Emission Projections for the EPA Section 812 Second Prospective Clean Air Act Cost/Benefit Analysis

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Prospective Analysis Steps:

1. Estimate air pollutant emissions in 1990, 2000, 2010, and 2020
2. Estimate the cost of emission reductions arising from CAAA
3. Model air quality based on emission estimates
4. Quantify air quality-related health and environmental effects
5. Estimate the economic value of cleaner air
6. Aggregate results and characterize uncertainty

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Presentation Outline

- Summary of Methods
- Summary of Results by Sector
- On-Road Emissions Findings
- EGU NO_x and SO_2 Findings
- Local Measures Analysis – 8-Hour Ozone Attainment Example

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Unique Features of this Analysis

- Use of consistent economic assumptions – across all sectors
- Analysis of with versus without CAAA emission paths
- First EPA analysis using 2002 emissions baseline
- RPO control factor files
- Modeling emission benefits of 8-hour ozone, CAVR, $PM_{2.5}$ NAAQS

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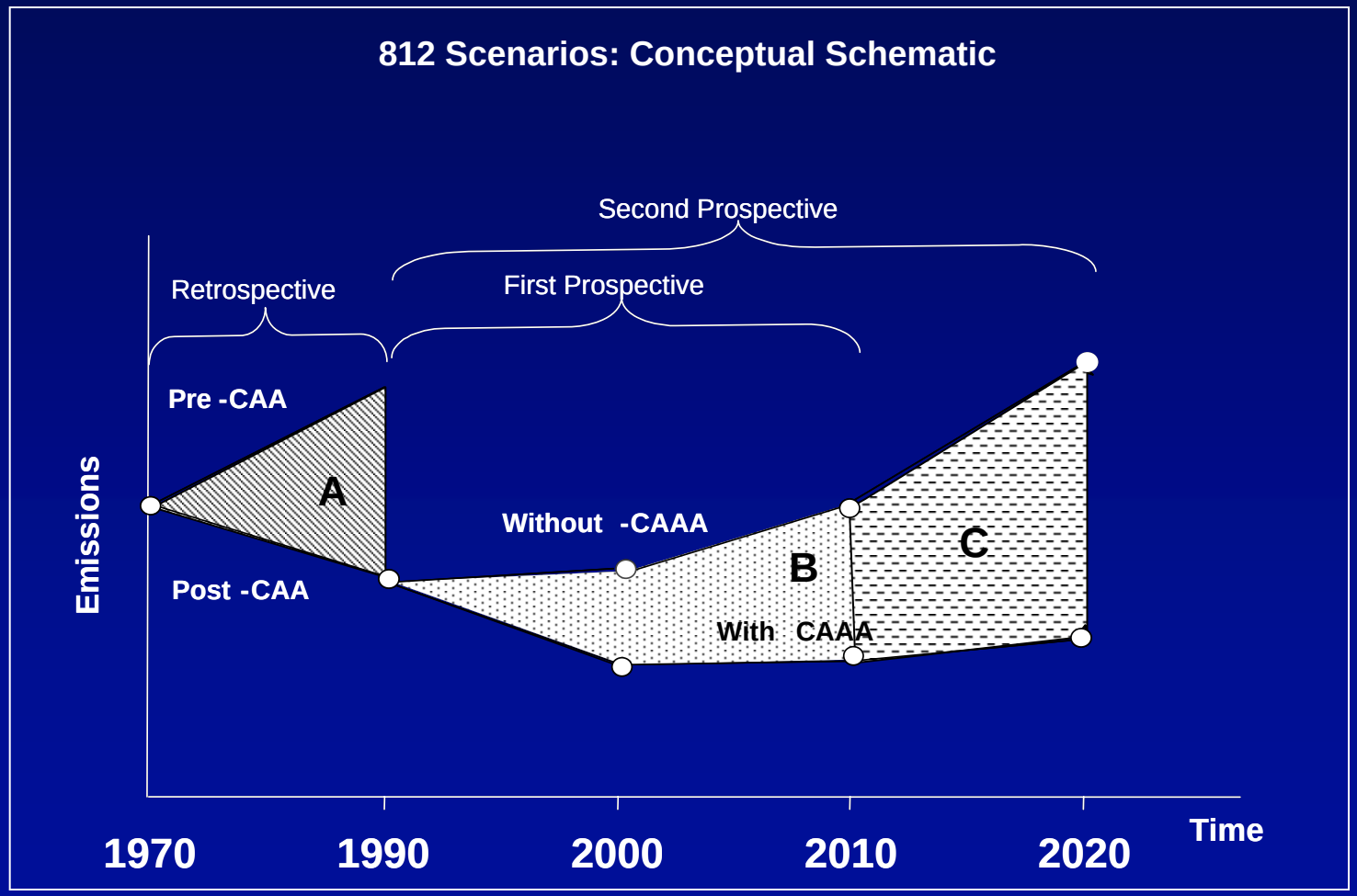
Summary of Methods



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Base Year Emission Data Sources

Sectors	*Without-CAAA* Scenario – 1990	*With-CAAA* Scenario – 2000
Non-EGU Point	1990 EPA Point Source NEI	2002 EPA Point Source NEI
EGU	1990 EPA Point Source NEI	Estimated by the EPA Integrated Planning Model for 2001
Off-Road/Nonroad	NONROAD 2004 Model Simulation for Calendar Year 1990	NONROAD 2004 Model Simulation for Calendar Year 2000
On-Road	MOBILE6.2 Emission Factors and 1990 NEI VMT Database	MOBILE6.2 Emission Factors and 2000 NEI VMT Database. The California Air Resources Board supplied estimates for California.
Nonpoint	1990 EPA Nonpoint Source NEI with Adjustments for Priority Source Categories	2002 EPA Nonpoint Source NEI

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Modeling Approach by Major Sector

Sectors	Activity Growth	Controls
Non-EGU Point	U.S. Department of Energy (DOE) *Annual Energy Outlook 2005* forecasts	Based on control factors developed by the five Regional Planning Organizations (RPOs), and California information from the California Air Resources Board (ARB)
EGU	DOE *Annual Energy Outlook 2005* forecasts	Integrated Planning Model
Off-Road/Nonroad	EPA NONROAD Model growth forecasts are largely based on historical trends in national engine populations by category/sub-category of engine	EPA NONROAD Model
On-Road	National VMT Forecast from *Annual Energy Outlook 2005*	MOBILE6.2 emission factors
Nonpoint	DOE *Annual Energy Outlook 2005* forecasts	Based on control factors developed by the five RPOs, and California information from ARB

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Major Rules That are Part of the "Wedge"

EGUs:

- Title IV SO_2 and NO_x
- NO_x SIP call
- *CAIR/CAMR/CAVR*
- NSR settlements
- State regulations

Onroad Mobile:

- Tier 1 and 2 tailpipe;
- Reformulated gasoline;
- NLEV;
- California LEV2 (in CA only);
- *Heavy-duty diesel fuel and engine standards*

Nonroad Engines:

- Phase I and II engine standards;
- *Nonroad Diesel Rule*

Non-EGU Point and Nonpoint:

- 2-yr, 4-yr,*7-yr, and 10-yr* MACT standards
- petroleum refinery settlements
- CAVR

NAAQS:

- PM_{10} and 1-hour ozone (for 2000);
- *$PM_{2.5}$ and 8-hour ozone (for 2010 and 2020)*

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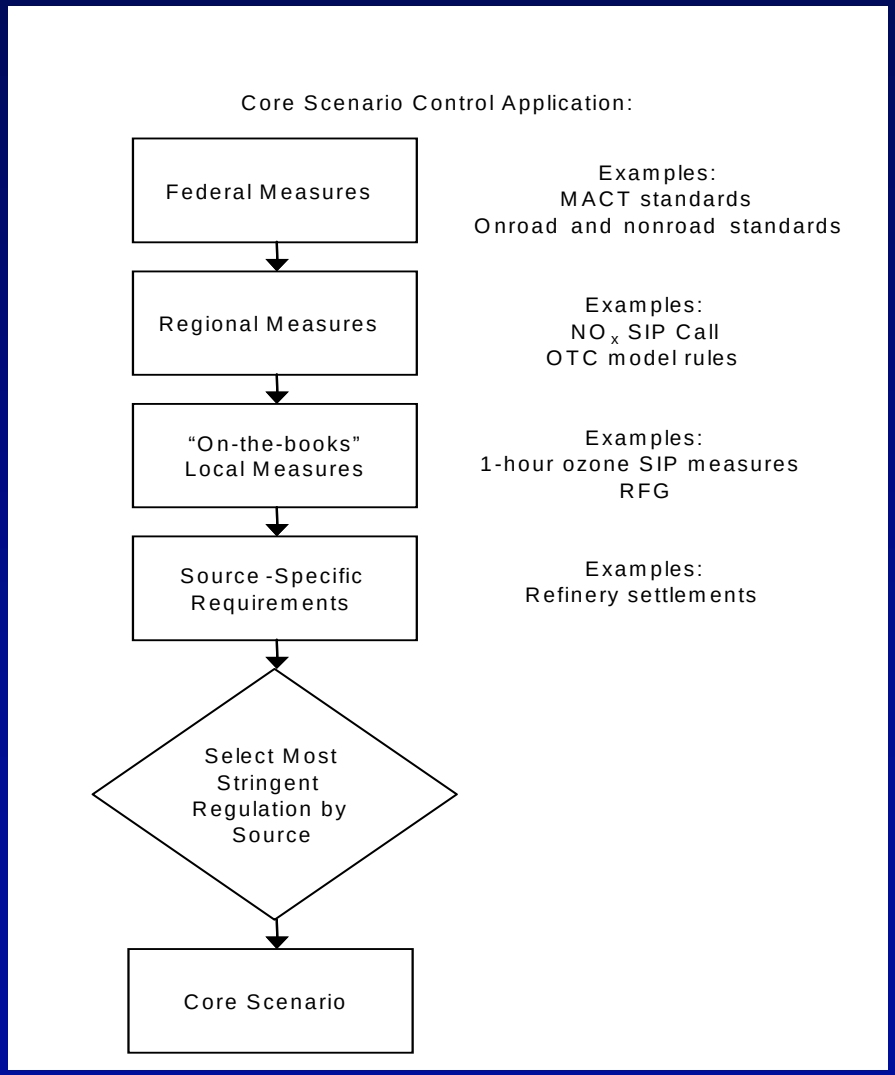
Sequencing of Federal, Regional, and Local Controls



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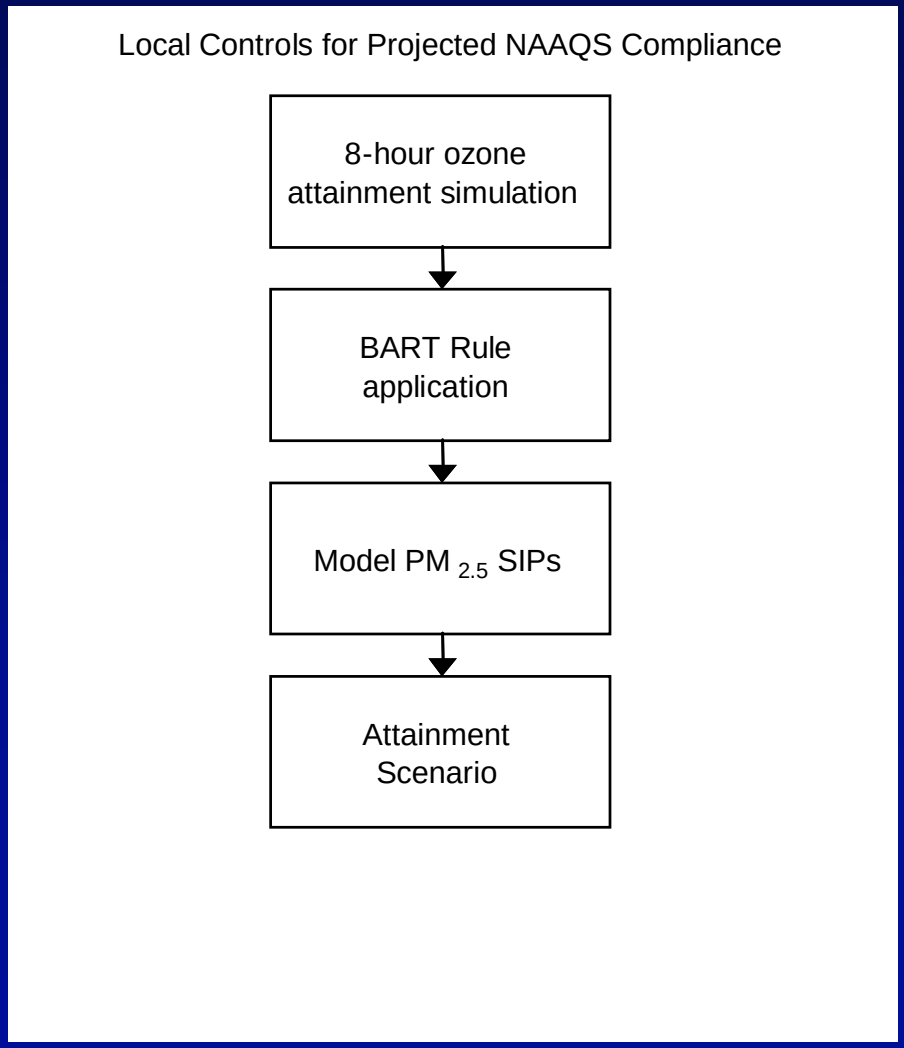
Sequencing of Federal, Regional, and Local Controls



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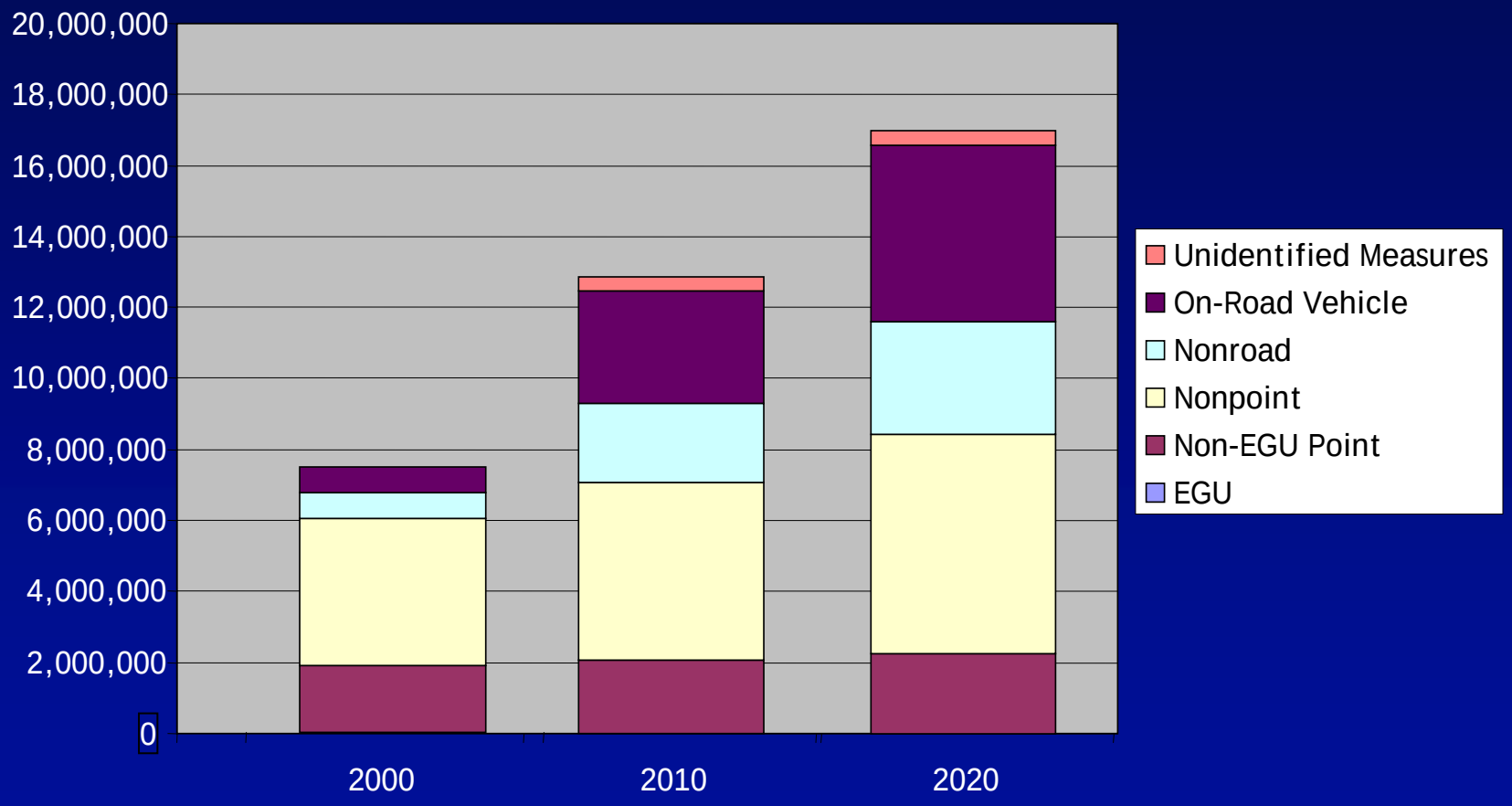
Summary of CAAA-Associated Emission Reductions - VOC



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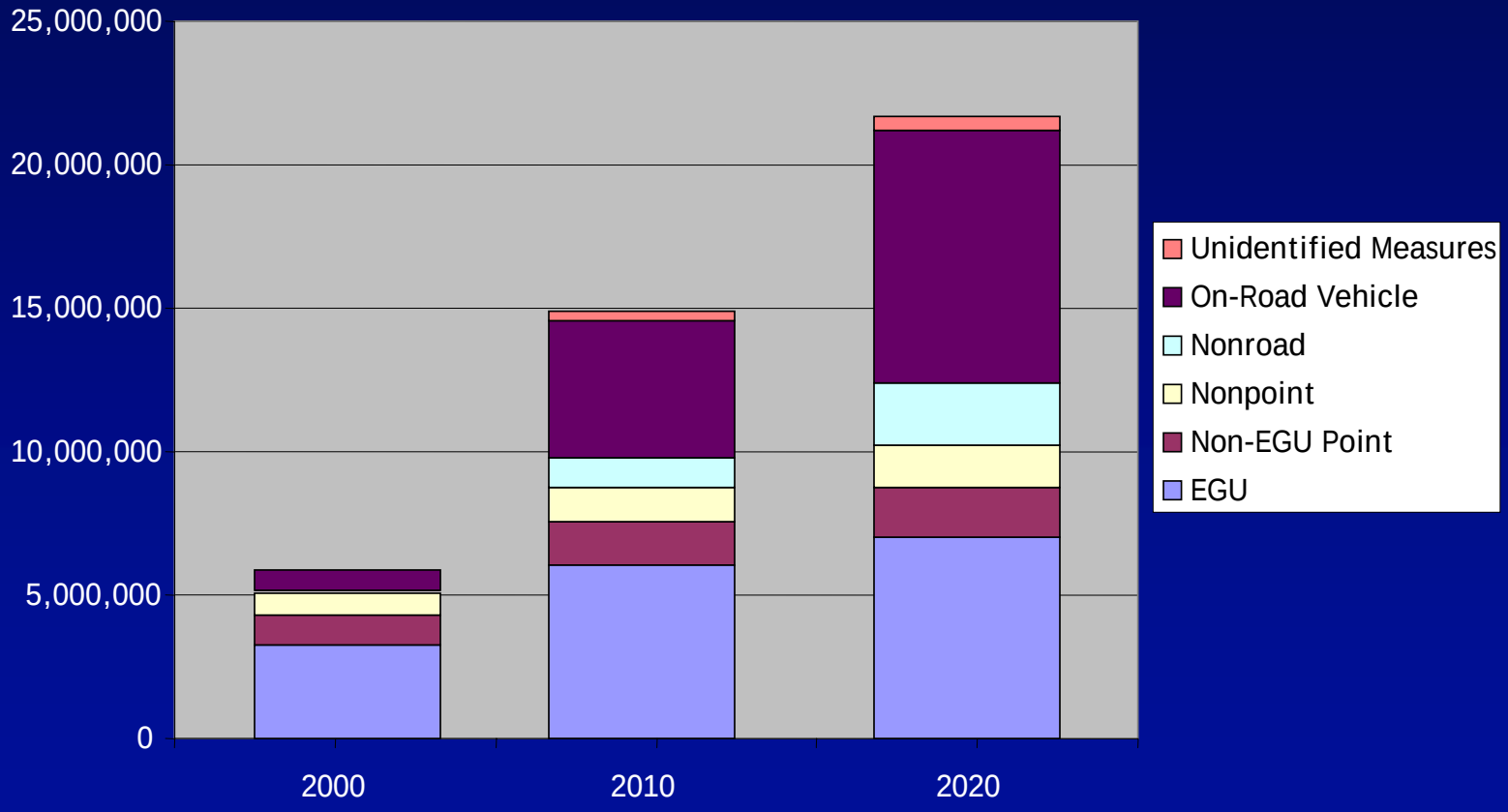
Summary of CAAA-Associated Emission Reductions - NO_x



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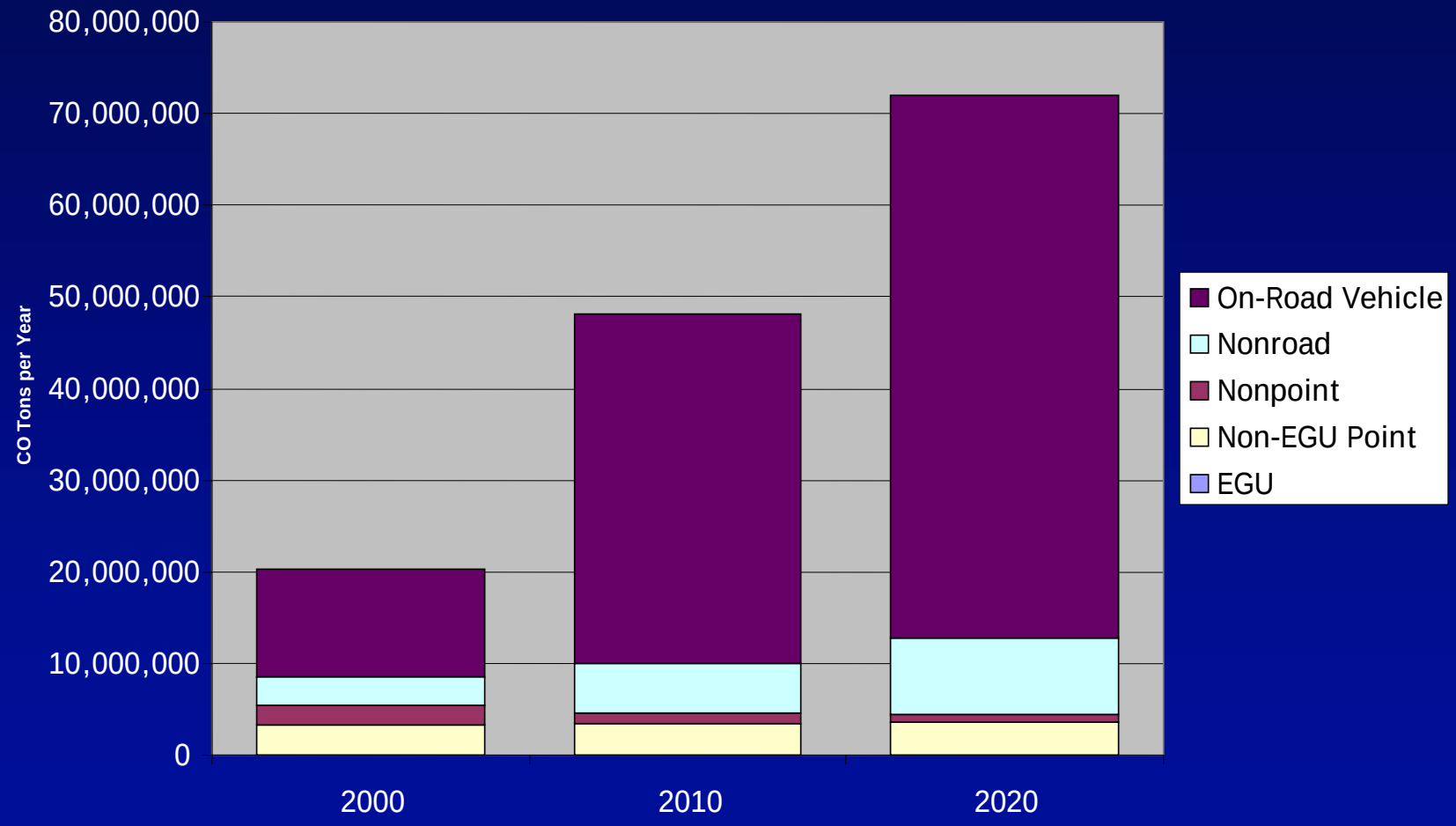
Summary of CAAA-Associated Emission Reductions - CO



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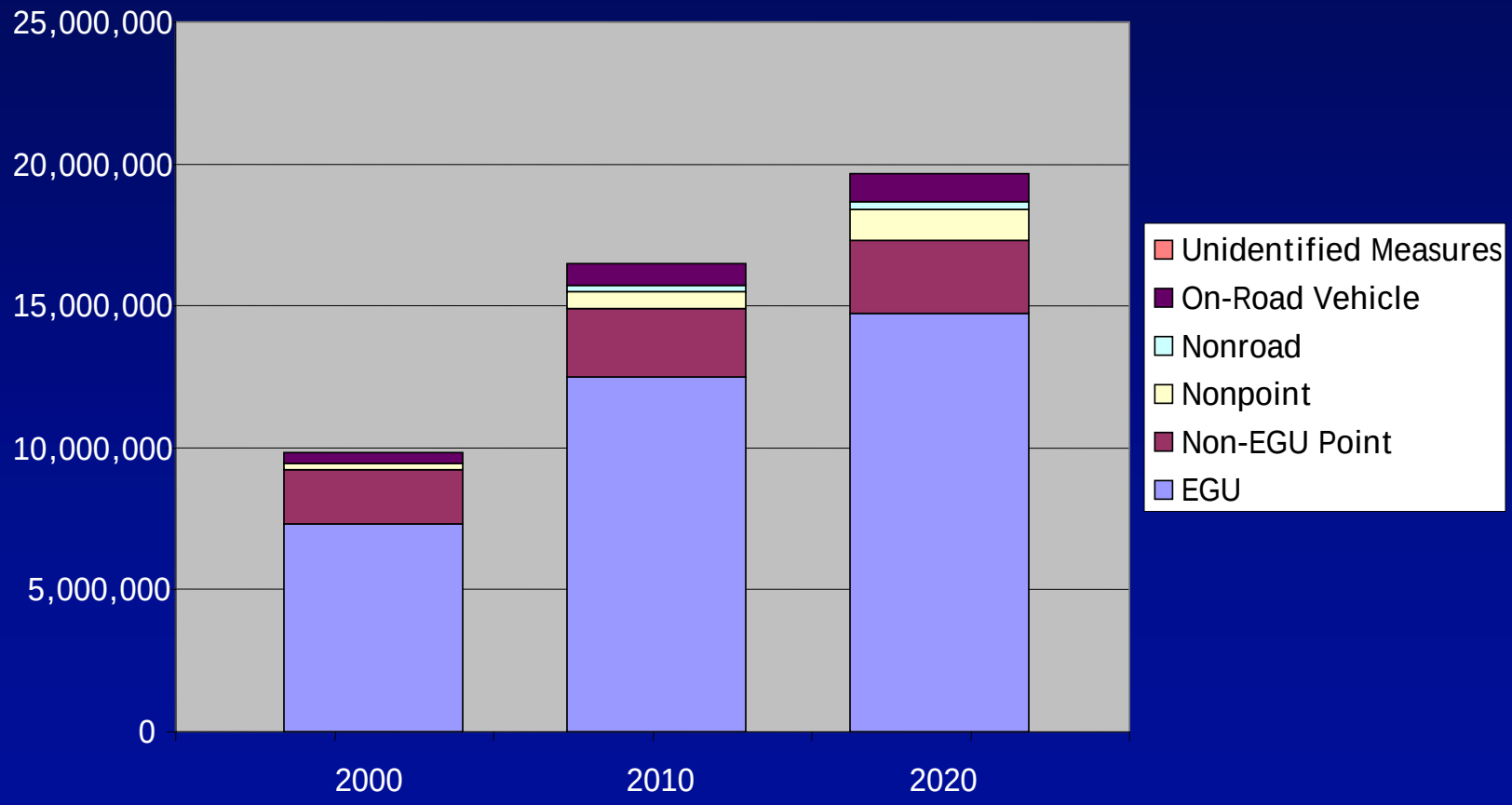
Summary of CAAA-Associated Emission Reductions - SO_2



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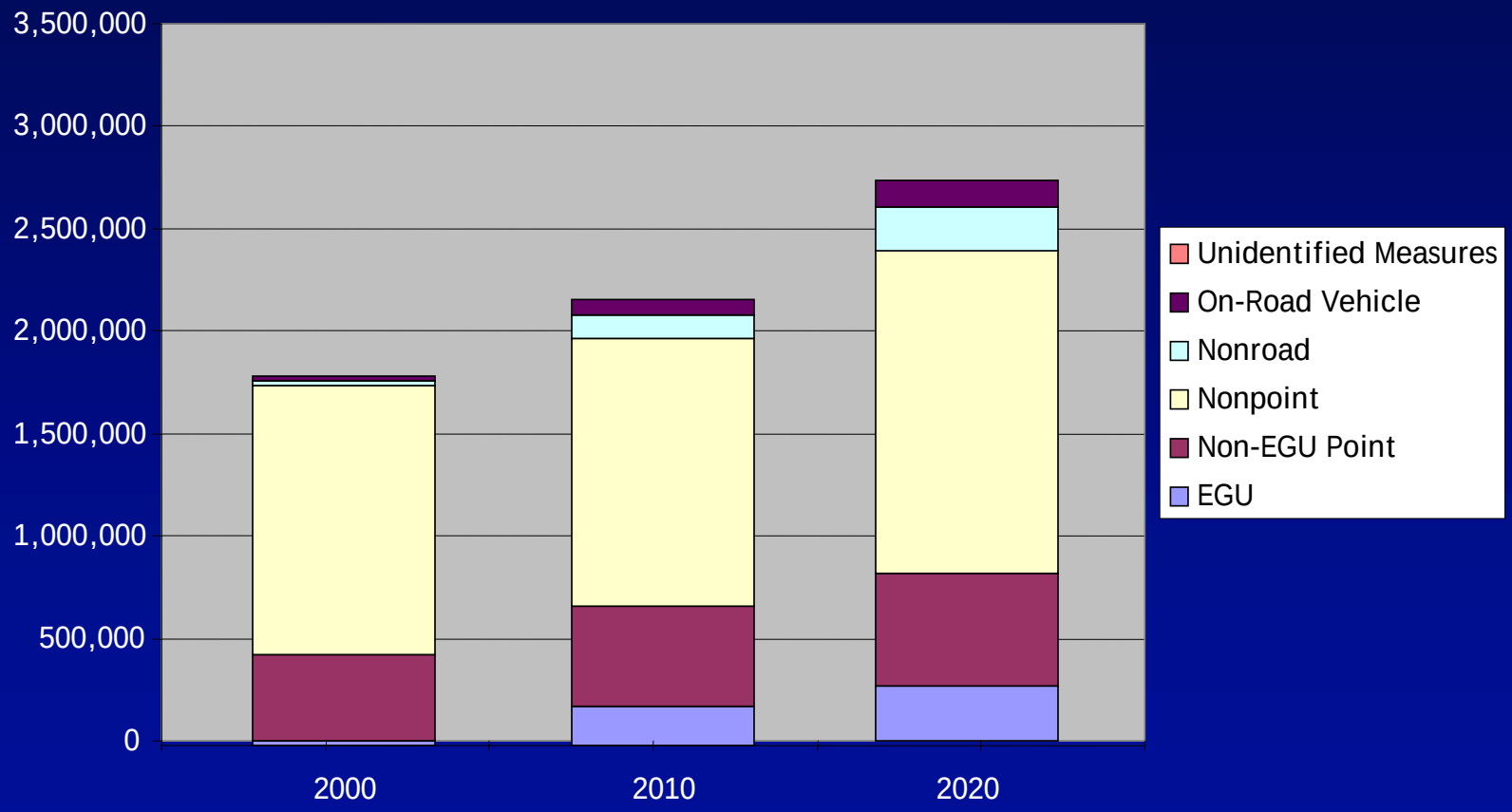
Summary of CAAA-Associated Emission Reductions – $PM_{2.5}$



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Onroad Results

- Year 2000 fuel quality dampens emission benefits in that year
- Much more significant benefits in 2010 and 2020

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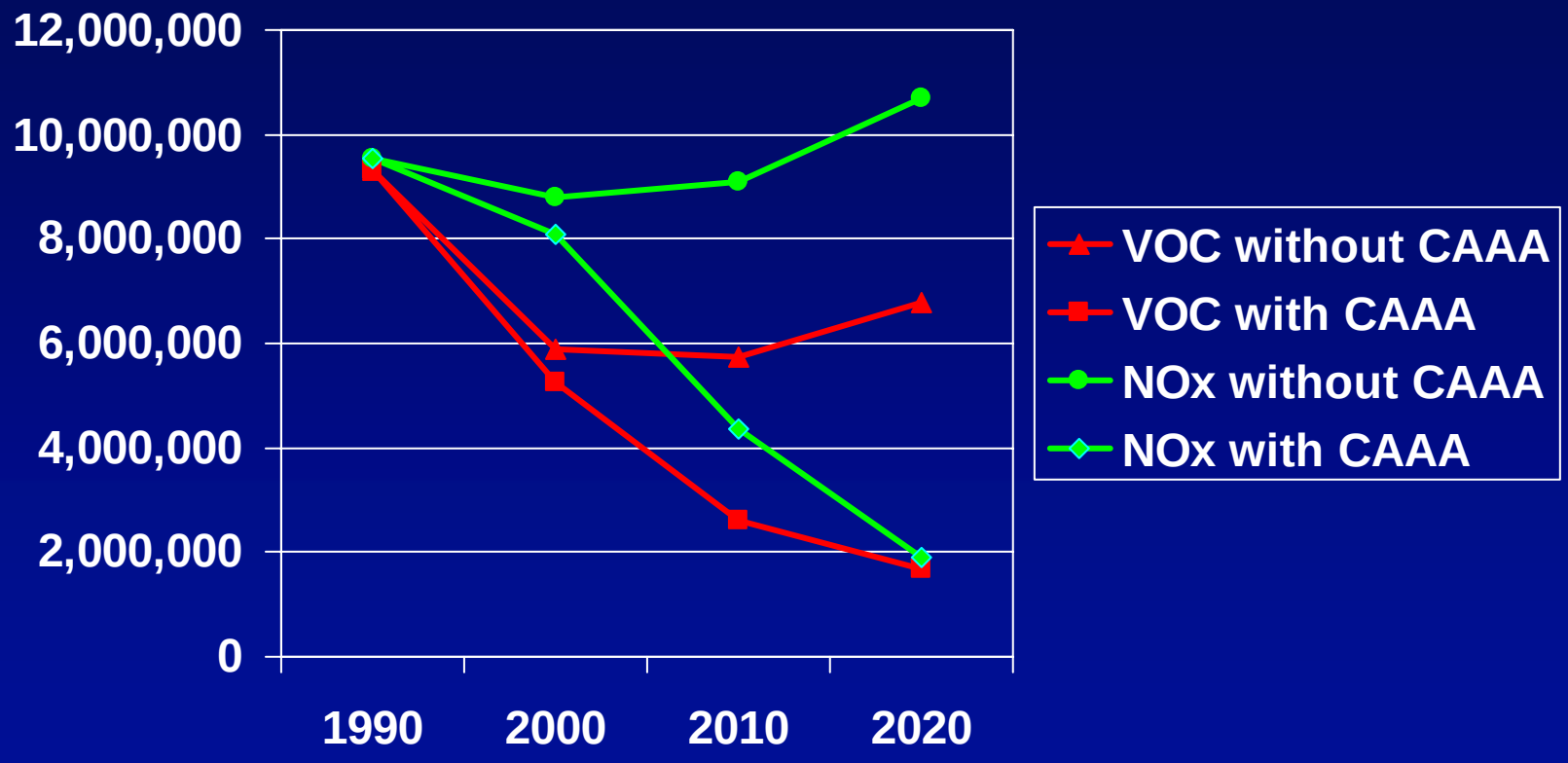
Onroad VOC and NO_x Emissions



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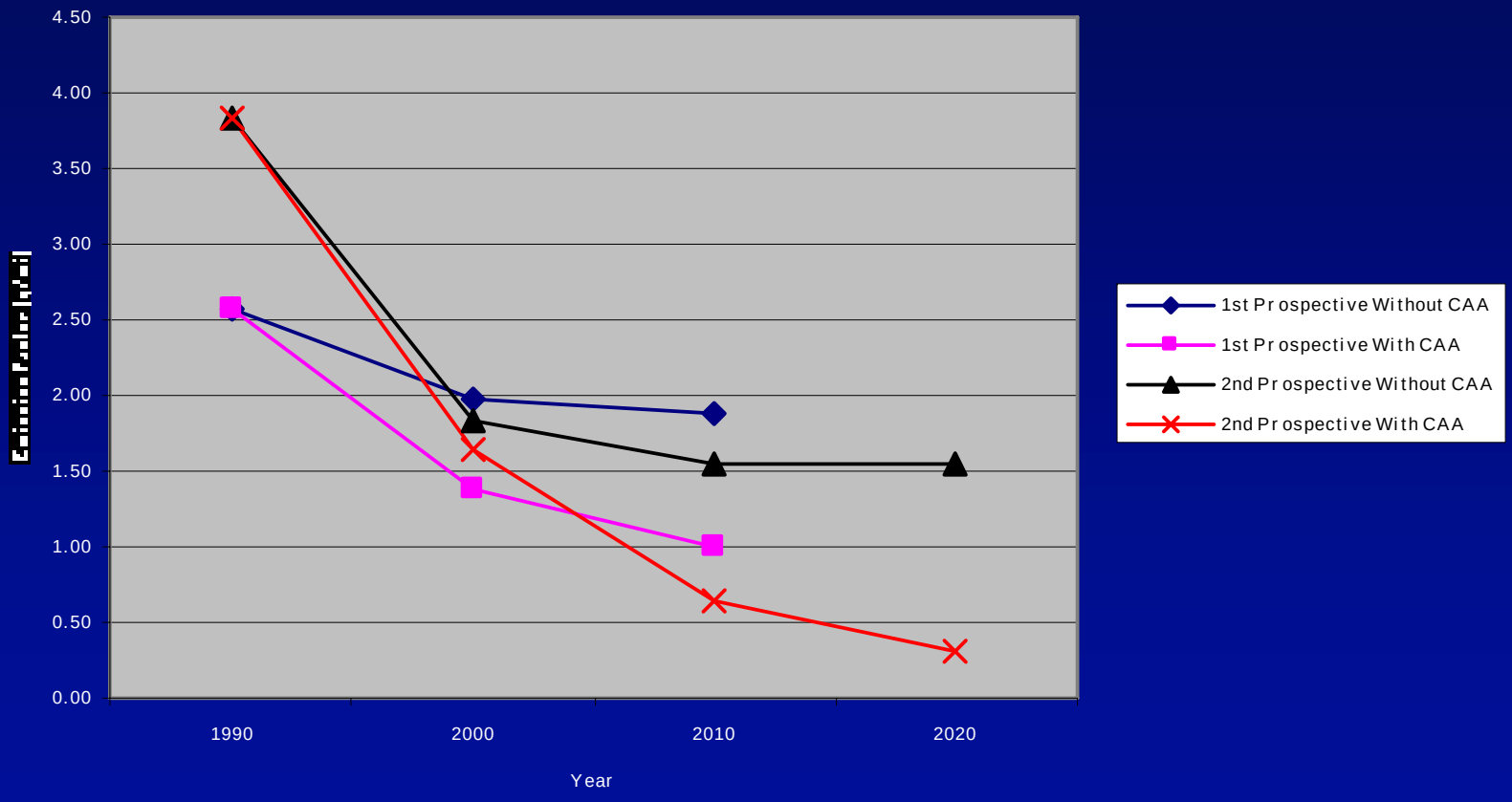
VOC LDGV Emission Factors



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Observations on 2000 On-Road Emissions

- Exhaust running EFs higher for Tier 1 cars than Tier 0 cars
- Tier 0 cars tolerate high sulfur gasoline better than Tier 1 (and LEV) vehicles

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EGUs

- Title IV SO_2 and NO_x
- NO_x SIP call
- *CAIR/CAMR/CAVR*
- NSR settlements
- State regulations

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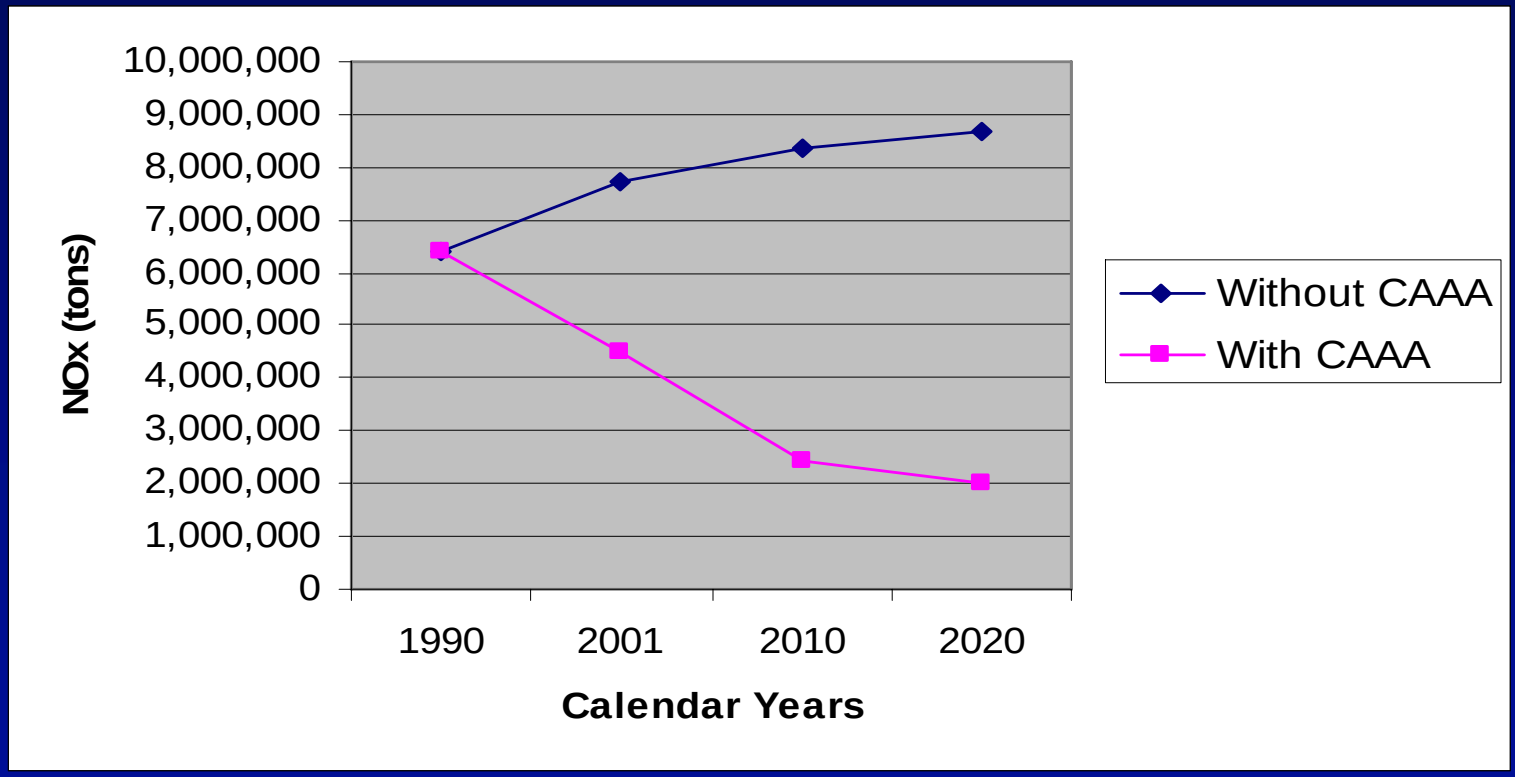
EGU NO_x Emissions



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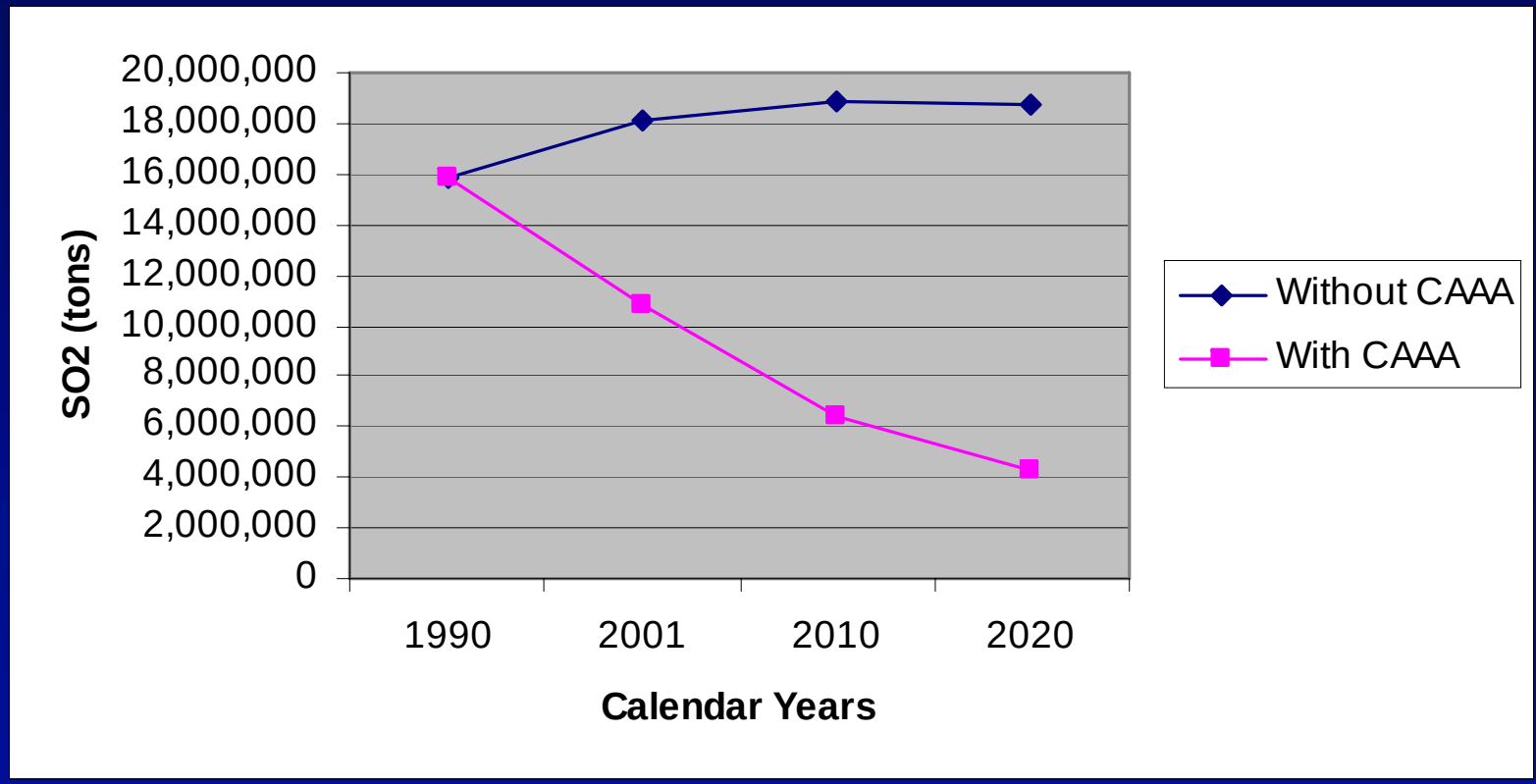
EGU SO_2 Emissions



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8-Hour Ozone NAAQS Analysis

- California Areas
- Focus on Serious and Severe Nonattainment Areas
  - Sacramento Metro
  - San Joaquin Valley
  - Riverside County
  - Los Angeles-South Coast Air Basin

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Summary of Attainment Targets and Emission Reductions Needed in the Sacramento Nonattainment Area for 2012

Sacramento Nonattainment Area	**VOC (tpd)**	**NO_x tpd)**
2002 Baseline Emissions	168	176
2012 Emissions Forecast	130	118
% Shortfall from 2012 Emissions Forecast	27%	27%
2012 Attainment Targets	95	86
2012 Emission Reductions Needed (Shortfall)	35	32

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Percentage Target Reductions
Sacramento 8-Hour Ozone Nonattainment Area

Nonattainment Area	2010 NO_x Target (%)	2010 VOC Target (%)	2020 NO_x Target (%)	2020 VOC Target (%)
Sacramento, CA	27 (from 2012 baseline)	27 (from 2012 baseline)	10 (from 2018 baseline)	10 (from 2018 baseline)

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8-Hour Ozone NAAQS Cost Analysis Summary (2010)

Nonattainment Area	Annual Cost (million 1999$)	VOC Tons Reduced from Core Scenario	NO_x Tons Reduced from Core Scenario
Sacramento, CA	106	16,252	21,152

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Sacramento, California 2010 Local Control Measure Emission Reductions by Sector/Pollutant

Pollutant	Sector				
	EGU	**Point**	**Area**	**Onroad**	**Nonroad**
VOC	-	-	16,098	153	-
NO_x	1,707	16,455	1,056	1,934	-

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8-Hour Ozone NAAQS Cost Analysis Summary (2020)

Nonattainment Area	Annual Cost (million 1999$)	VOC Tons Reduced from Core Scenario	NO_x Tons Reduced from Core Scenario
Sacramento, CA	2	5,517	1,634

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Sacramento, California 2020 Local Control Measure Emission Reductions by Sector/Pollutant

Pollutant	Sector				
	EGU	**Point**	**Area**	**Onroad**	**Nonroad**
VOC	-	-	5,517	-	-
NO_x	-	1,524	110	-	-

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All Section 812 project reports are available at:

http://www.epa.gov/OAR/sect812/

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