

Sick of Soot

The Public Health and Economic Impacts of Diesel Pollution in California

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2004 DEER Conference



Union of Concerned Scientists

Citizens and Scientists for Environmental Solutions



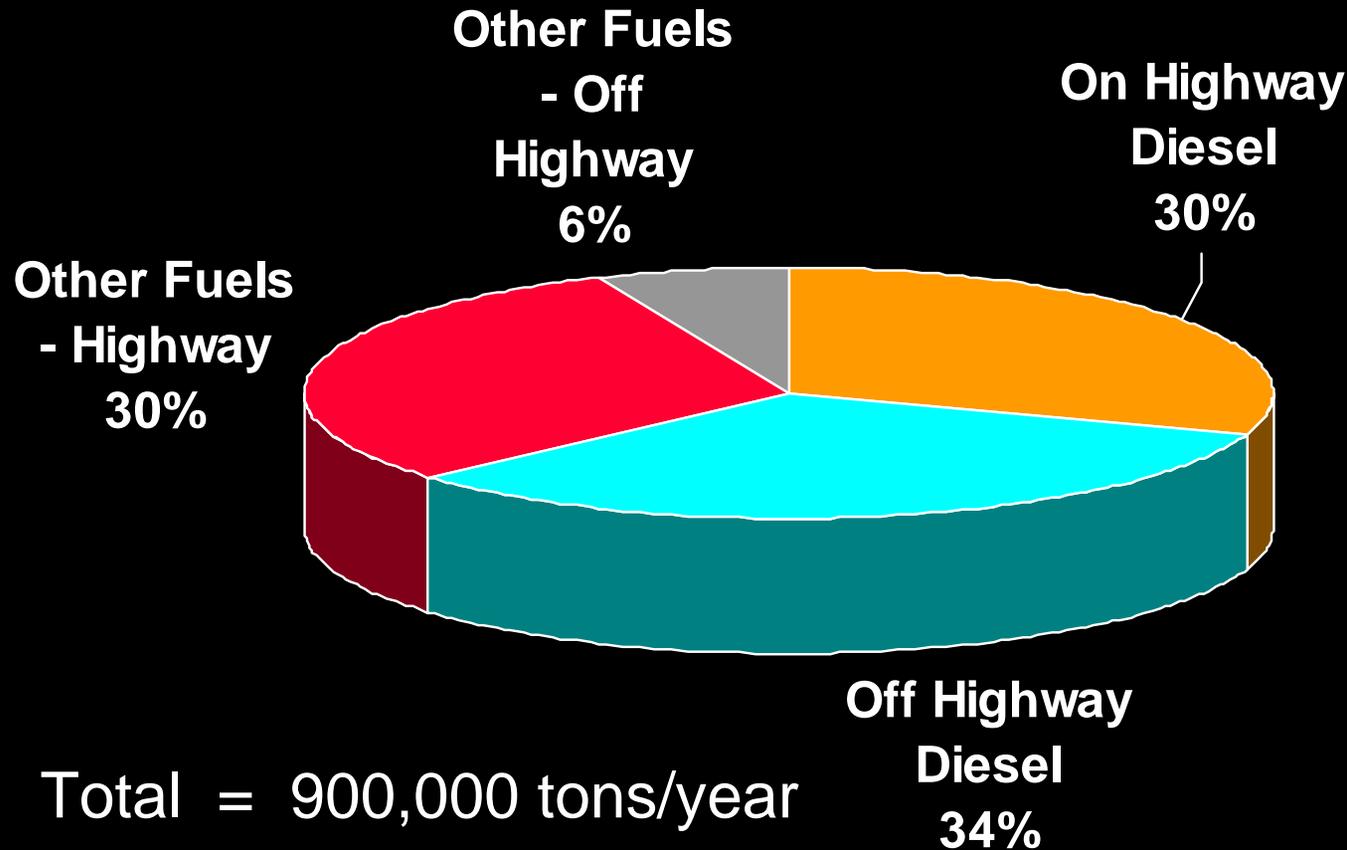
Outline

- Background & Motivation
- Study Methodology
- Health and Economic Impacts
- Carl Moyer Program Analysis
- Policy Recommendations



Background: 2005 CA Mobile Source NO_x

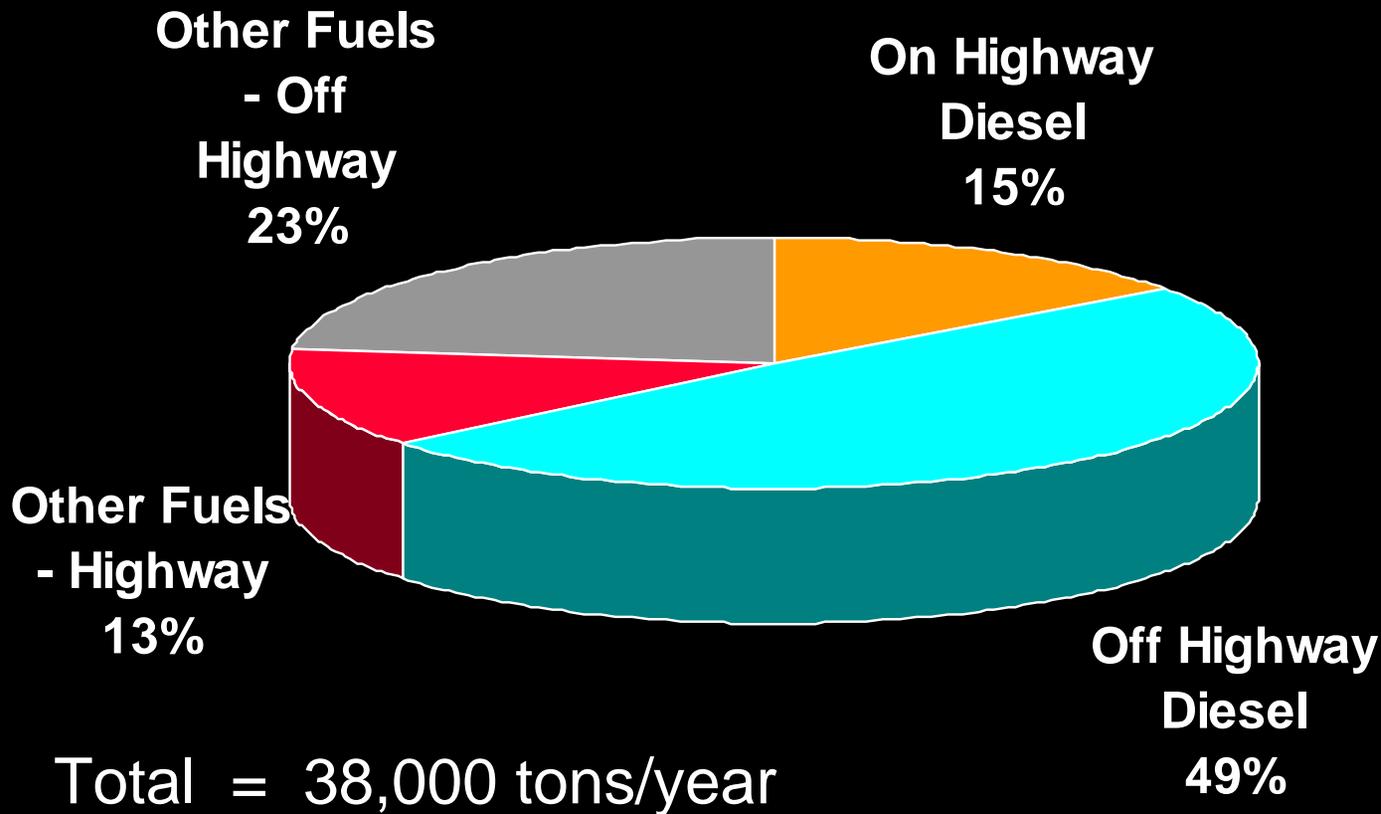
- > 60% Mobile Source NO_x attributed to diesel





Background: 2005 CA Mobile Source PM

- > 60% Mobile Source PM attributed to diesel



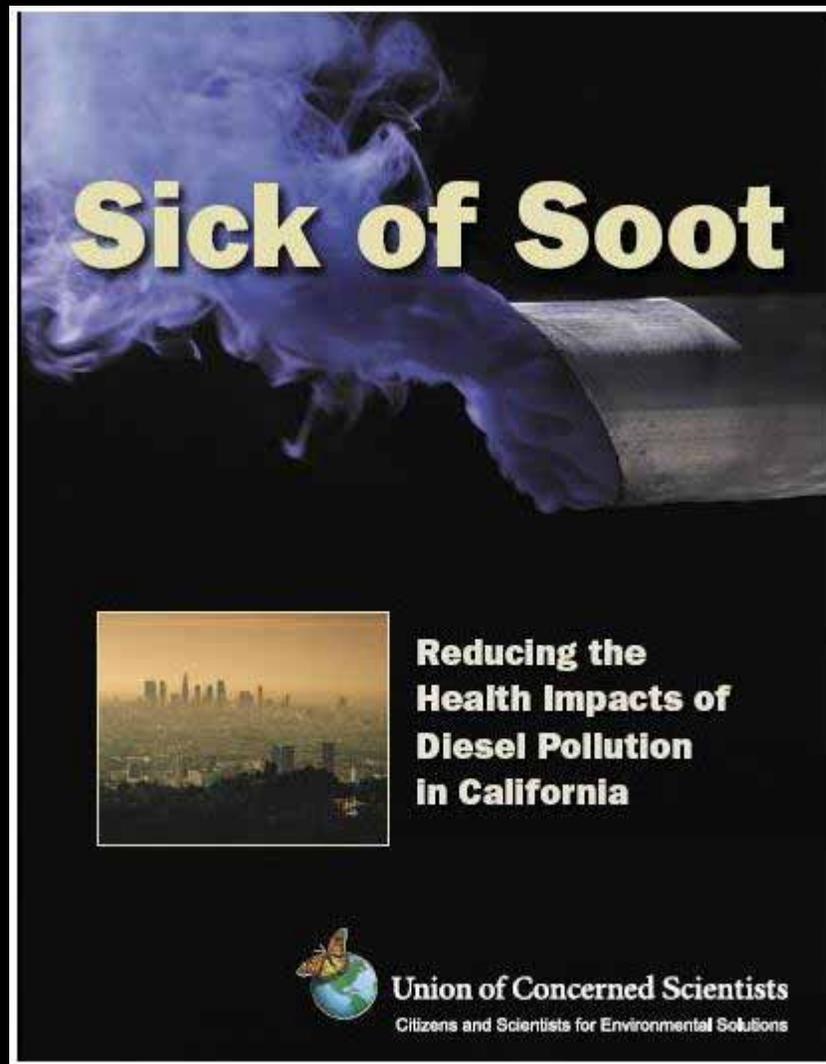
Background: Health Impacts of PM

- Diesel PM is a Toxic Air Contaminant (CARB, 1998)
- 70% Airborne Toxic Cancer Risk
- Epidemiological Studies
 - Chronic Obstructive Pulmonary Disease Hospitalizations (Samet et al. 2000)
 - Cardiovascular Hospitalizations (Samet et al. 2000)
 - Asthma Hospitalizations and ER visits (Sheppard et al. 1999, Schwartz 1993)
 - Chronic Bronchitis (Abbey et al. 1995)
 - Premature death (Krewski et al. 2000)



Sick of Soot: Motivation

- What are the regional health and economic impacts of diesel pollution in CA?
- How will these impacts change over the next 2 decades?
- What are the benefits of accelerating emission reductions and is it worth the cost?





Methodology: 2004 Health Impacts

- Based on Statewide Health Impacts Study for 2000 (Lloyd and Cackette)
- Updated exposure estimates and population for 2004
- Expanded analysis to include air basin estimates



Estimate Diesel
NOx and PM
Emissions
by Air Basin

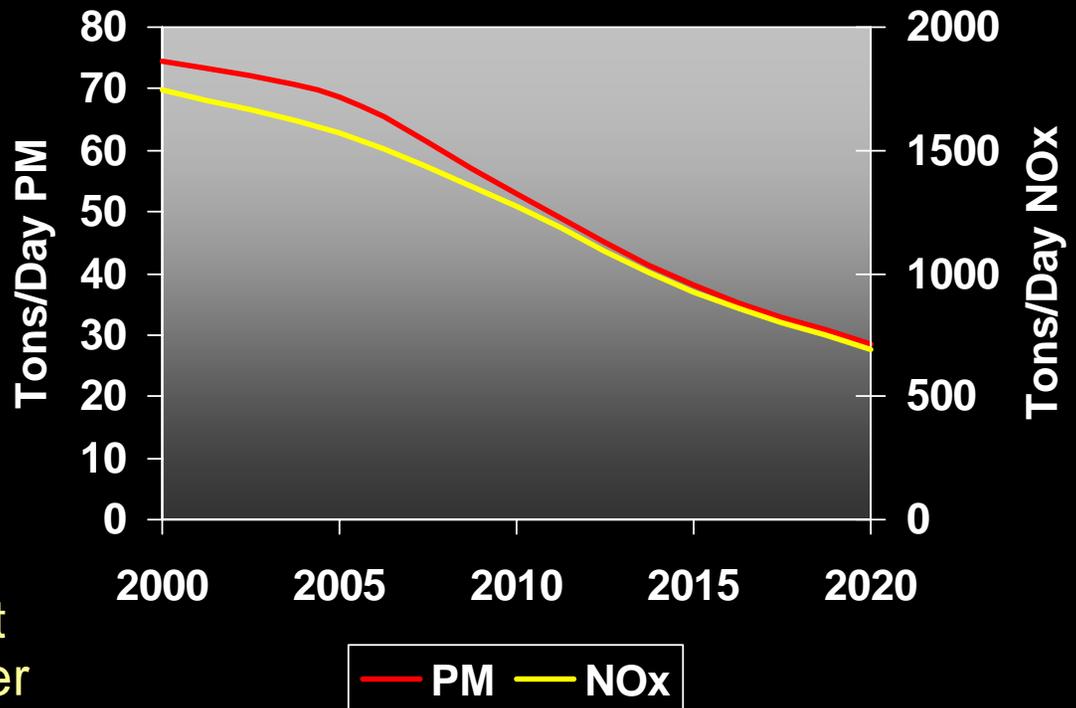
Calculate
Population –
Weighted
Exposure for
Each Air Basin

Calculated health
impacts for
updated exposure
and population



Methodology: Future Health Impacts

- Project health impacts through 2020 using same methodology
- Emission Projections
 - Includes 2007 Highway diesel engine standards and low sulfur fuel requirements
 - Adjusted for recently passed nonroad diesel rule
 - Does not include Retrofit Regulations adopted over past year





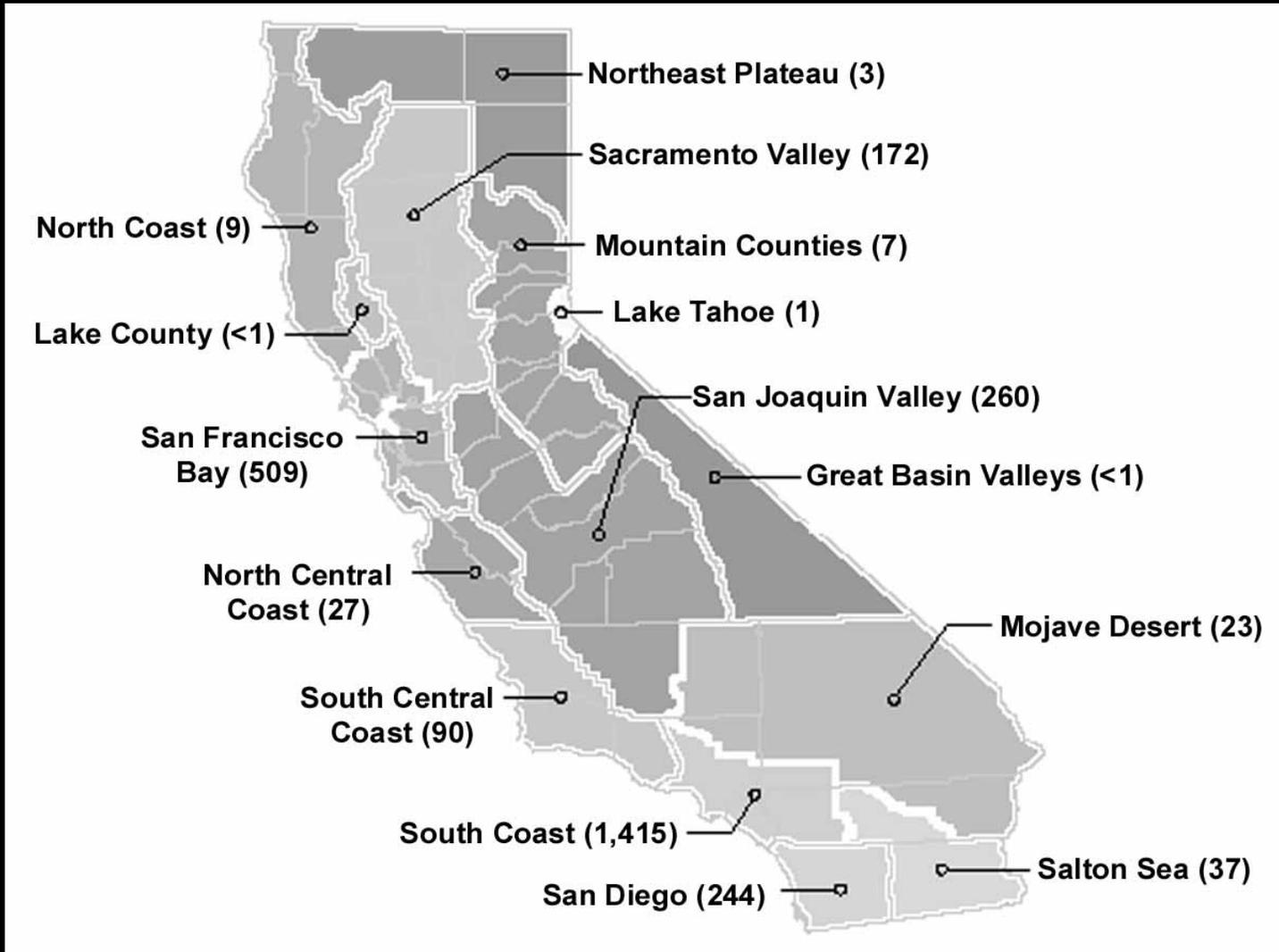
Methodology: Economic Impacts

Health End Point	1990	2020
Premature Mortality	\$6,300,000	\$8,000,000
Chronic Bronchitis	\$340,000	\$430,000
Hospitalizations		
Chronic Obstructive Pulmonary Disease	\$12,378	\$12,378
Cardiovascular Illness	\$18,387	\$18,387
Asthma Admissions	\$6,634	\$6,634
Asthma ER	\$286	\$286

Source: EPA 2003 Draft RIA: Control of Emissions from Non-Road Diesel Engines



Results: 3000 Premature Deaths in 2004



- Image Source: California Air Resources Board. Results are based on the mean

Results: 2004 Economic Impacts

Health Endpoints	Estimated Mean No. of Incidences in 2004					
	Sacramento Valley	San Diego	San Francisco Bay Area	San Joaquin Valley	South Coast	Statewide
Premature Mortality	172	244	509	260	1,415	2,980
Chronic Bronchitis	154	219	459	234	1,273	2,682
Hospital Admissions	253	359	751	383	2084	4391
Total Estimated Health Costs (millions of 2004\$)	\$1,242	\$1,763	\$3,688	\$1,884	\$10,241	\$21,575

- **Statewide Impacts - \$21 billion/year**
- **South Coast - \$10 billion/year**



Results: 2020 Health and Economic Impacts



- 1,500 premature deaths, \$12 billion/year in 2020
- 38,000 premature deaths between 2004 and 2020



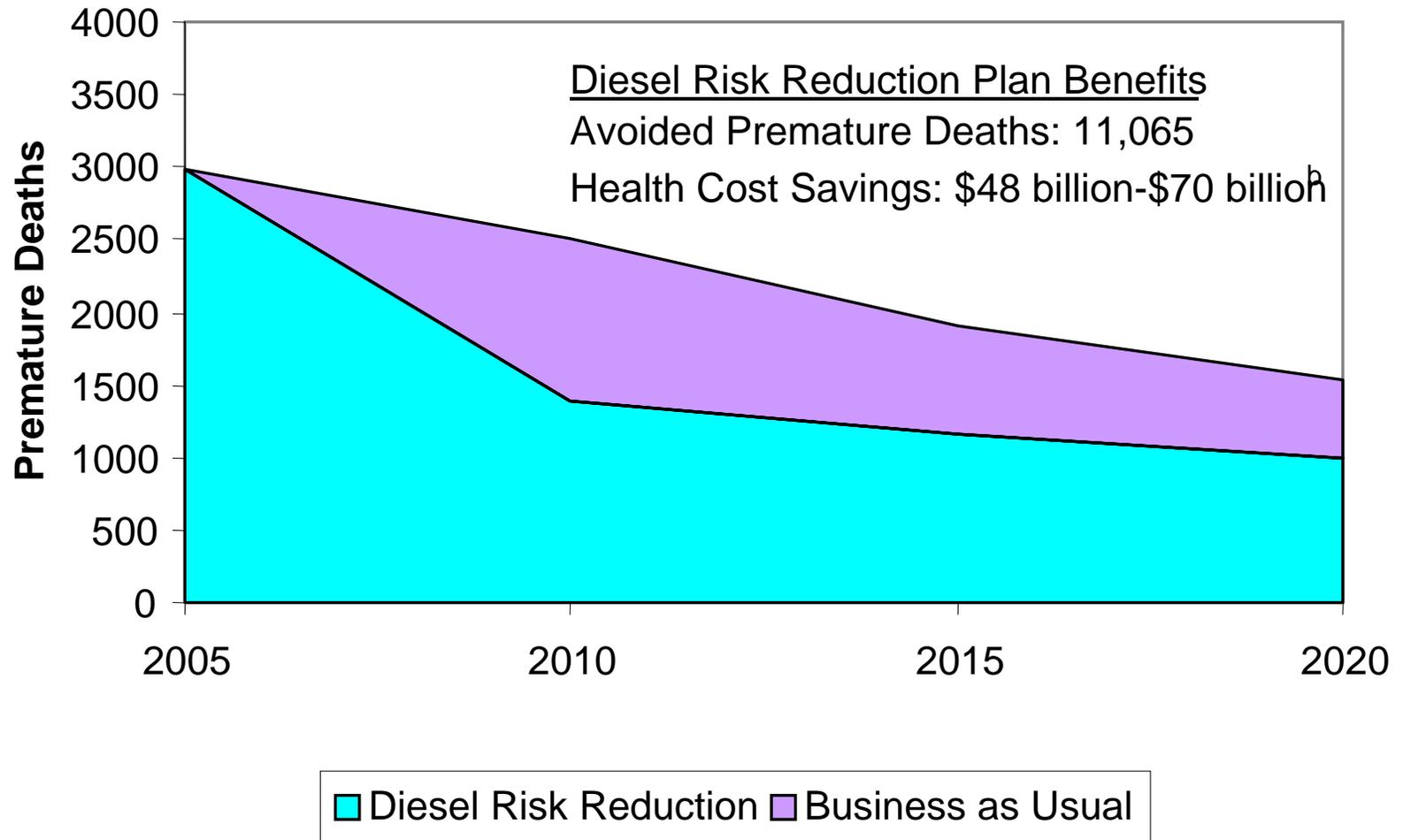
Diesel Risk Reduction Plan

- Can we further accelerate diesel emission reductions?
- DRRP Goals
 - 75% by 2010 (from 2000)
 - 85% by 2020 (from 2000)
- Measures
 - Fuel & Engine Standards
 - Regulations
 - Incentive Programs





Comparing “Business as Usual” to “Diesel Risk Reduction”





Carl Moyer Incentive Program

- Pays for incremental cost of going above and beyond current emission standards and regulations
- Focused on NO_x, but achieves significant PM reductions through
 - Repowers
 - Replacements
 - Electrification and alternative fuels
- Marine, construction, transit, irrigation pumps, refuse trucks, and others.



Carl Moyer Program Cost-Benefit Analysis

- Evaluated the past performance of the program
- Evaluated benefits of future investments in program at \$100 million/year for 10 years
- Future program adjustments
 - project cost growth of 7% per year
 - project life lowered to 7 years from today's average of 9 years
- Health and Economic Benefits
 - >1200 premature deaths avoided
 - \$5 to \$8 billion in economic savings



Key Conclusions from Moyer Cost-Effectiveness Analysis

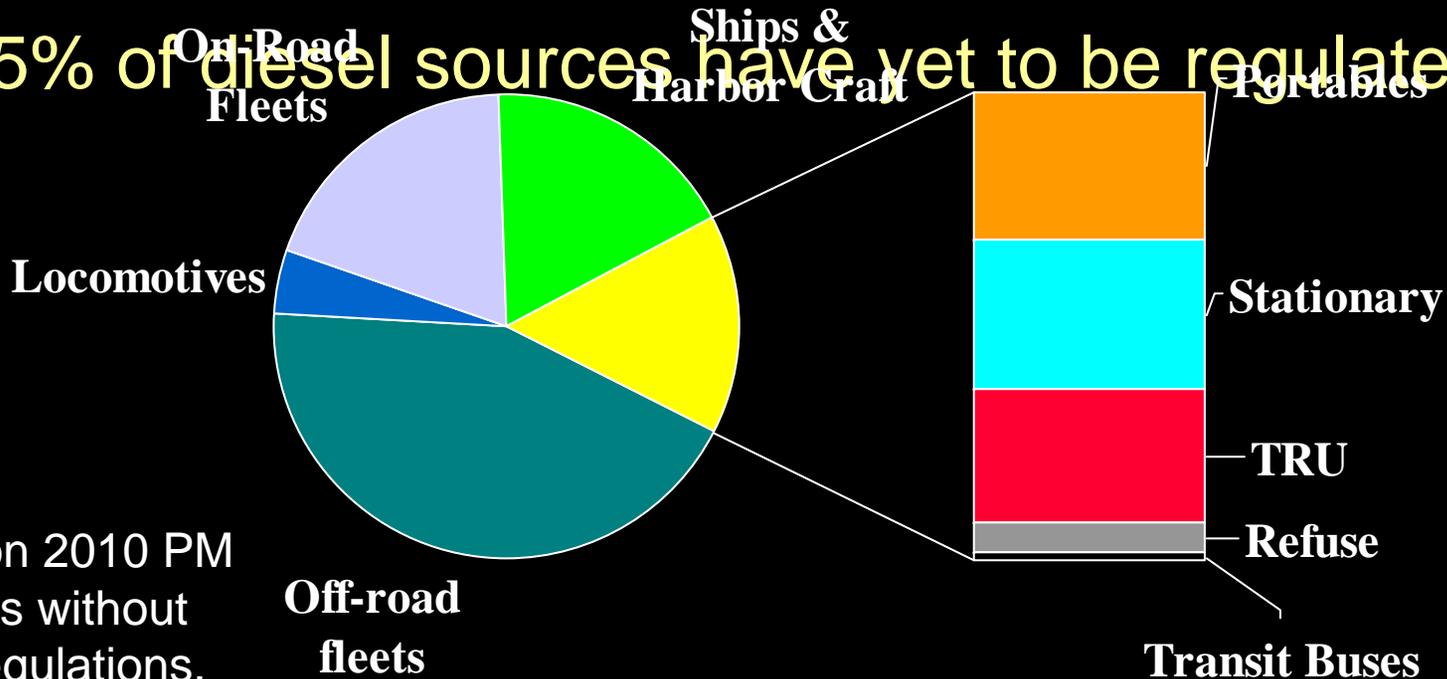
- For every \$1 invested, the Carl Moyer Program (CMP) has reduced health costs by \$9 to \$16
- The CMP could continue to provide 10 to 1 benefits to costs for the next decade
- The cost of avoiding a premature death thru the CMP is just 2 cents per Californian





Can CA meet the 2010 goals?

- Regulations are the cornerstone of achieving DRRP 2010 Goals
- \$/ton cost-effectiveness similar to the Moyer Program
- 85% of diesel sources have yet to be regulated



•Based on 2010 PM emissions without DRRP regulations.
 •Total = 20,500 TPY



Policy Conclusions

- California

- Aggressively develop regulatory programs (cornerstone to achieving goals of Risk Reduction Program)
- Fully fund the Moyer Program
- Provide stable school bus funding

- US EPA

- Pass new engine stds for trains and ships
- Develop retrofit regulations & voluntary incentives based on CA and TX
- Help CA reduce pollution from trains, ports/ships, long-haul trucks



THANK YOU

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