


Improving Air Quality Benefits Public Health and Economy



**Shankar B. Prasad, M.B.B.S.
Deputy Secretary for Science &
Environmental Justice**



California Environmental Protection Agency

California's Strong Economy

- **Sixth largest economy in world**
- **20% of U.S. trade**
- **Trade tripled by 2020**
- **Largest agricultural productivity in U.S.**
- **36 million, diverse population**



California takes the initiative on Climate Change

“I say the debate is over. We know the science. We see the threat. And we know the time for action is now.”

**--Governor Schwarzenegger
UN World Environment Day
June 1, 2005**



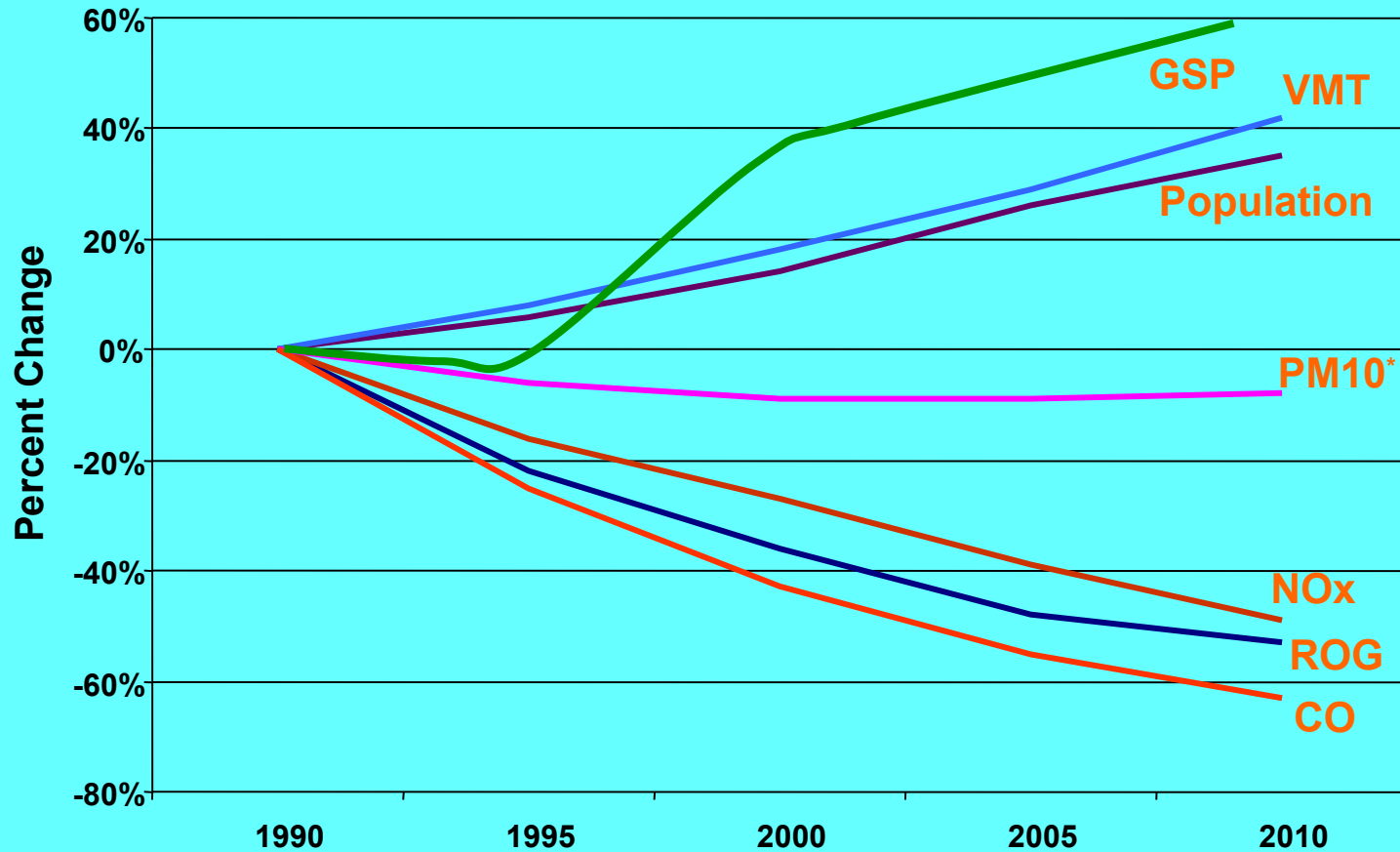
Executive Order Established Statewide GHG Targets

- **By 2010, Reduce to 2000 Emission Levels***
- **By 2020, Reduce to 1990 Emission Levels****
- **By 2050, Reduce to 80% Below 1990 Levels**

**** Equals 60 Million Tons Emission Reductions,
11% Below BAU***

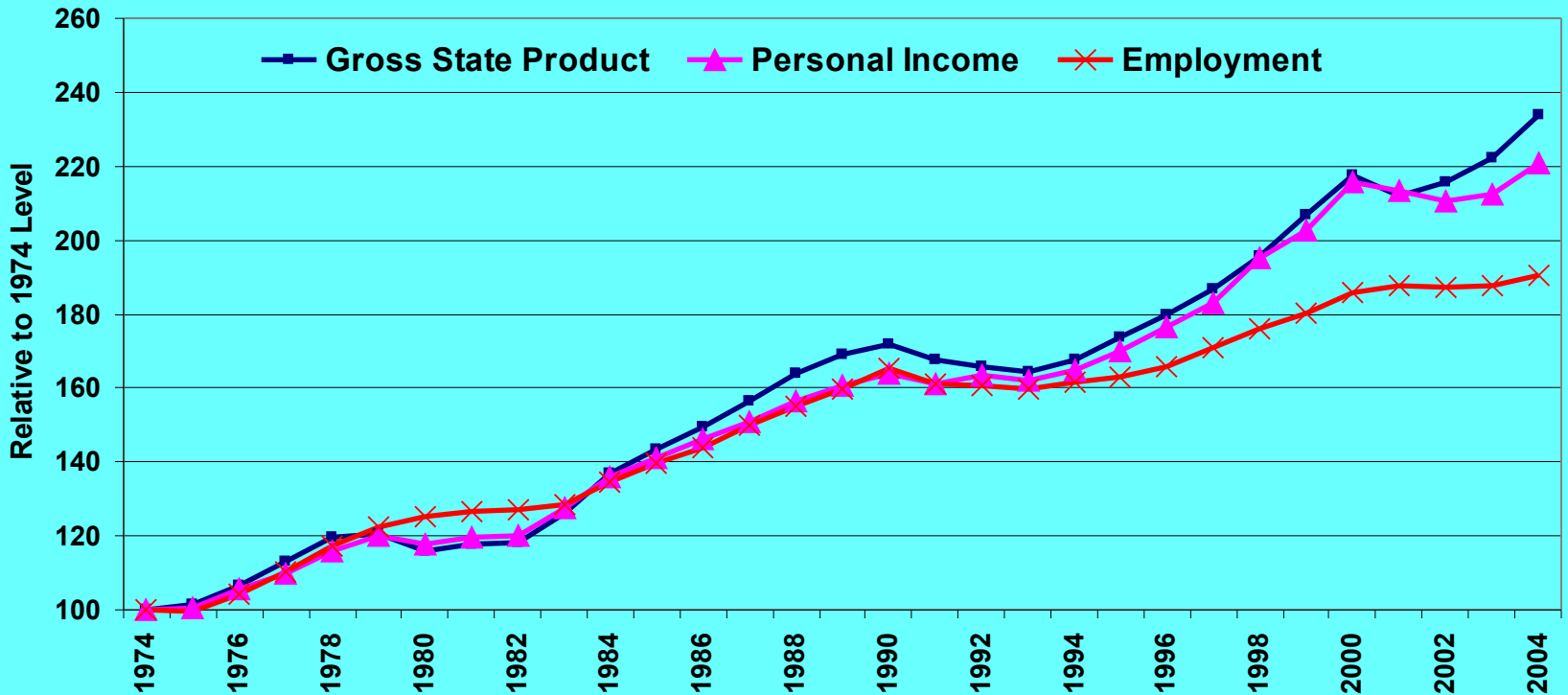
***** Equals 175 Million Tons Emission Reductions,
25% Below BAU***

Air Emissions & Growth Trends (Statewide)



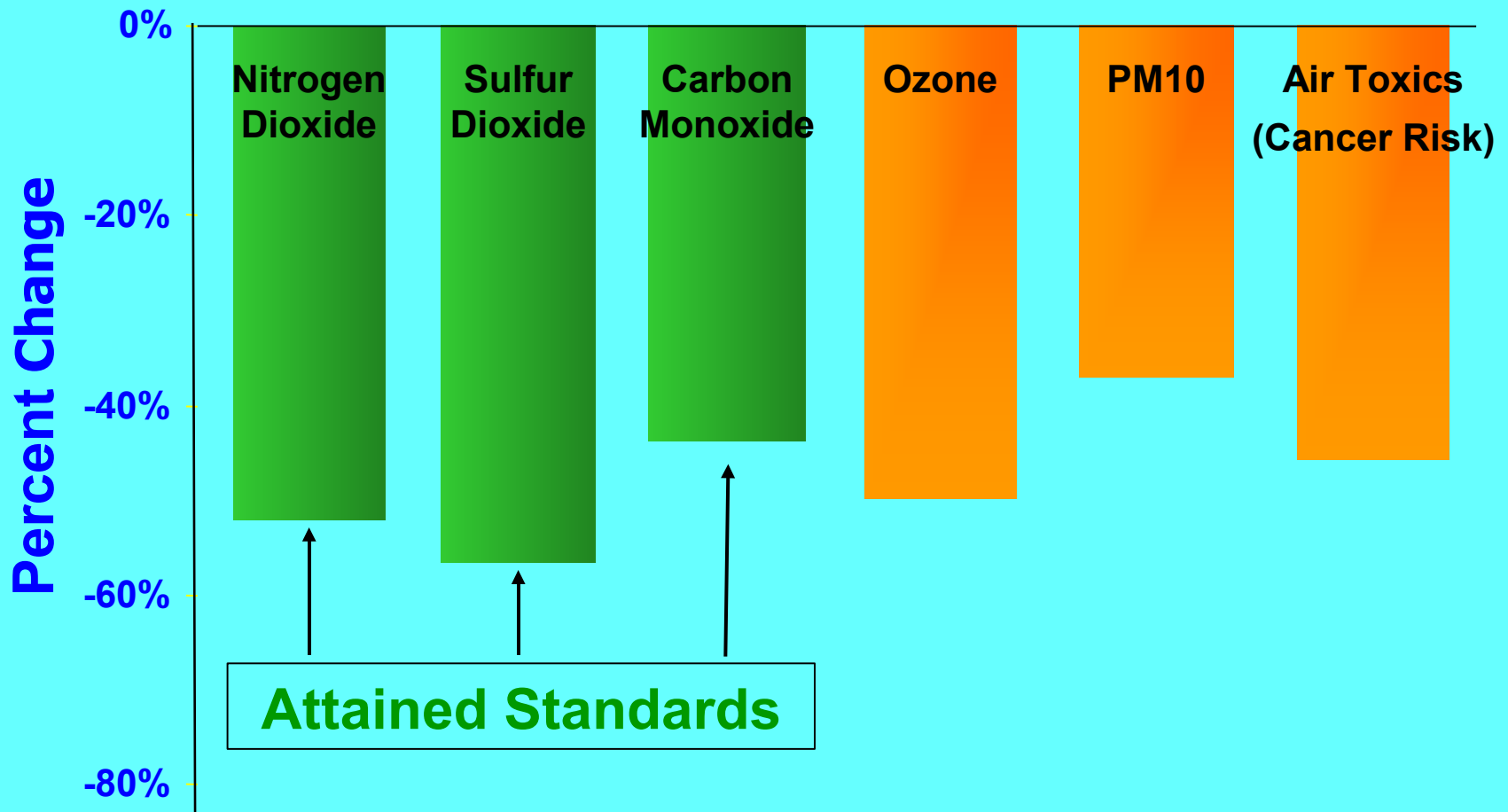
* Weighted based on source apportionment for typical urban area in California, assuming 50:50 direct:secondary split

The California Economy Has Doubled in 30 Years

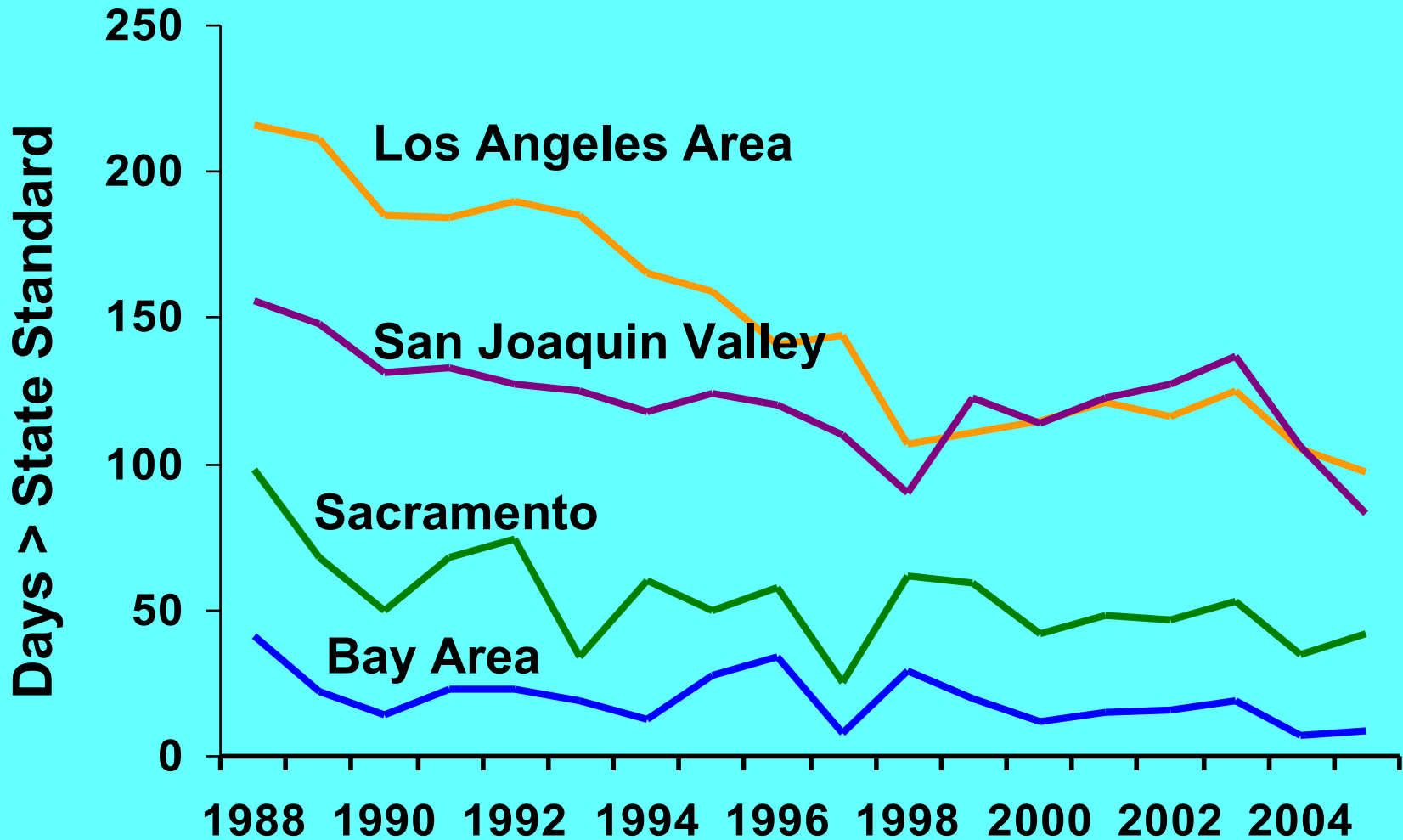


Source: California Department of Finance

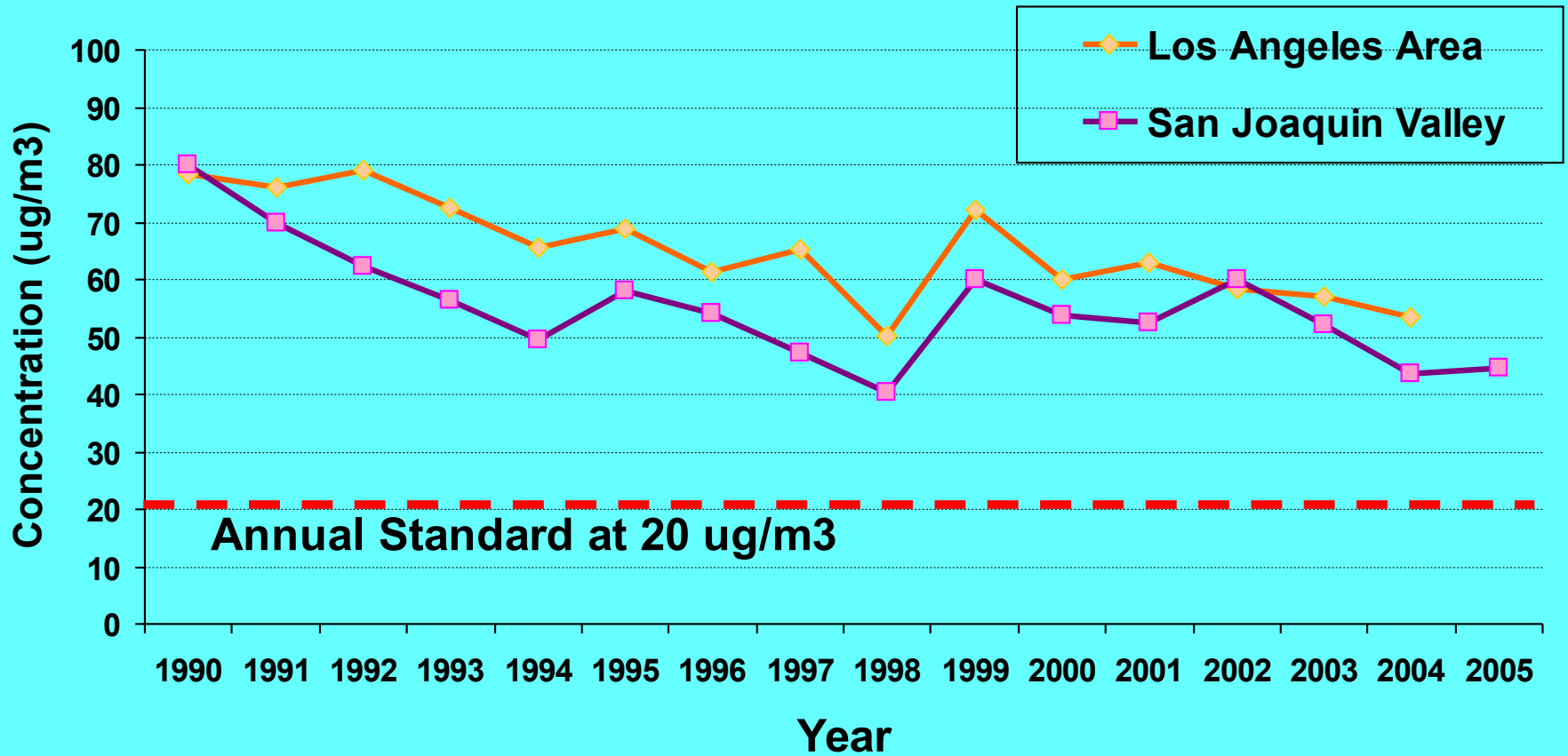
Air Quality Improvement Over Past 20 Years



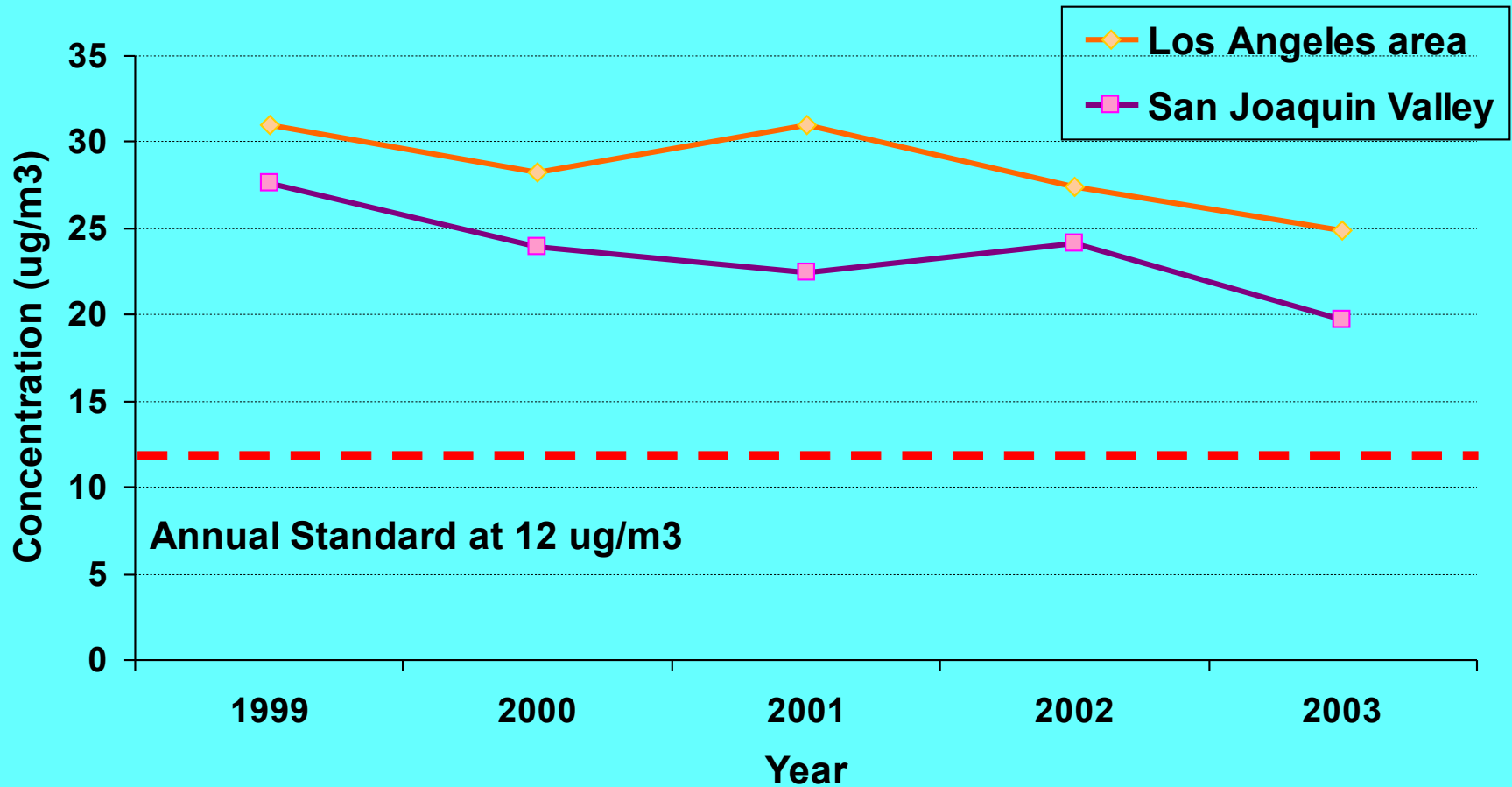
Unhealthy Ozone Days



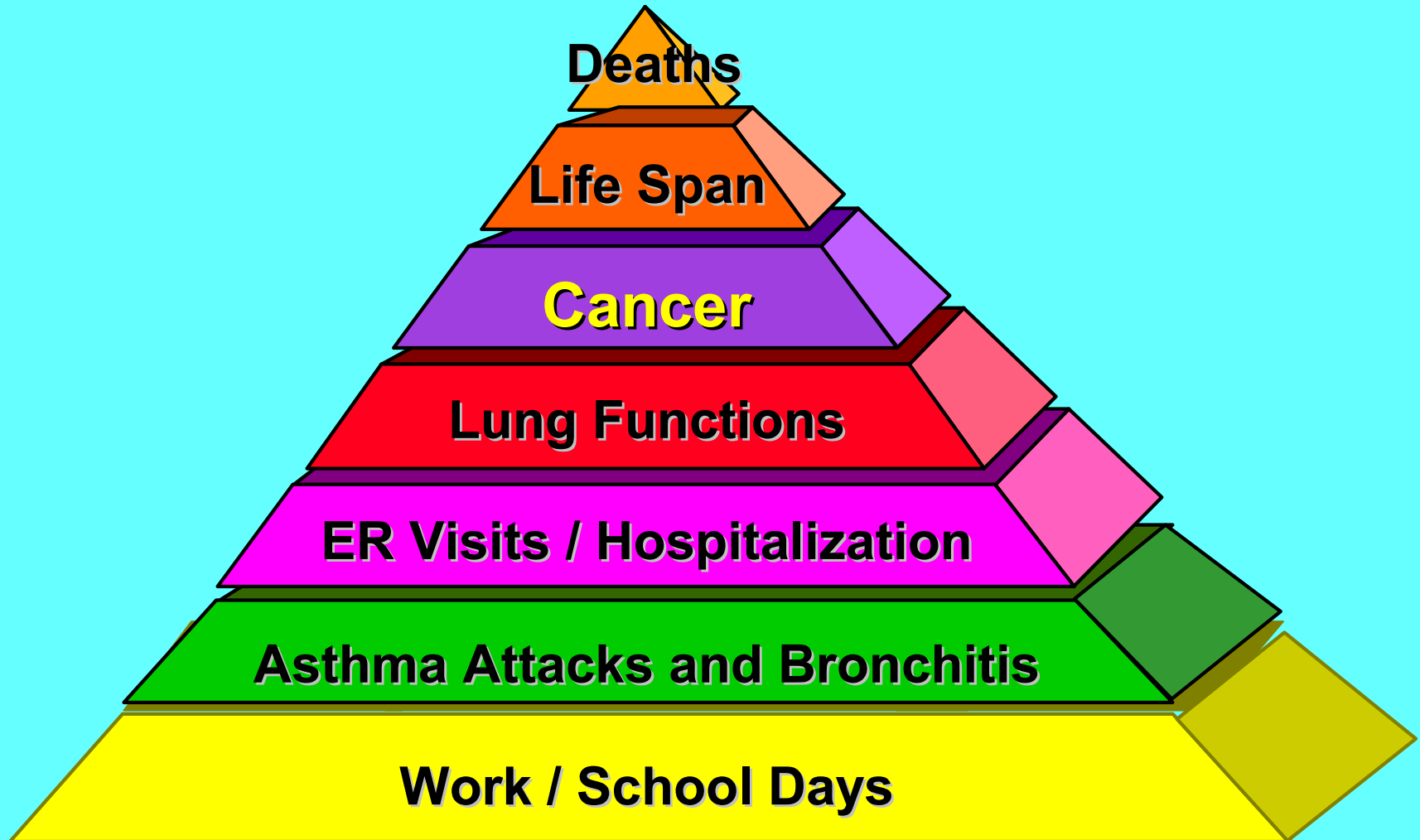
Ambient PM10 Levels (Annual Average)



Ambient PM2.5 Levels (Annual Average)



Health Impacts of Air Pollution



Non-Quantifiable Responses

- **Resistance** ↑
- **Permeability** ↑
- **Inflammation** ↑
- **Clearance** ↓
- **Breathing Capacity** ↓
- **Exercise Tolerance** ↓

Magnitude of Health Benefits

(Attaining California PM & Ozone Standards)

Impacts	Cases Avoided / yr.	
	<u>PM2.5</u>	<u>Ozone</u>
Premature Deaths	6,500	630
Hospital / Emergency Room Admissions	4,700	4,900
Asthmatic Attacks	170,000	
Chronic Bronchitis	5,700	
Respiratory Symptoms in Children	417,000	
Minor Restricted Activity Days	7,400,000	3,100,000

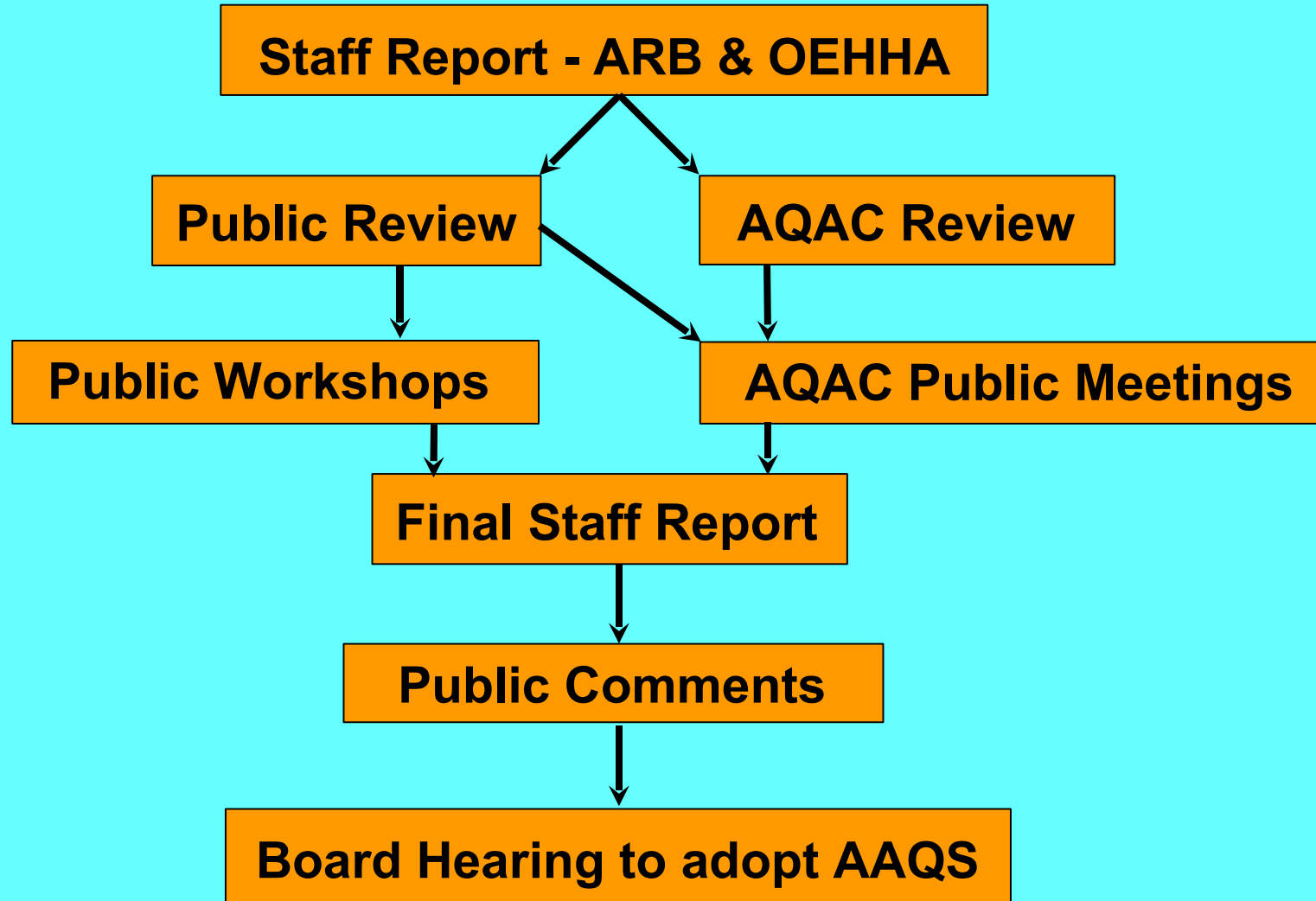
Annualized Cost of Impacts (California)

P r e m a t u r e D e a t h s	\$ 4.3 B i l l i o n
H o s p i t a l i z a t i o n & T r e a t m e n t	\$ 3.5 B i l l i o n
A s t h m a T r e a t m e n t	\$ 1.3 B i l l i o n
L o s s o f W o r k	2.8 M i l l i o n d a y s
S c h o o l A b s e n c e s	1.3 M i l l i o n d a y s

California Ambient Air Quality Standard

- Based health and welfare Impacts
- Represents safe level
- Has four parts:
 - Pollutant definition
 - Concentration
 - Averaging time
 - Monitoring Method
- Is baseline for SIP

The Standard Setting Process



Ozone and PM Standards (California)

	1-hr (ppm)	8-hr (ppm)	24-hr ($\mu\text{g}/\text{m}^3$)	Annual ($\mu\text{g}/\text{m}^3$)
Ozone	0.09	0.070* <0.08>★	--	--
PM 10	--	--	50 <150>	20* <50>
PM 2.5	--	--	--	12* <15>

* New standards adopted within last three years

★ Federal standards are in green

Health Concerns of Ozone Exposure

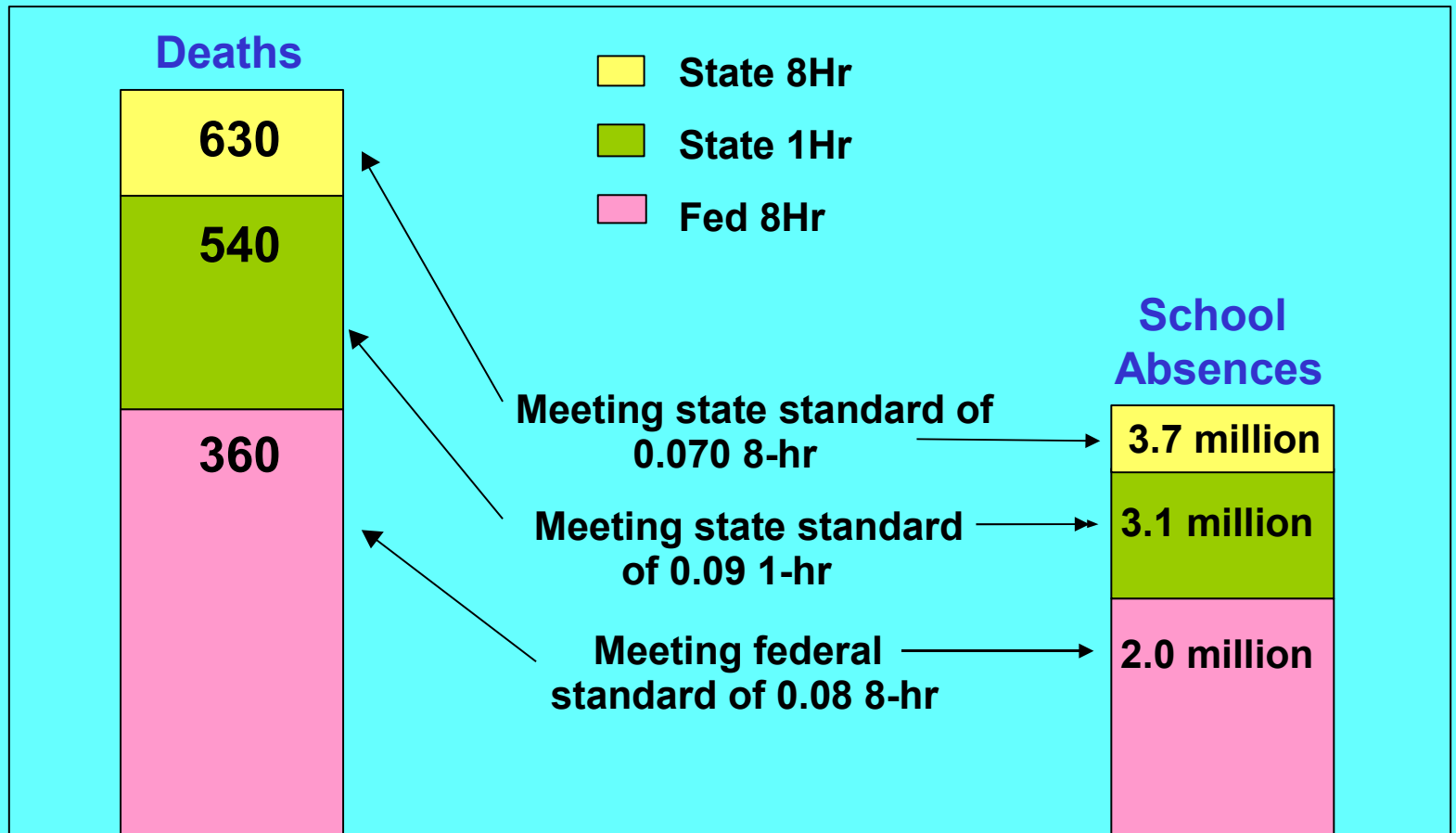
- **Affects large population segments**
- **Risk proportional to amount inhaled**
- **Greatest risk to people who are active outdoors**
 - **Adults who exercise or work outdoors**
 - **Children**

Health Basis for Setting New 8-Hr AAQS at 0.070 ppm

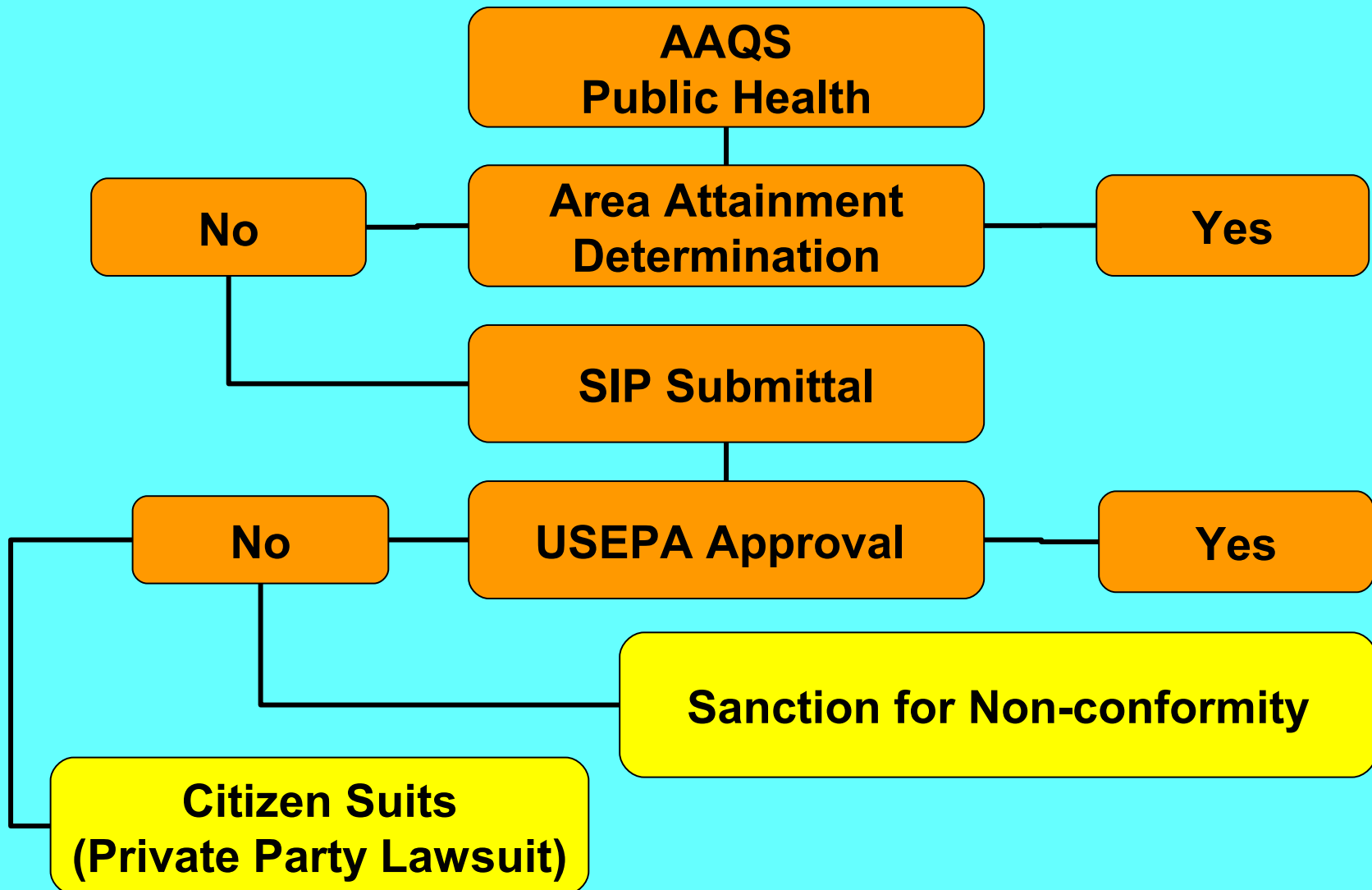
- **Controlled human exposure studies report symptoms, lung function changes, and airway responsiveness effects at 0.08 ppm**
- **26% of individuals exhibited large changes with 6.6-hour exposure to 0.08 ppm**
- **Studies at 0.04 and 0.06 ppm reported no significant effects**

Incremental Impacts Analysis

Additional Avoided Cases per Year with Attainment of CA 8-hr Ozone Standard



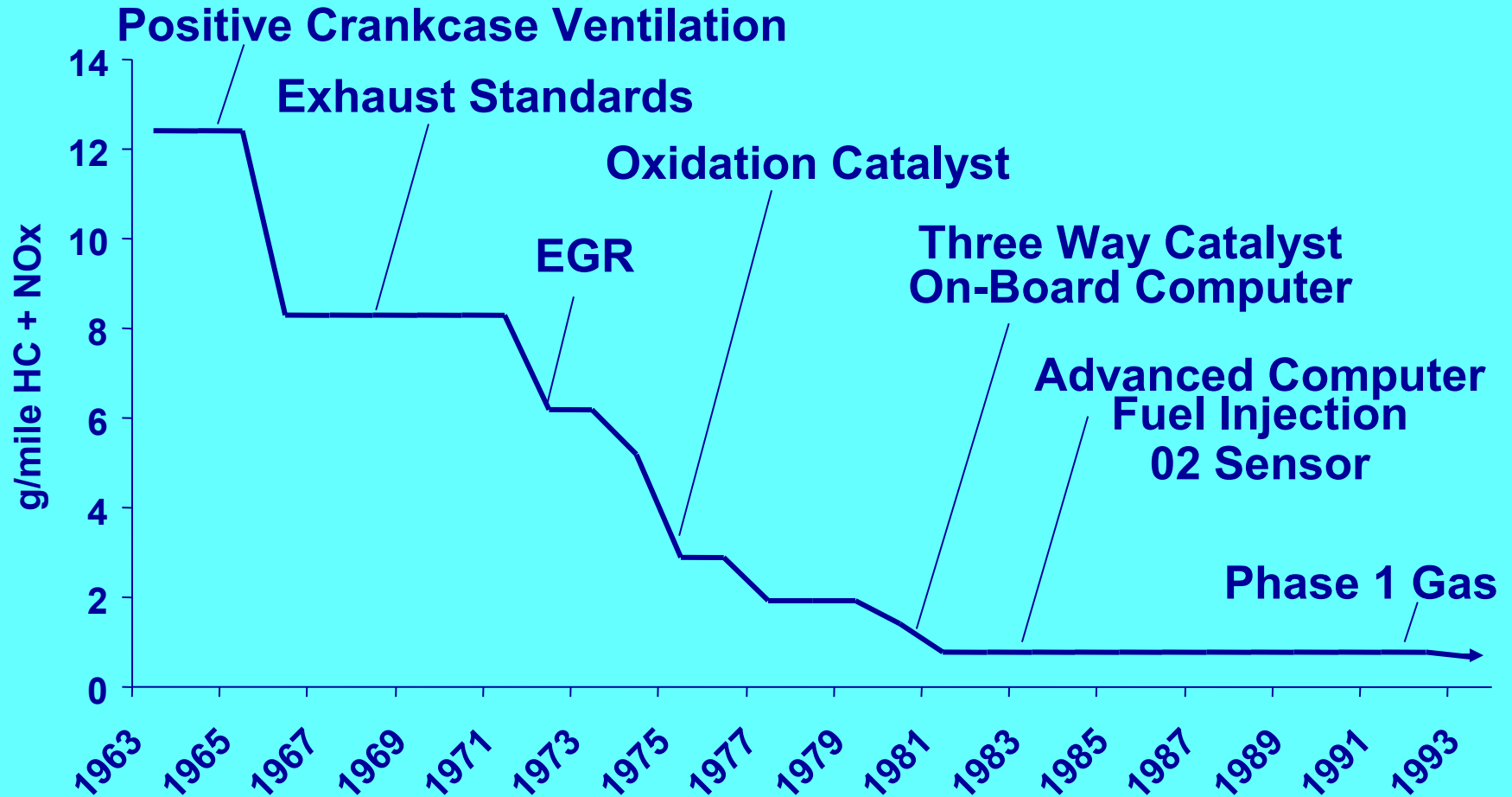
State Implementation Plan (SIP)



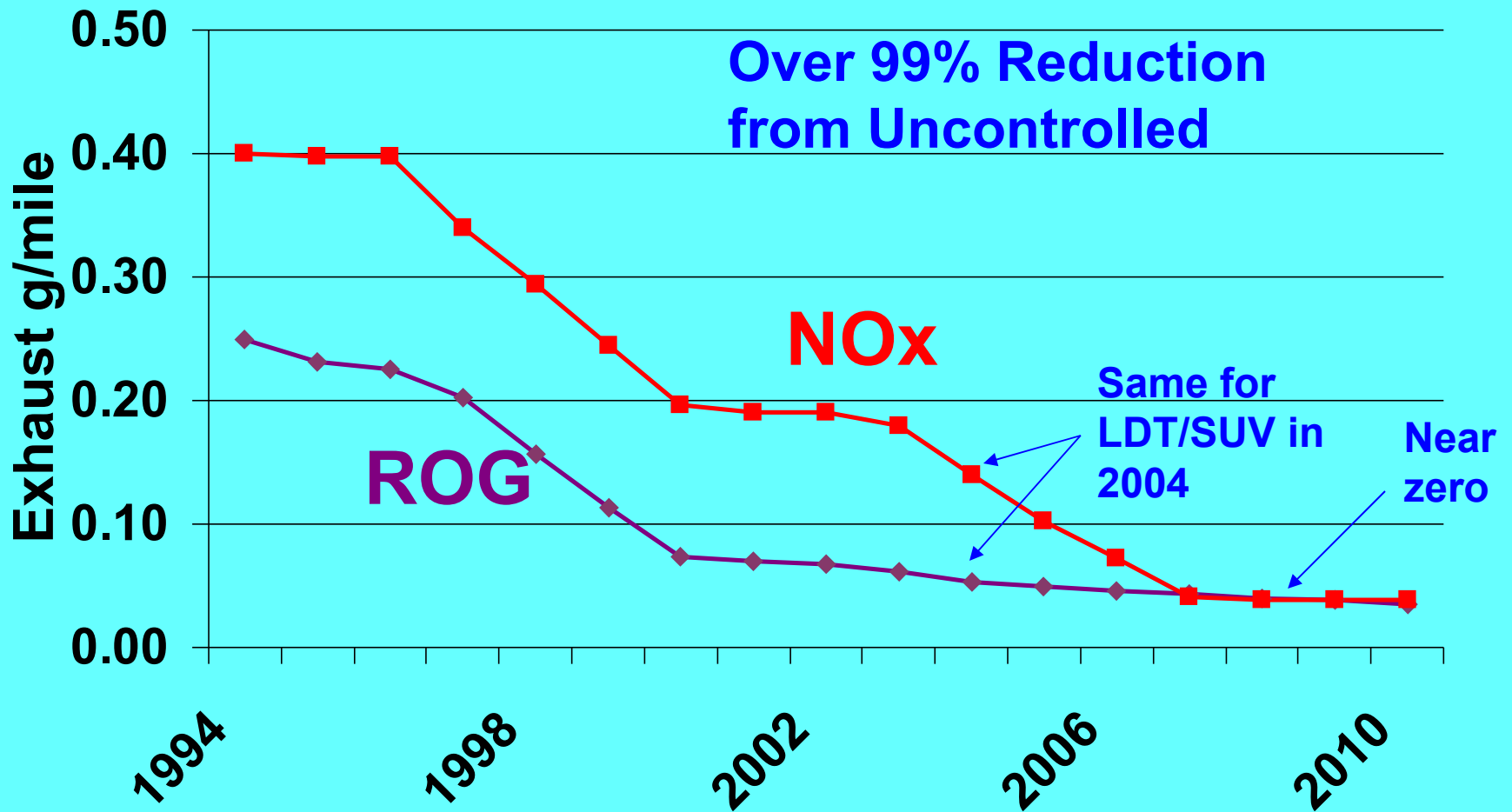
Consequences of Failure to Attain

- **FCAA Title I S179**
 - Highway sanctions
 - Reduce emission offsets allowance
- **FCAA Title III S304**
 - A citizen can bring an civil action against US EPA administrator, government, and source operators / owners

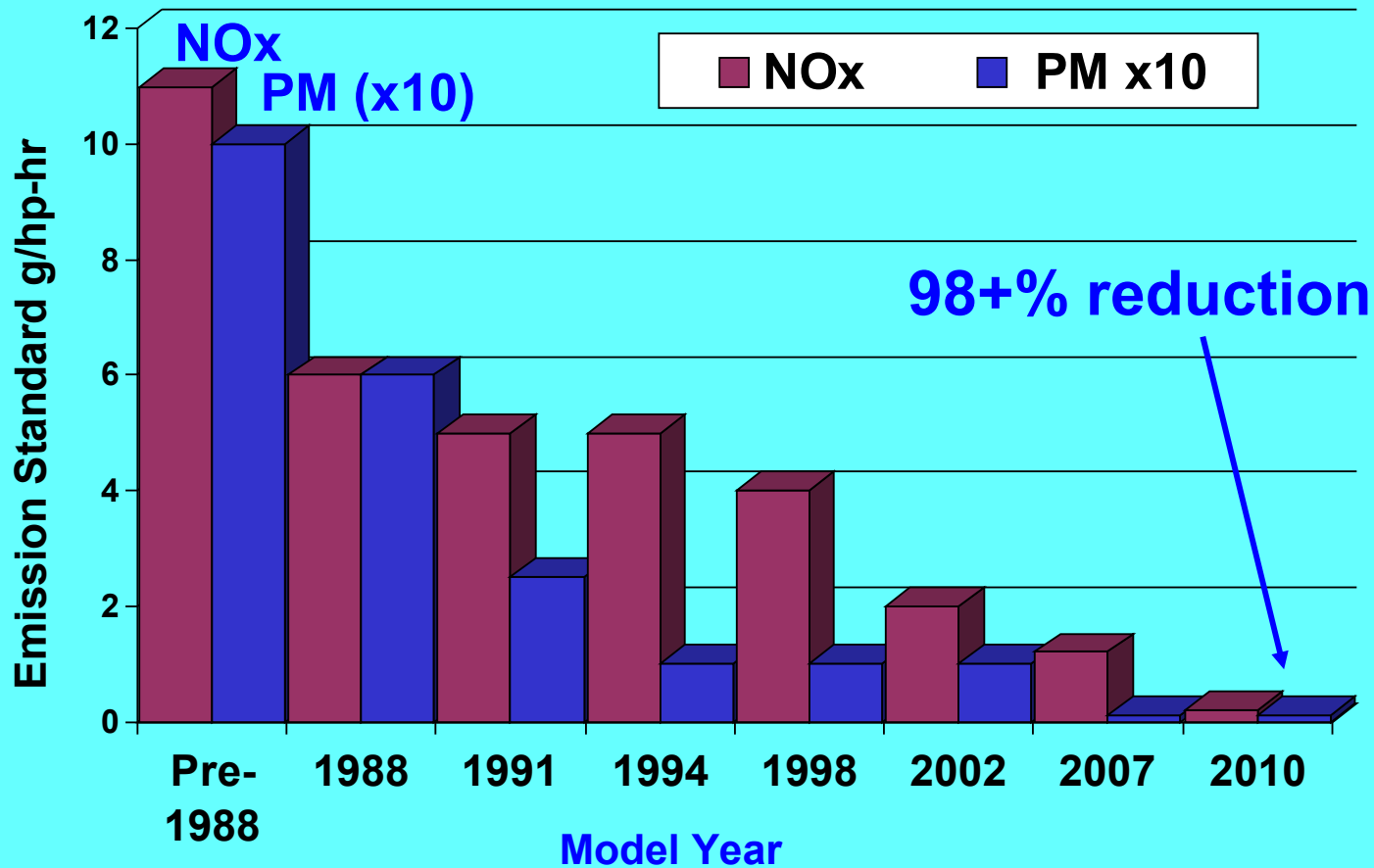
Evolution of CARB Auto Controls Implementation: 1963 - 1993



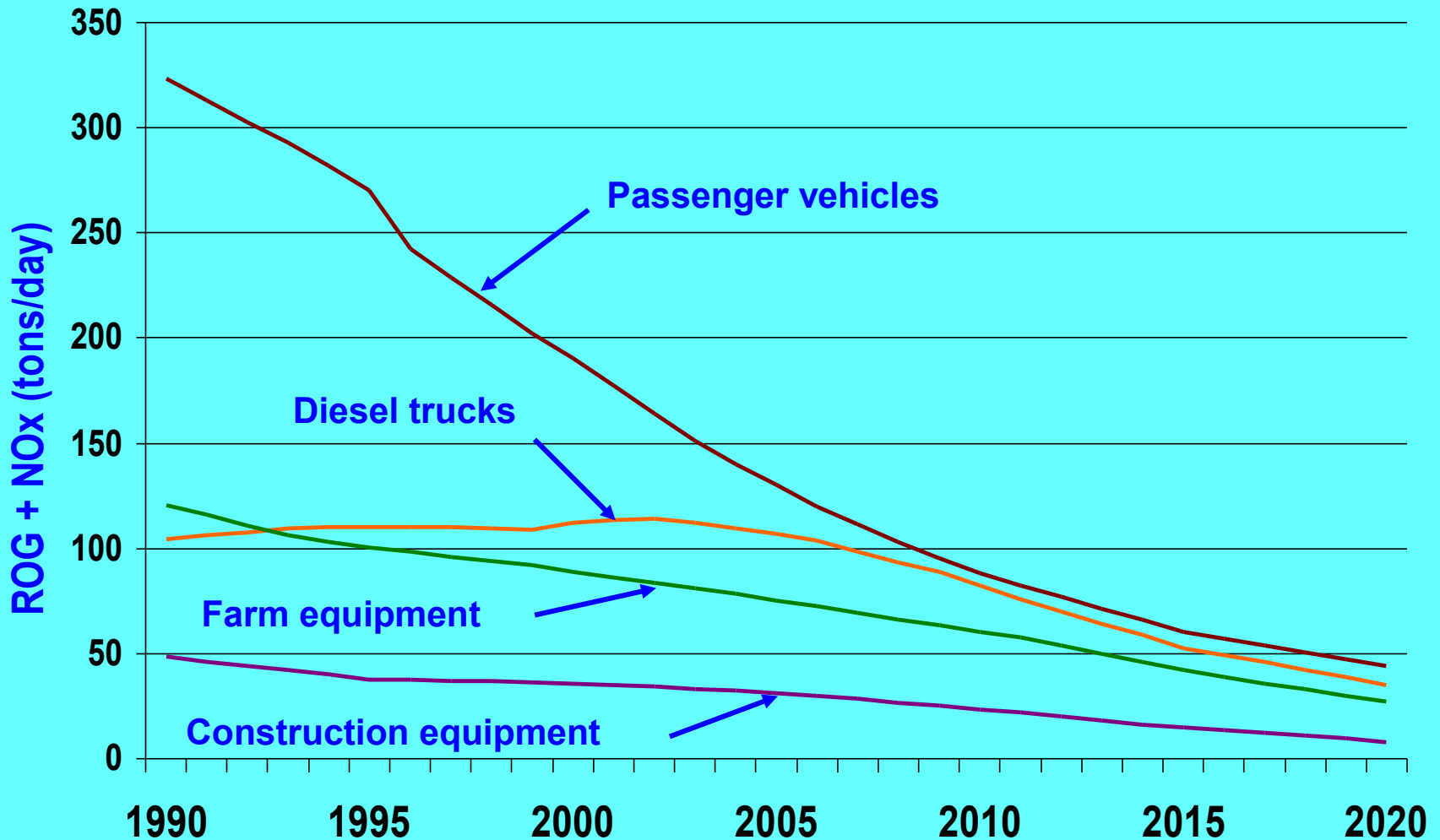
California Emission Standards for New Cars



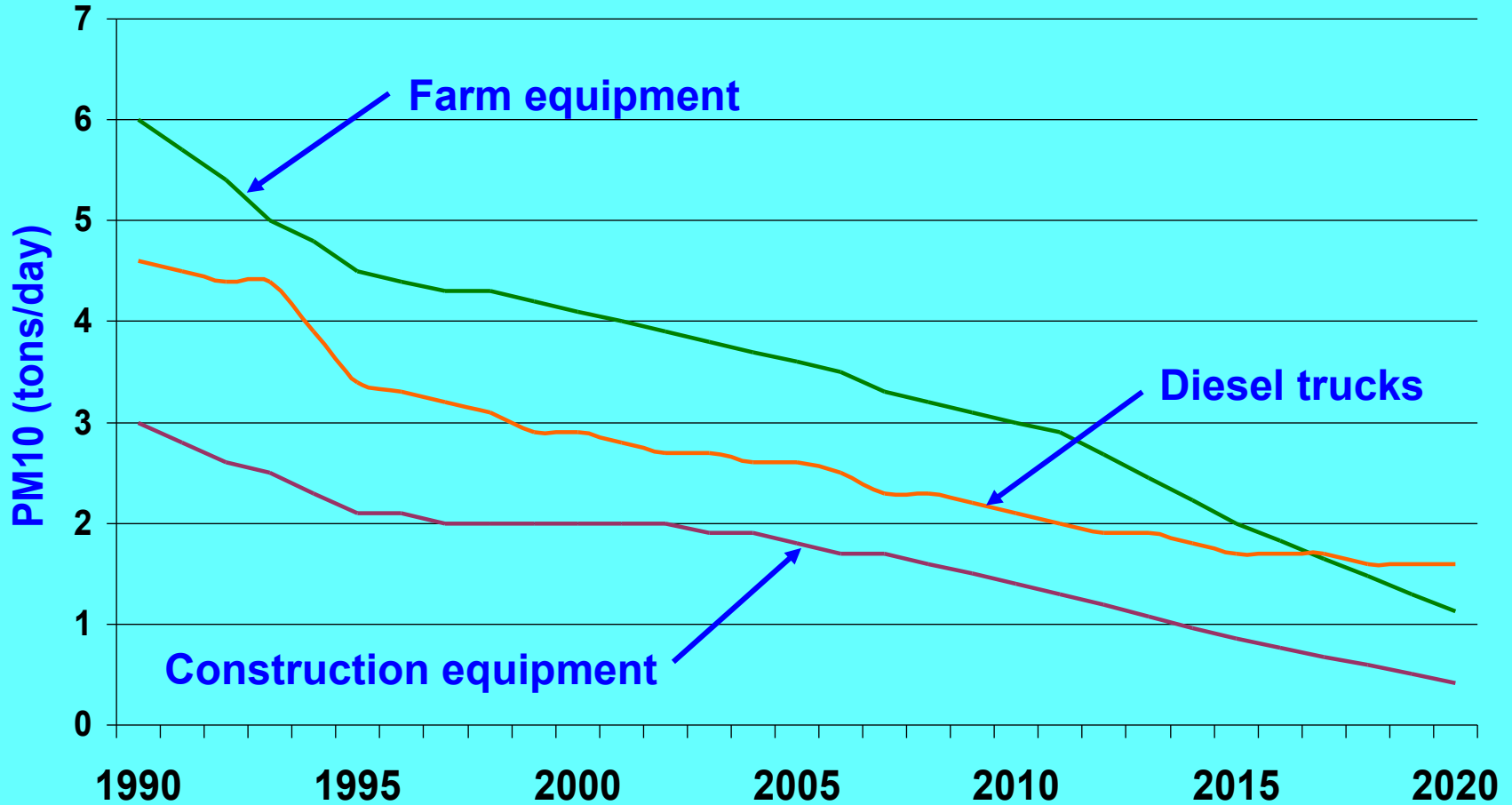
Heavy-Duty Truck New Engine Standards



Smog-forming Emissions Are Going Down



Particulate Emissions From Diesels Are Declining

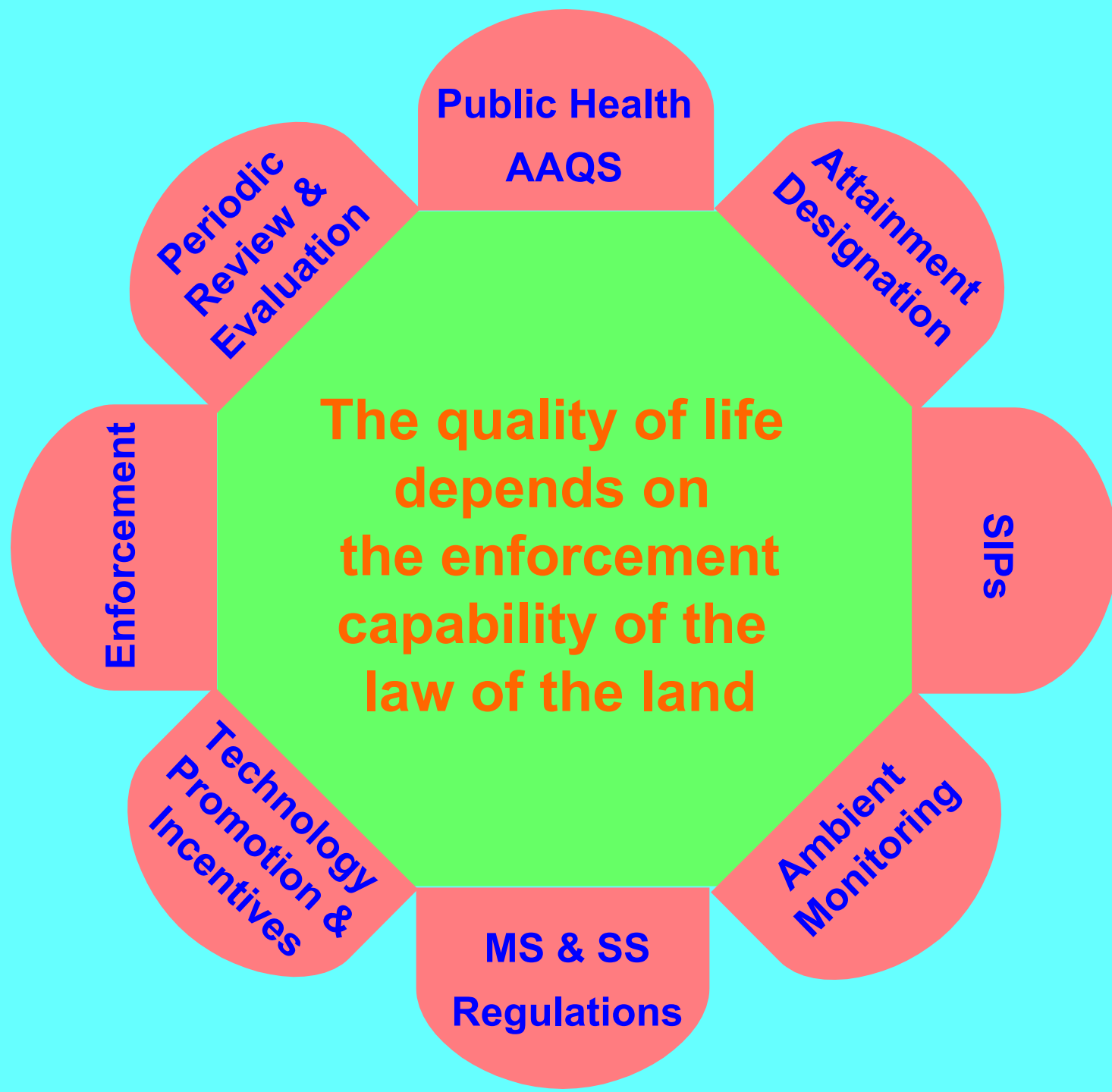


Fuel Program Benefits

Program	Emissions Reductions (tons / day)					
	HC	NOx	PM	SOx	CO	Toxics
Diesel (1993)	--	70	20	80	--	25%
CaRFG1 (1992)	210	--	--	--	--	--
CaRFG2 (1996)	190	110	--	30	1300	40%
CaRFG3 (2003)	0.5	19	--	4	--	7%
Total	400	199	20	114	1300	na
% Change	15	10	25	80	6	na

Diesel Risk Reduction Plan (California)

- **ARB identified diesel PM as a toxic air contaminant in 1988**
- **Diesel PM accounts for 70% of cancer risk in California**
- **Contributes 2,900 deaths per year**
- **ARB adopted DRRP in 2000**
 - **75% reduction in diesel PM by 2010**
 - **85% reduction in diesel PM by 2020**



Take Home Messages

- **Air pollution negatively impacts public health, resources & economy**
- **Improving air quality promotes economic growth**
- **ABC's of air quality improvement**
 - **Acknowledgement**
 - **Big & bold actions w/o delay**
 - **Commitment on a long-term basis**
 - **Dedicated staff & resources**
 - **Enforcement**