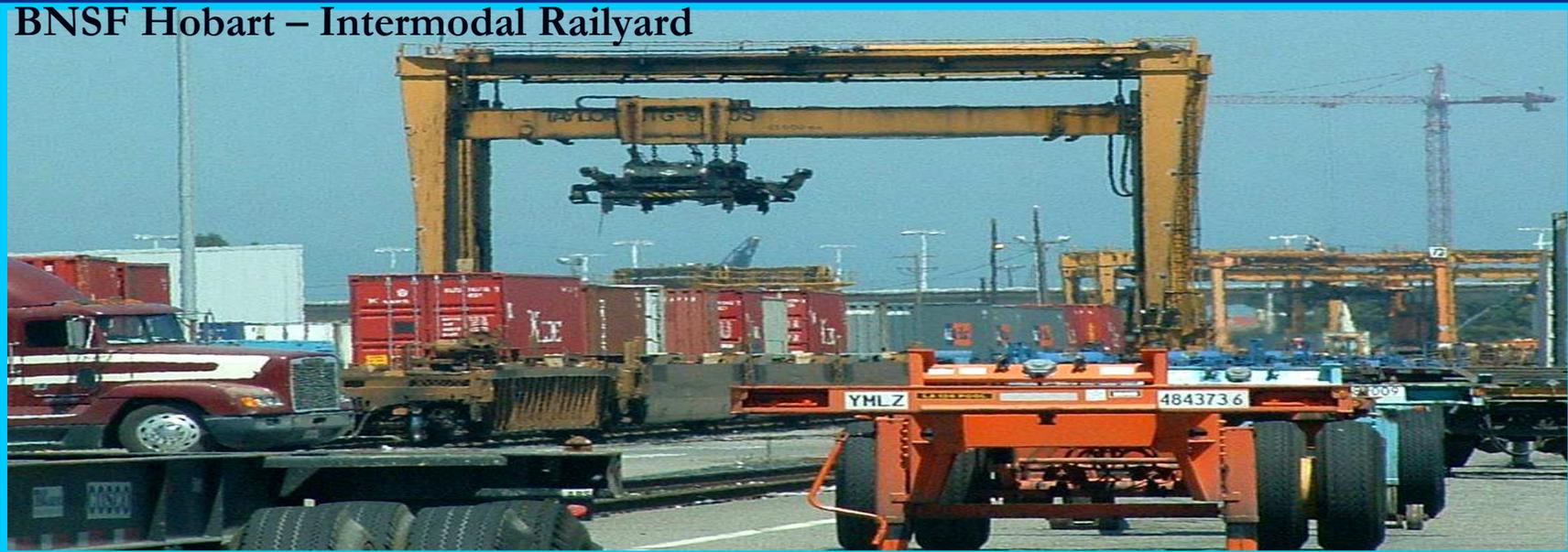


STAFF RECOMMENDATIONS TO PROVIDE FURTHER LOCOMOTIVE AND RAILYARD EMISSION REDUCTIONS

BNSF Hobart – Intermodal Railyard



September 25, 2009

California Environmental Protection Agency

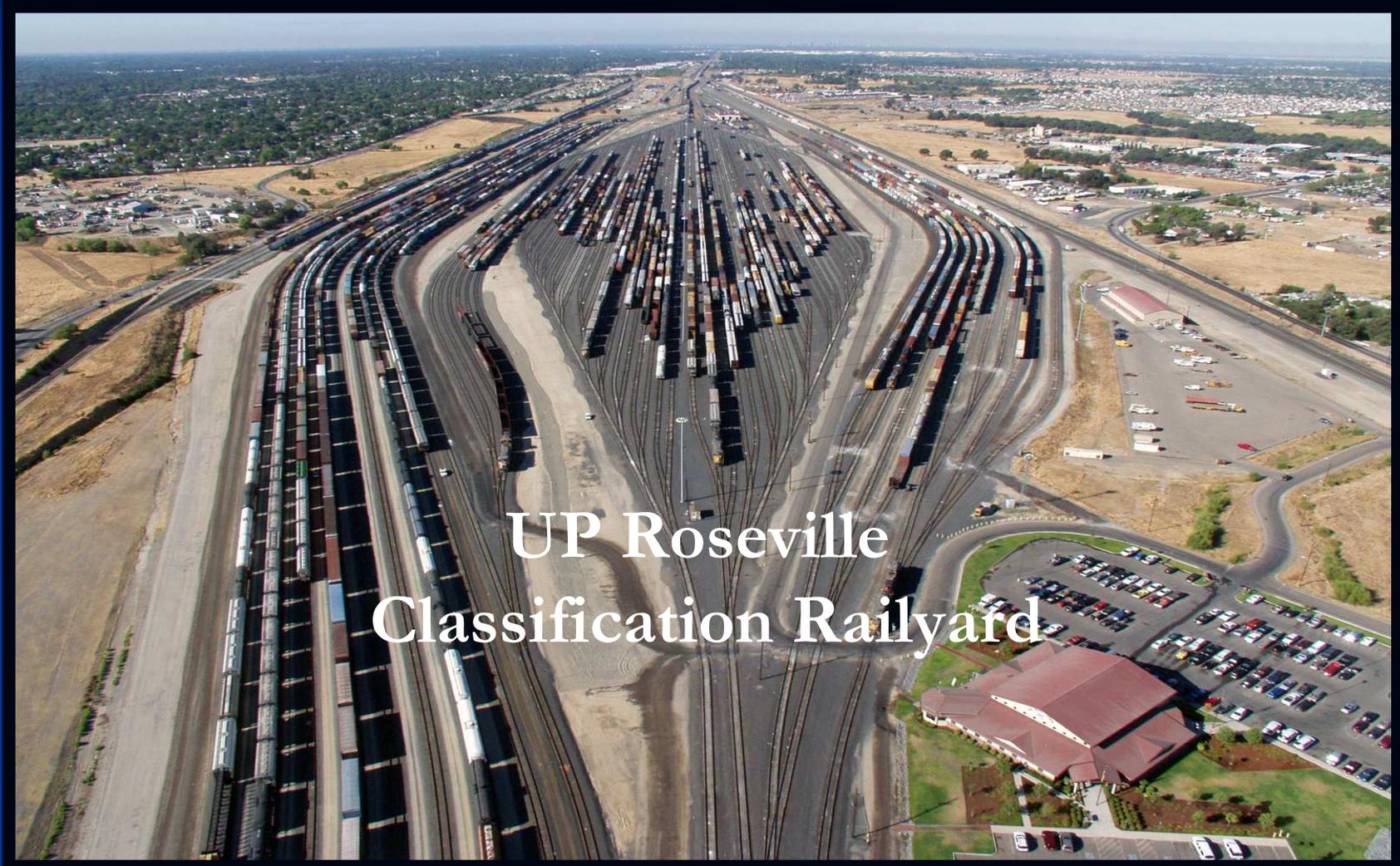


Air Resources Board

Presentation Overview

- Objectives
- Recent Activities
- Recommendations for Locomotives
- Additional Recommendations
- Summary and Next Steps

OBJECTIVES

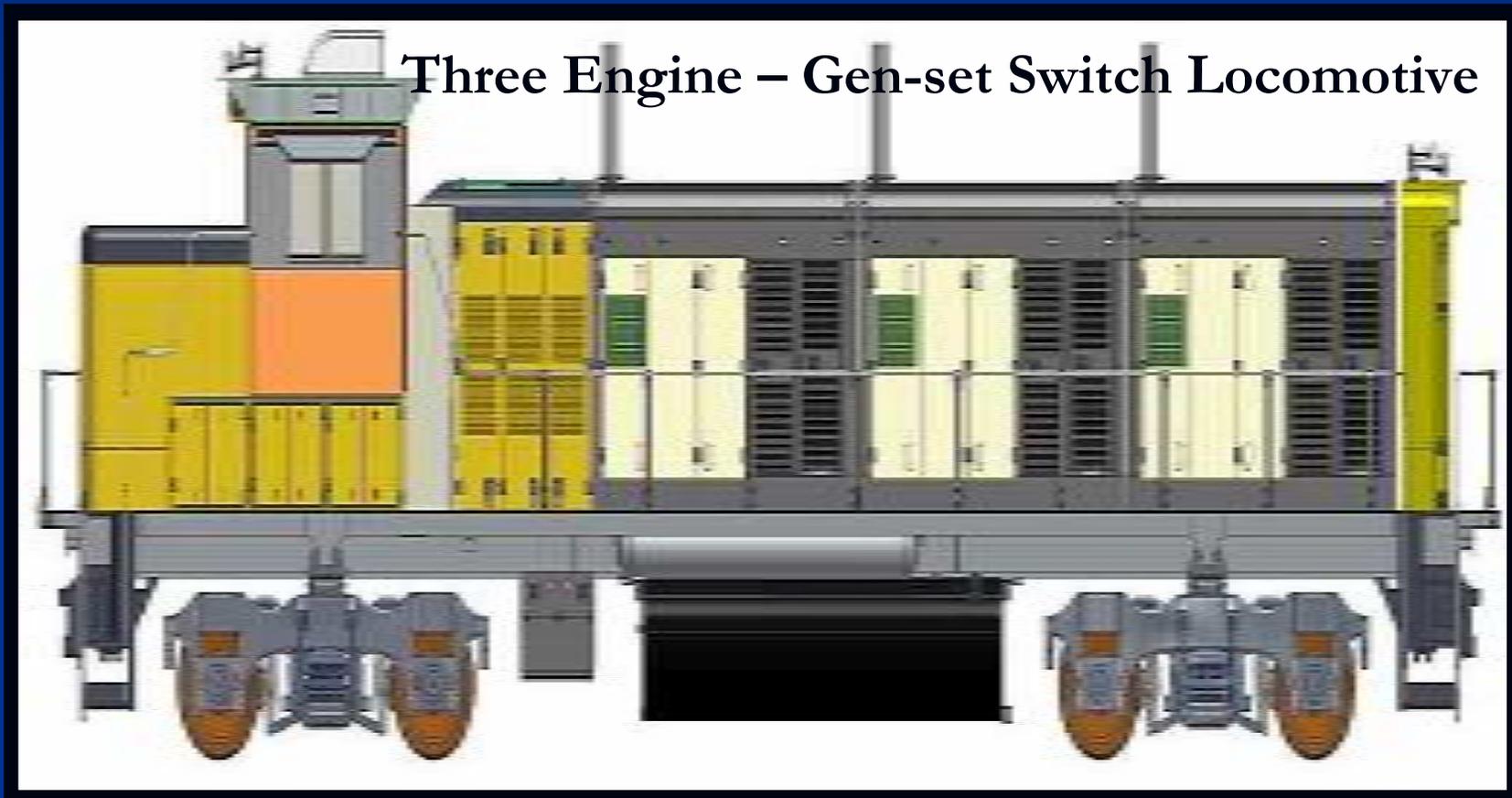


UP Roseville
Classification Yard

Objectives

- Reduce directly emitted diesel PM in and around railyards to reduce risk
- Reduce regional NO_x from locomotives to address 2014 and later SIP targets
- Reduce GHG emissions

RECENT ACTIVITIES



Actions Taken to Address Locomotives and Railyards

- **Approved specific regulations and agreements affecting locomotives and railyards**
- **Completed HRAs at 18 major railyards**
- **Analyzed impacts of existing measures on emissions and risk**
- **Prepared Technical Options Report**
- **Prepared Recommendations Report**

Regulations and Agreements

- ARB adopted regulations
 - Drayage trucks
 - Cargo handling equipment
 - Transport refrigeration units
 - Cleaner fuel for intrastate locomotives
- ARB Agreements
 - South Coast Locomotive Fleet Average
 - Idling reduction devices
 - Cleaner fuel for interstate locomotives
- U.S. EPA locomotive regulations

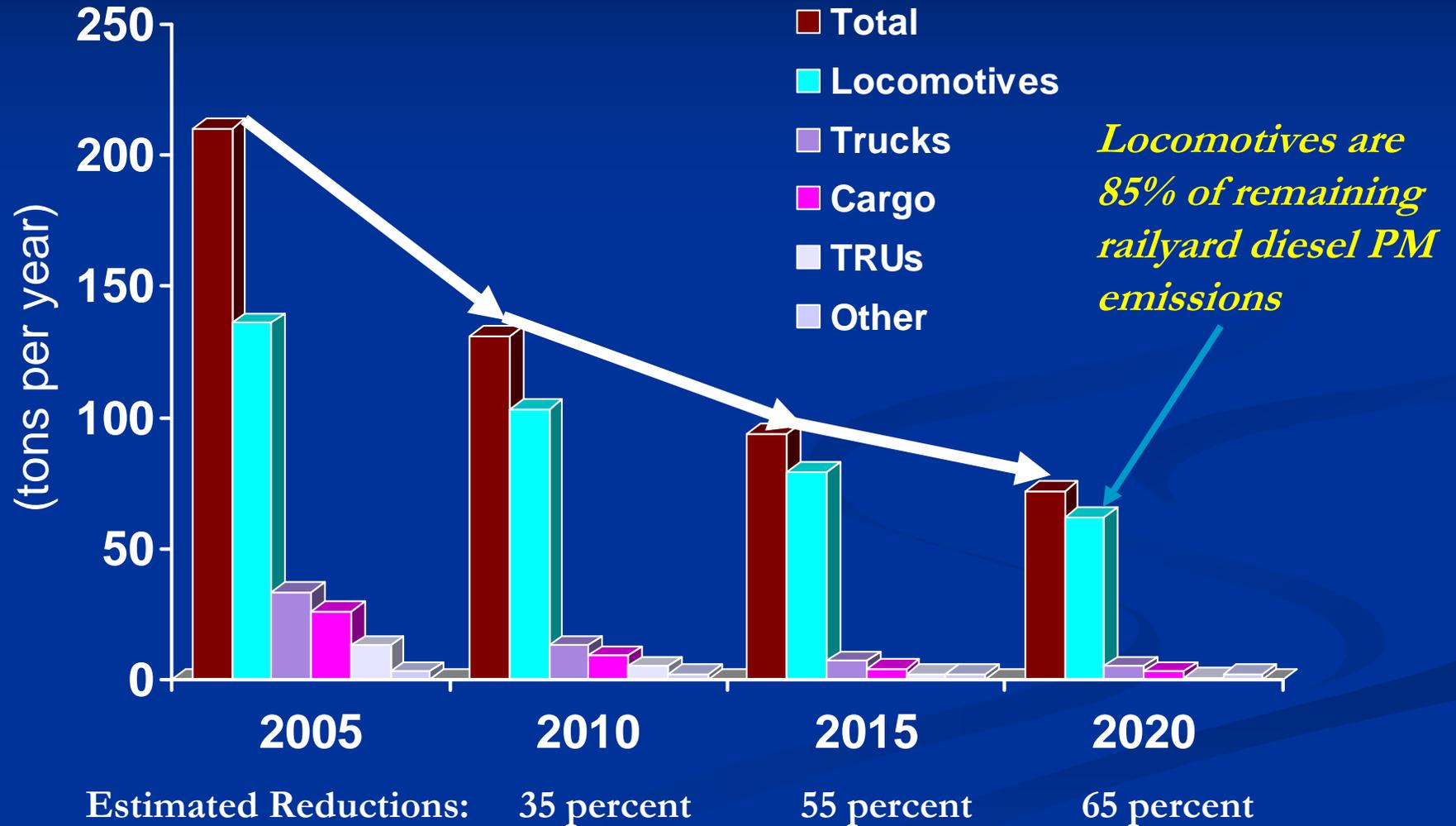
Health Risk Assessments

- ARB, in cooperation with the UP and BNSF, completed HRAs for 18 major railyards
- First comprehensive assessment of emissions and public health risks
- Based on 2005 railyard activity
- Results showed that living around a railyard poses significant public health risk
- Locomotives major contributor to emissions and risk; other sources significant in 2005

Benefits of Existing Regulations and Agreements

- At railyards, existing U.S. EPA and ARB measures reduce diesel PM emissions by:
 - 35% by 2010
 - 55% by 2015
 - 65% by 2020
- Moderate reductions in diesel PM and oxides of nitrogen from line haul locomotives in later years

Diesel PM Emission Reductions With Existing U.S. EPA and ARB Regulations (18 Major Railyards)



Technical Options Report

- ARB staff assessed 37 options based on:
 - Technical feasibility
 - Potential emissions reductions
 - Costs
 - Cost-effectiveness
- Draft report released in December 2008
 - Solicited public comments
 - Incorporated modifications, updated information
- Revised report released in August 2009

Major Findings of Technical Options Report

- Reducing emissions from locomotives is the most cost-effective and expeditious way to reduce railyard emissions and public health risks
- Technology is commercial or near commercial for reducing emissions from switch and medium horsepower locomotives
- Technology for reducing emissions from line haul locomotives is under development
- Other measures may have potential, but are generally not as cost-effective

Draft Recommendations Report

- Based on Technical Options Report and HRAs
- Five locomotive measures
 - Greatest emissions and risk reductions
 - Most cost-effective
 - Generally rely on incentive funding
- Additional Recommendations
 - Separate but parallel efforts with locomotive measures
 - Focus on railyard specific measures
- Released report on September 9, 2009

RECOMMENDATIONS FOR LOCOMOTIVES



Five Locomotive Measures

- **Switch locomotives:**
 - Engine repowers
 - Aftertreatment retrofits for NO_x and DPM
- **Medium horsepower locomotives:**
 - Engine repowers
 - Aftertreatment retrofits for NO_x and DPM
- **Interstate line haul locomotives:**
 - Accelerate replacement with new Tier 4

Statewide Emission Reductions

Five Locomotive Measures

(Year of reductions based on final implementation date)

Measure	Locomotive Type	Statewide Reductions (tons per day)	
		NO _x	PM
Repower: 2010 – 2013	Switch	7	0.3
	MHP	23	1.3
Retrofit: 2012 – 2016	Switch	1	0.04
	MHP	7	0.2
Accelerated Introduction: 2015 – 2025	New Tier 4 Interstate Line Haul	31	1.6
Total		69	3.4

Statewide Costs and Cost-Effectiveness

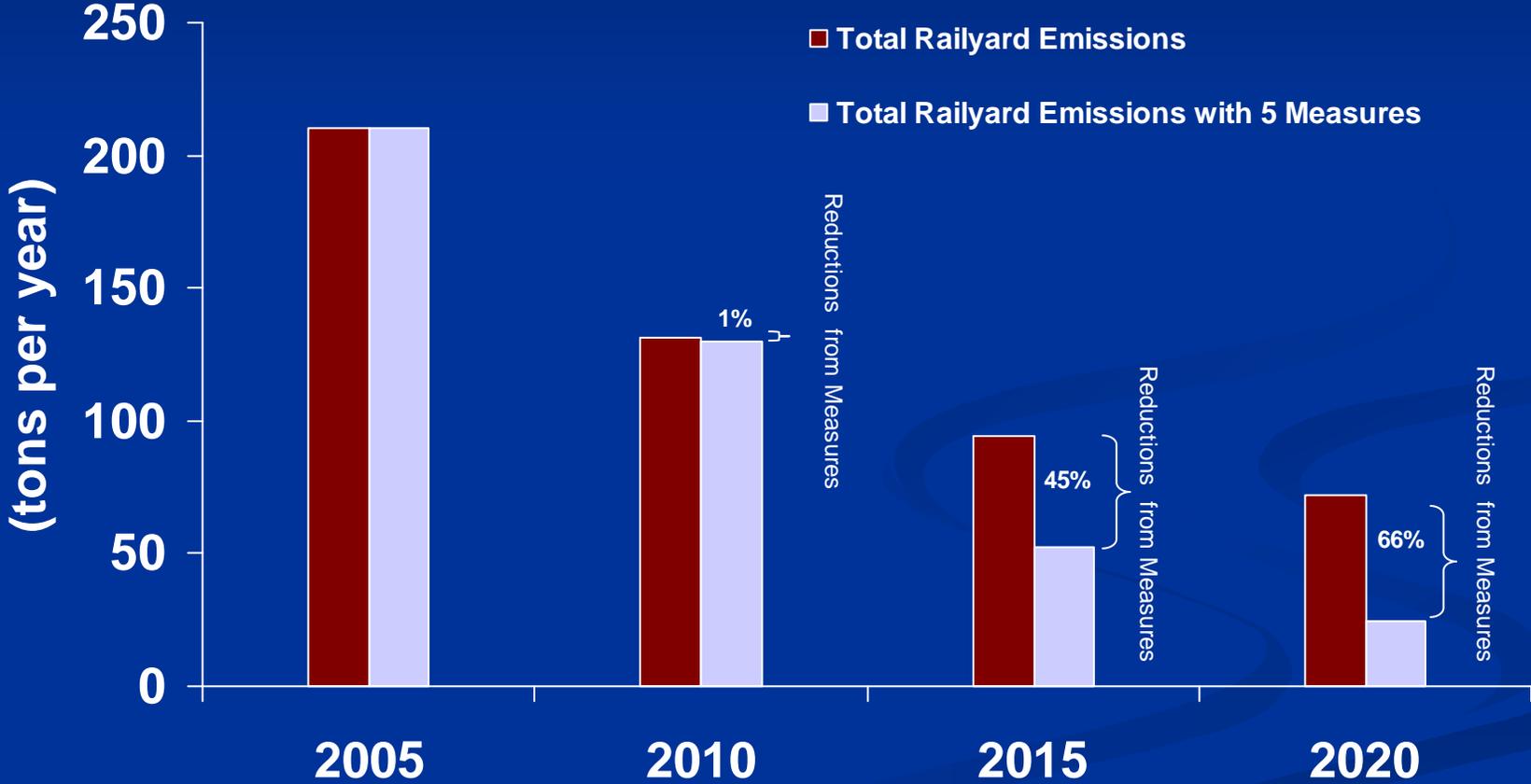
Five Locomotive Measures

(Year of reductions based on final implementation date)

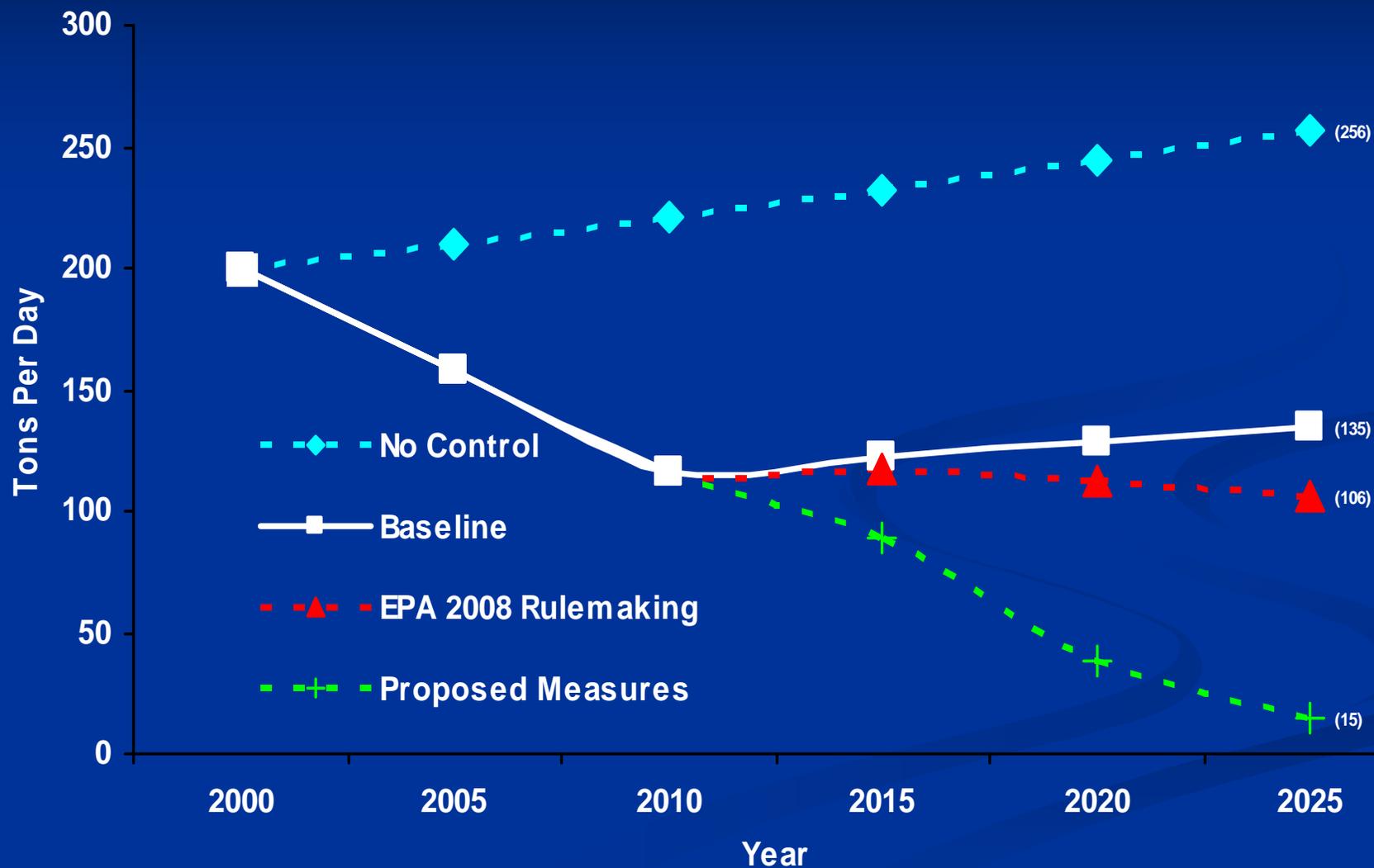
Measure	Locomotive Type	Cost (millions)	Cost Effectiveness (\$/lb)
Repower: 2010 – 2013	Switch	230	2-3
	MHP	400	3-5
Retrofit: 2012 – 2016	Switch	50	~1
	MHP	200	2-3
Accelerated Introduction: 2015 – 2025	New Tier 4 Interstate Line Haul	3,000 *	4-9
Total		3,900	1-9

* California's fair share (20%) of \$15 billion based on activity levels within the state.

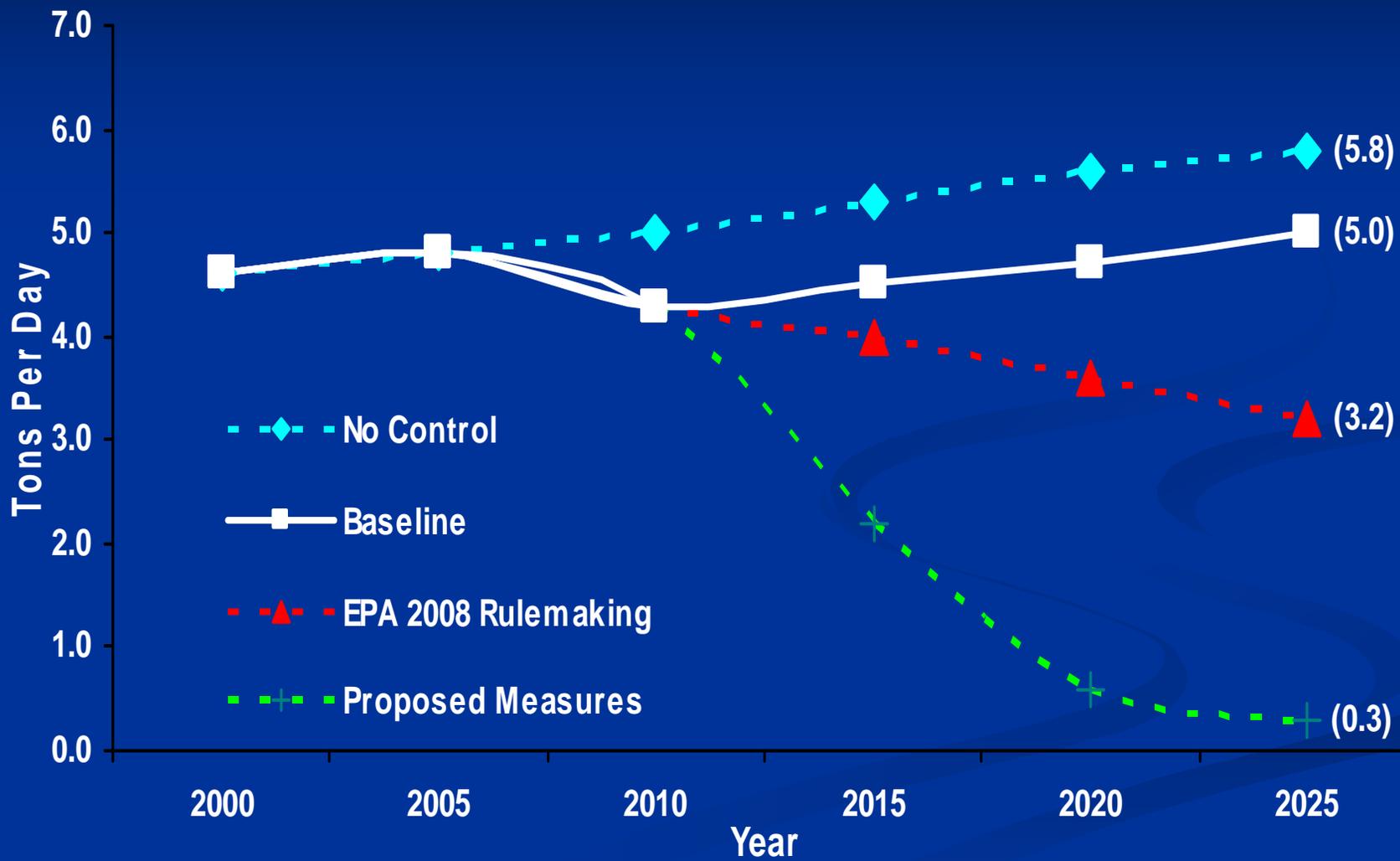
18 Major Railyards: Additional Diesel PM Emission Reductions With Five Locomotive Measures



Statewide NO_x Emissions Reductions Five Locomotive Measures



Statewide PM Emissions Reductions Five Locomotive Measures



Implementing Mechanism

- Staff recommends cooperative effort to seek incentive funds to implement locomotive measures
- Considered regulatory and enforceable agreement options, but chose incentives as the best and most expeditious method
- Regulatory Option:
 - Authority limited to older, uncontrolled locomotives
 - Regulation likely result in only minimal reductions and could jeopardize South Coast agreement
 - Focus should remain on repower and retrofit of all locomotives to more stringent standards
- Enforceable Agreement Option: Slow process; may play role in the future

Potential Sources of Incentive Funding

- Federal Diesel Emissions Reduction Act
- Proposition 1B
- Carl Moyer Program
- AB 118 - Air Quality Improvement Program
- AB 118 - Alternative and Renewable Fuel and Vehicle Technology Program
- Other Funding Sources

Funding for Repowers and Retrofits

Funding Source	Funds Needed (millions)							
	2009	2010	2011	2012	2013	2014	2015	2016
Incentive Funds	9	100	110	85	74	25	20	20
Railroad Matching Funds	3	100	110	85	74	25	20	20
Total	12	200	220	170	148	50	40	40
Cumulative Total	12 *	212	432	602	750	800	840	880

* DERA funds awarded to ARB in 2009 for about \$9 million.

ADDITIONAL RECOMMENDATIONS



Pursue Railyard-Specific 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)

Additional Recommendations

- **Support changes to federal law to provide greater authority to California to regulate railroads**
- **Support changes to U.S. EPA locomotive regulations**
- **Evaluate advanced cargo handling equipment**
- **Develop ARB goods movement efficiency measure to address GHG emissions**

Additional Recommendations

(continued)

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

SUMMARY AND NEXT STEPS

BNSF San Bernardino Intermodal Railyard



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

Next Steps

- Assemble coalition of stakeholders to obtain incentive funds for locomotive measures
- Work with local governments, railroads, and local districts to evaluate and implement railyard specific measures
- Develop coalition of interested stakeholders to propose changes to federal law
- Continue efforts to implement additional staff recommendations