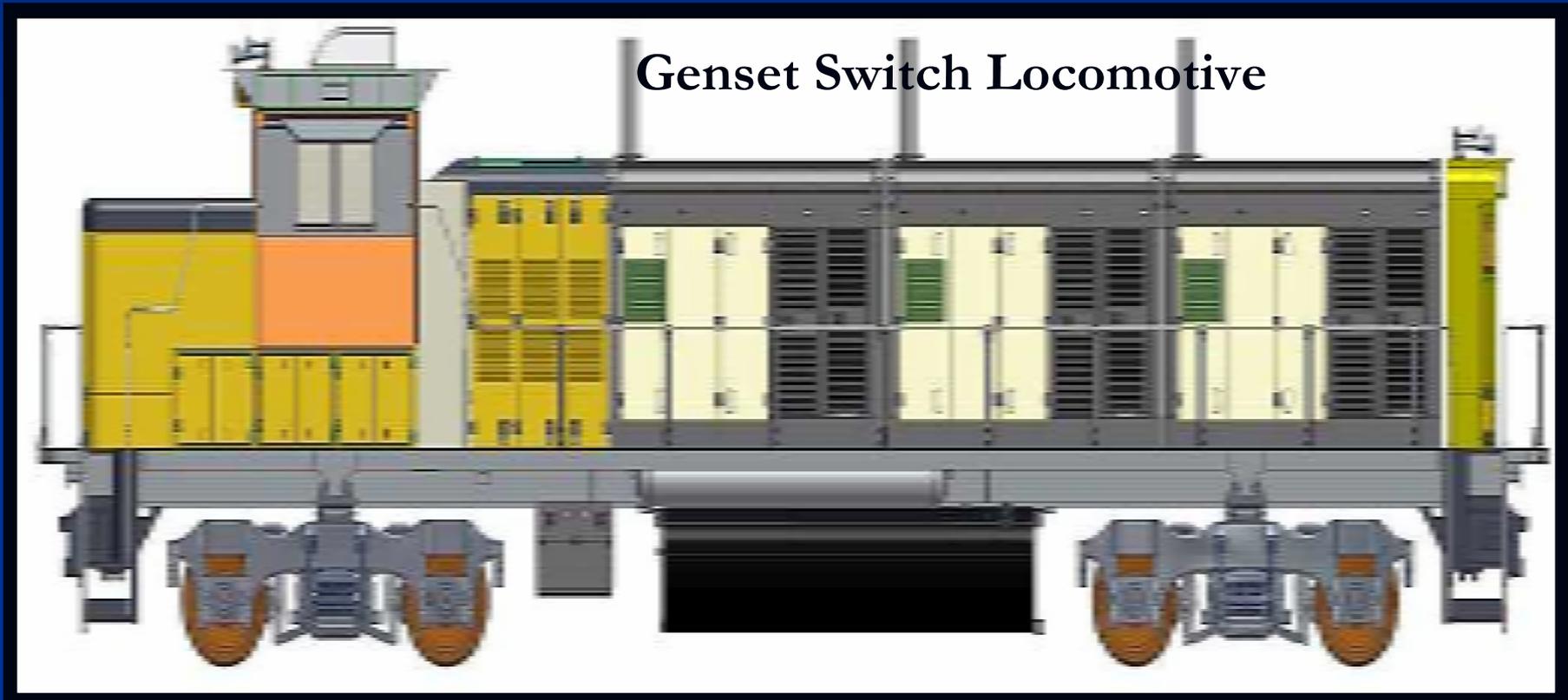


Estimated Emissions Reductions: 25 percent 40 percent 55 percent

Air Quality Impacts at Railyards

- Significant diesel PM risks at most railyards
- Existing measures will significantly reduce railyard diesel PM emissions
 - 50 percent or more by 2015
 - 65 percent or more by 2020
- Further locomotive and railyard emissions and risks reductions needed

TECHNICAL OPTIONS DOCUMENT



Technical Options Document

- Identify options that provide further locomotive and railyard emissions reductions
- Technical assessment of 37 options
- Draft report released in December 2008
 - Solicited public comments
 - Incorporated modifications, updated information
- Revised report released in August 2009

Criteria to Evaluate 37 Options

- Potential emissions reductions
 - Per unit, railyard, regional, statewide
- Technical and operational feasibility
- Costs
 - Capital
- Cost-effectiveness
 - Carl Moyer Program methodology

Categories of Options

- Locomotives
- Non-locomotives
 - Trucks, CHE, and TRUs
- Advanced systems
 - Hood technology
 - Rail electrification
- Individual railyard measures
 - Trees and walls
 - Indoor air filters
 - Monitoring stations

General Findings

Measures identified as high priority based on:

- Technical feasibility near to mid-term
- Cost-effectiveness, in spite of high capital costs
- Significant local emissions and risk reductions
 - Assist with SIP commitments

STAFF RECOMMENDATIONS



Staff Recommendations

- Based on Technical Options Report
- Implementation mechanisms evaluated:
 - Incentive funding
 - Regulatory measures
 - Enforceable agreements
 - Voluntary actions
- Released report on September 9, 2009

Five Locomotive Measures

- Switch locomotive repowers
- Switch locomotive retrofits
- MHP locomotive repowers
- MHP locomotive retrofits
- Accelerate replacement with Tier 4 interstate line-haul locomotives

South Coast Air Basin

NO_x and PM Emissions Reductions by 2014 (tons per day)

- Up to 300 switch and MHP locomotives
- NO_x: 11.6 * PM: 0.7
- Total estimated capital costs:
 - ~\$350 million
- Carl Moyer cost-effectiveness range:
 - \$1 to \$5 per pound.

* Does not include passenger locomotive SCR reductions of 3.0 tpd identified in the 2007 South Coast SIP

Statewide

NO_x and PM Emissions Reductions by 2014

(tons per day)

- Up to 650 switch and MHP locomotives
- NO_x: 35 * PM: 1.8
- Total estimated capital costs:
 - ~\$900 million
- Carl Moyer cost-effectiveness range:
 - \$1 to \$5 per pound.

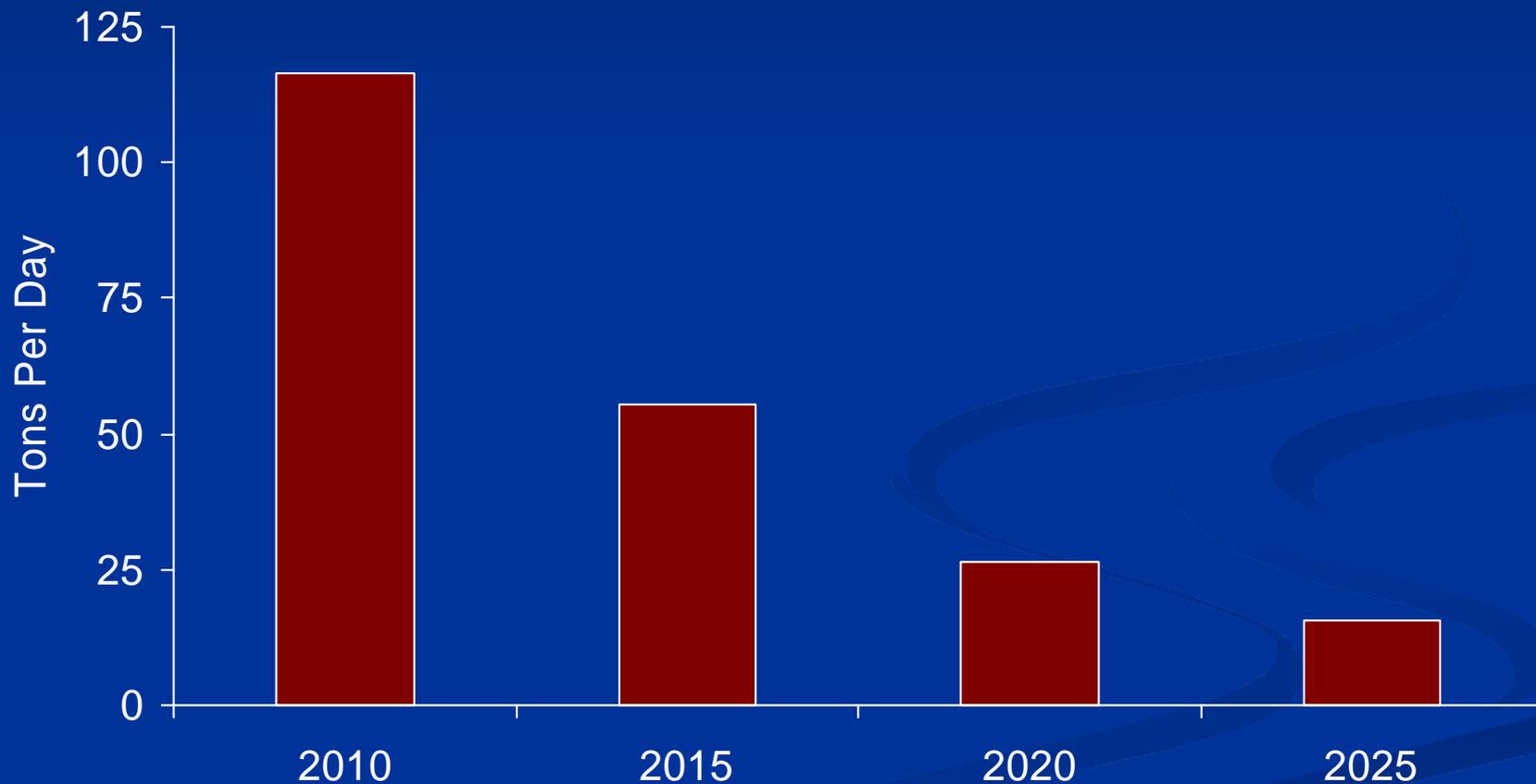
* Does not include passenger locomotive SCR reductions of 3.0 tpd identified in the 2007 South Coast SIP

Additional Statewide NO_x and PM Emissions Reductions by 2025 (tons per day)

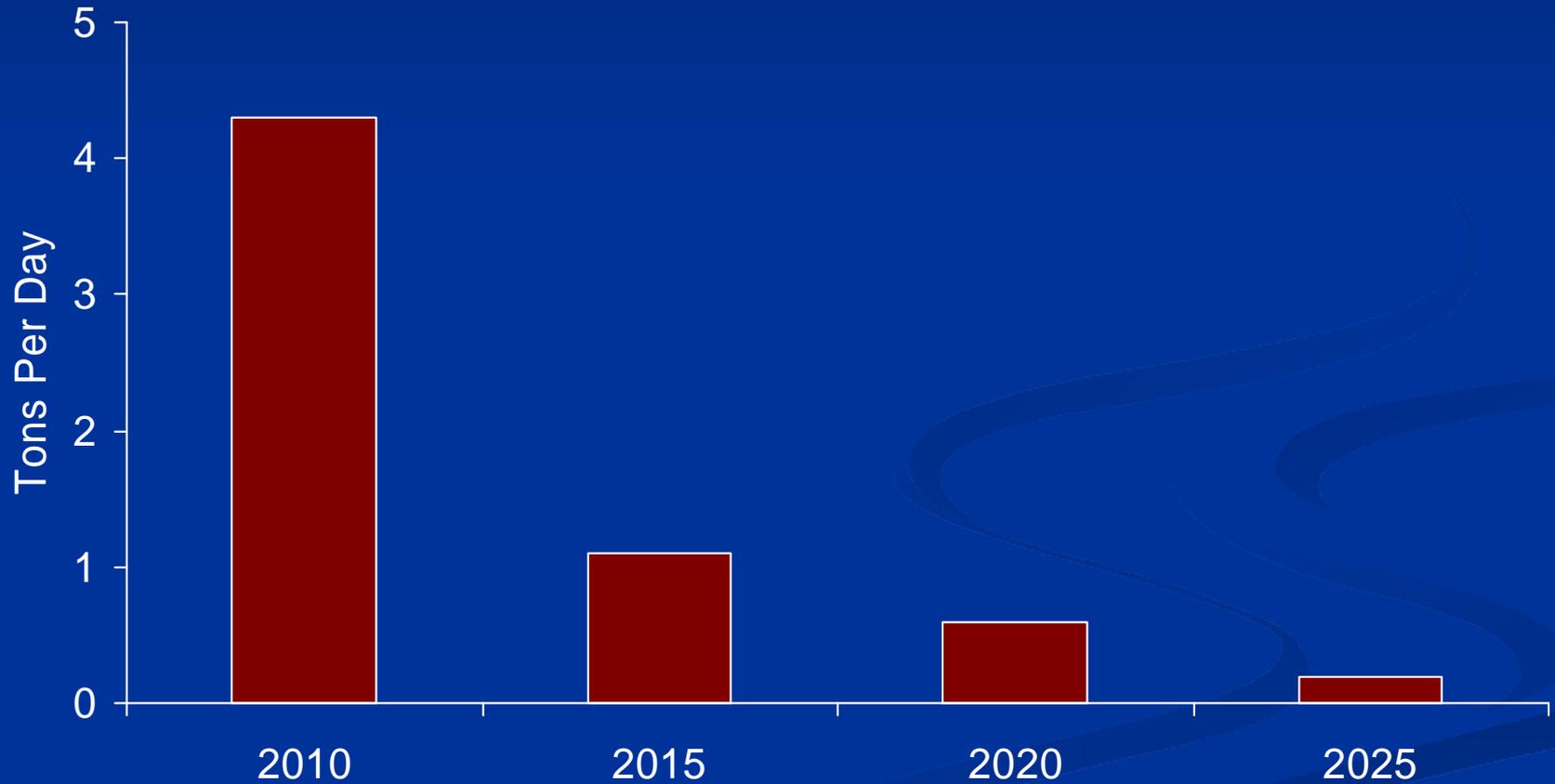
- Up to 1,200 interstate line locomotives
 - Operate in California on any given day
- NO_x: 29 * PM: 0.3
- Total estimated capital costs:
 - ~\$15 billion (Up to 5,000 Tier 4 units needed nationally)
 - California's Fair Share (20%): \$3 billion
- Carl Moyer cost-effectiveness:
 - <\$9 per pound.

* Does not include passenger locomotive SCR reductions of 3.0 tpd in the 2007 South Coast SIP

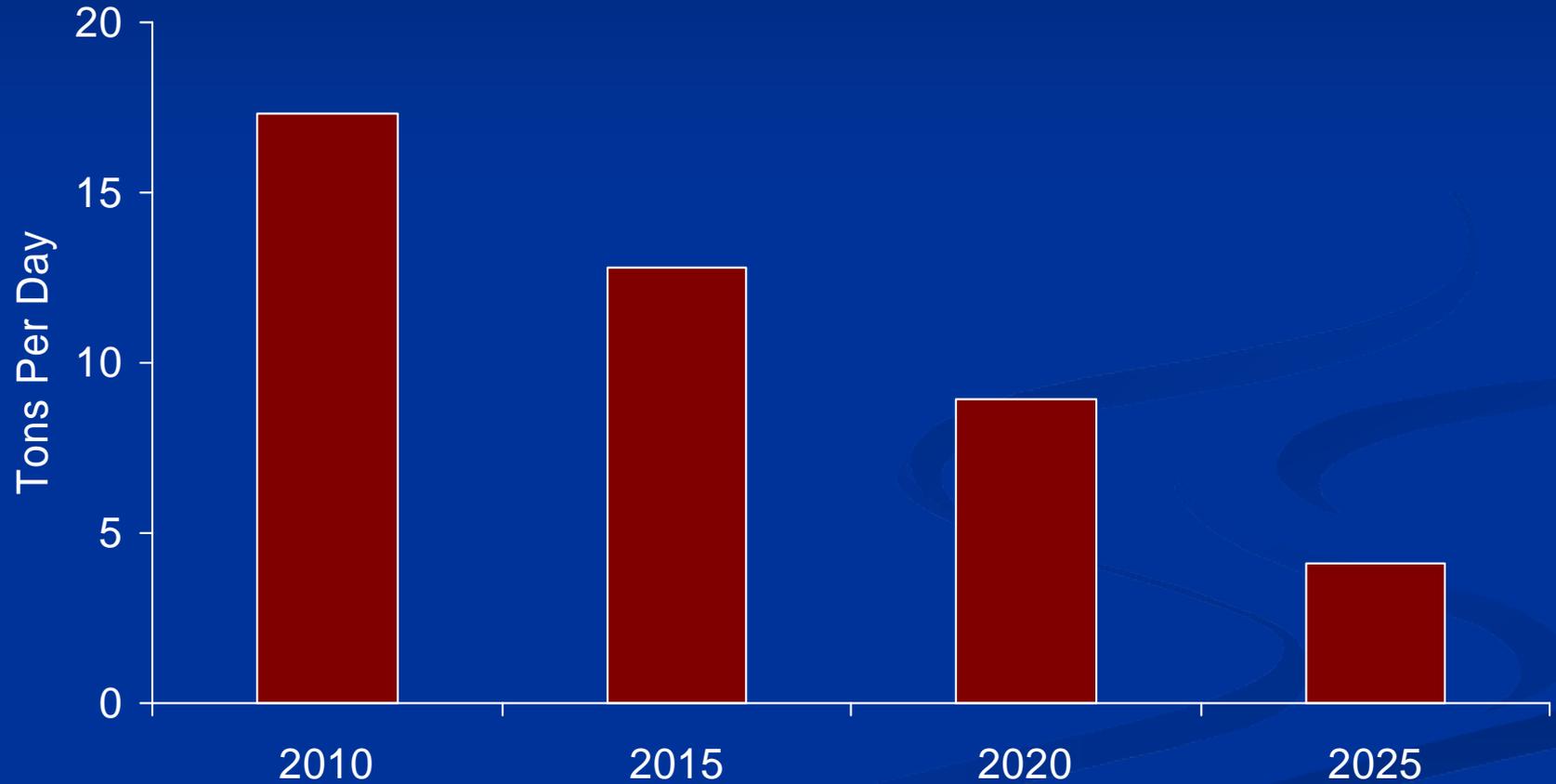
Estimated Statewide Locomotive NO_x Emissions Five Locomotive Measures



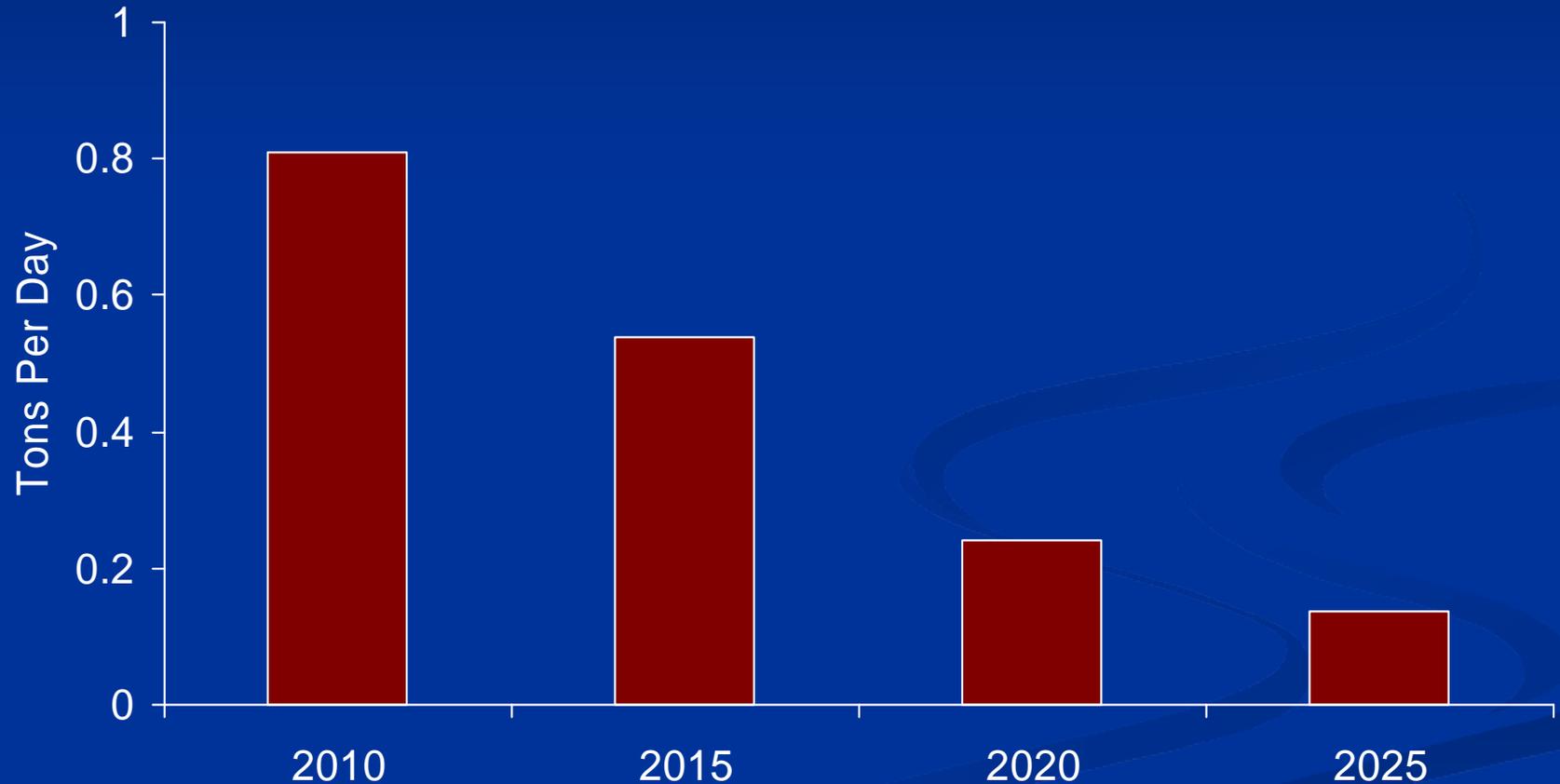
Estimated Statewide Locomotive PM Emissions Five Locomotive Measures



Estimated South Coast Locomotive NO_x Emissions Five Locomotive Measures

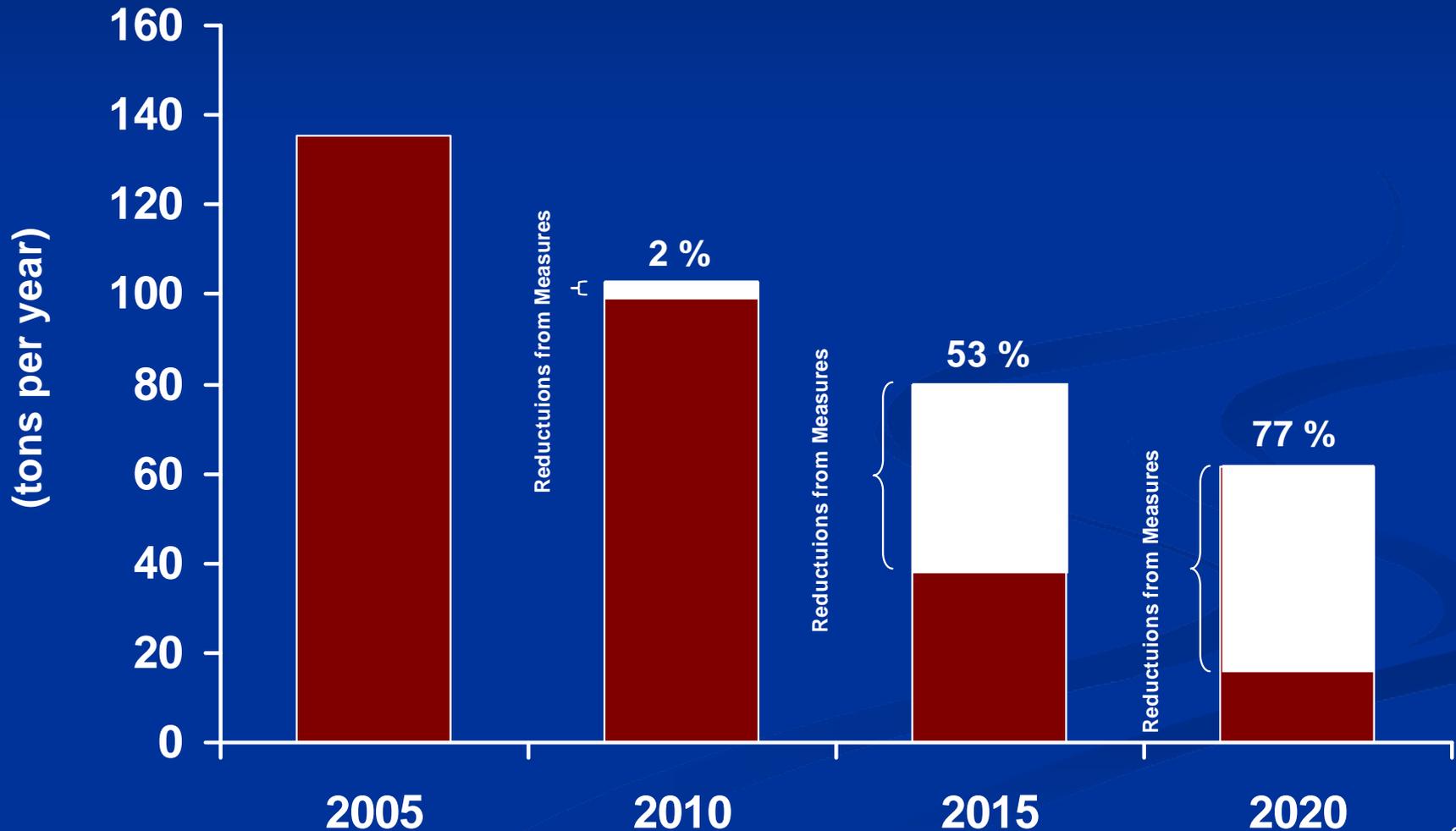


Estimated South Coast Locomotive PM Emissions Five Locomotive Measures



18 Railyards: PM Emissions Reductions

Five Locomotive Measures



Maximum Individual Cancer Risks at 18 Major Railyards

MICRs in 2005 - excess cancer risk in a million:

- Two railyards between 40 and 70
- Eight railyards between 100 and 250
- Seven railyards between 450 and 800
- One railyard at 2,500

Maximum Individual Cancer Risks at 18 Major Railyards

MICRs in 2015 - excess cancer risk in a million:

- 15 railyards between 20 and 150
- Two railyards between 250 and 300
- One railyard at 800

MICRs in 2020 - excess cancer risk in a million:

- 11 railyards between 5 and 30
- Five railyards between 50 to 150
- One railyard at 300

ADDITIONAL RECOMMENDATIONS



Implement Specific Railyard Measures

Examples of measures already implemented:

- Manual locomotive shutdowns
 - Before 15 minute shutdown required with idle devices
- Move truck gate entrances further from residences to reduce health risks
- Move service operations further from residences to reduce health risks
- Idle devices on cargo handling equipment
- Railyard system efficiencies (e.g., autogate system)

ARB and Other States Legal Authority

- U.S. EPA locomotive regulations apply to:
 - “New” and “remanufactured” locomotives
 - Each “remanufacture” re-starts a new “useful life”
 - “Useful life” - which is about ten years.
- States regulatory authority limited to:
 - Locomotives exceeding “useful life”
 - Control to U.S. EPA Tier 0 emission levels
- Interstate Commerce Commission Termination Act (ICCTA)
 - States must also harmonize locomotive regulations with ICCTA

Additional Recommendations

(continued)

- Eliminate federal locomotive preemptions
- Change U.S. EPA locomotive regulations
 - Require at remanufacture: NO_x reduction of 50 percent
 - Require remanufacture done every seven years
 - Accelerate Tier 4 interstate line haul locomotives
- Evaluate more Cargo Handling Equipment regulations
- Develop ARB Goods Movement Efficiency Measure

Additional Recommendations

(continued)

- Support ports Clean Air Act Plan update
- Participate in CEQA new railyard projects
- Evaluate rail electrification
- Improve locomotive and railyard emission inventories
- Continue locomotive research programs

SUMMARY

- Further locomotive and railyard emissions and risks reductions are still needed
- Switch and MHP locomotive are priority options
 - Technically feasible and cost-effective
 - High capital costs, but cost-effective
- Staff believes incentive funding is critical
 - ARB and other state agencies need to coordinate and prioritize funding for this effort
 - A state coalition needs to seek both greater authority and funding from the federal government

Contact and Reference Information

- Recommendations and Technical Options Documents: <http://www.arb.ca.gov/railyard/ted/ted.htm>
- Public Comments for ARB Board Meeting: http://www.arb.ca.gov/lispub/comm/bcsubform.php?listname=railyard09&comm_period=N
- Contact: Harold Holmes, Manager
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