Ozone Precursor Emission Trends in the South Coast Air Basin 1990-2020

(Presentation Revised – November 1, 2006)

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California Air Resources Board

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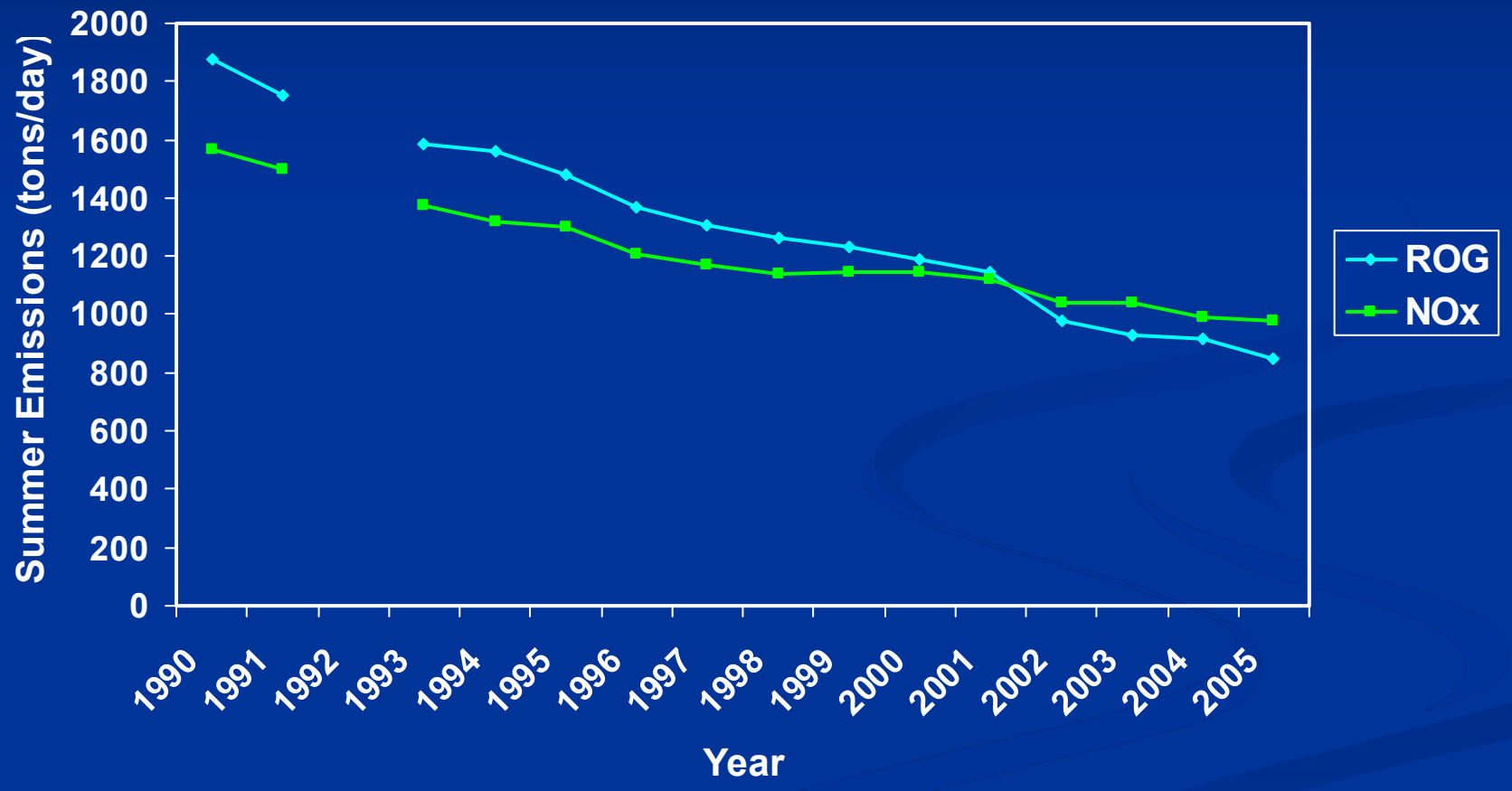
Ozone Air Quality Forum and Roundtable Discussion
Diamond Bar, California

Overview

- Historical ROG and NOx emissions trends
- Future ROG and NOx emissions trends
- Major ROG and NOx sources
- Mobile source inventory improvements
- Mobile source inventory research

Ozone Precursor Emissions

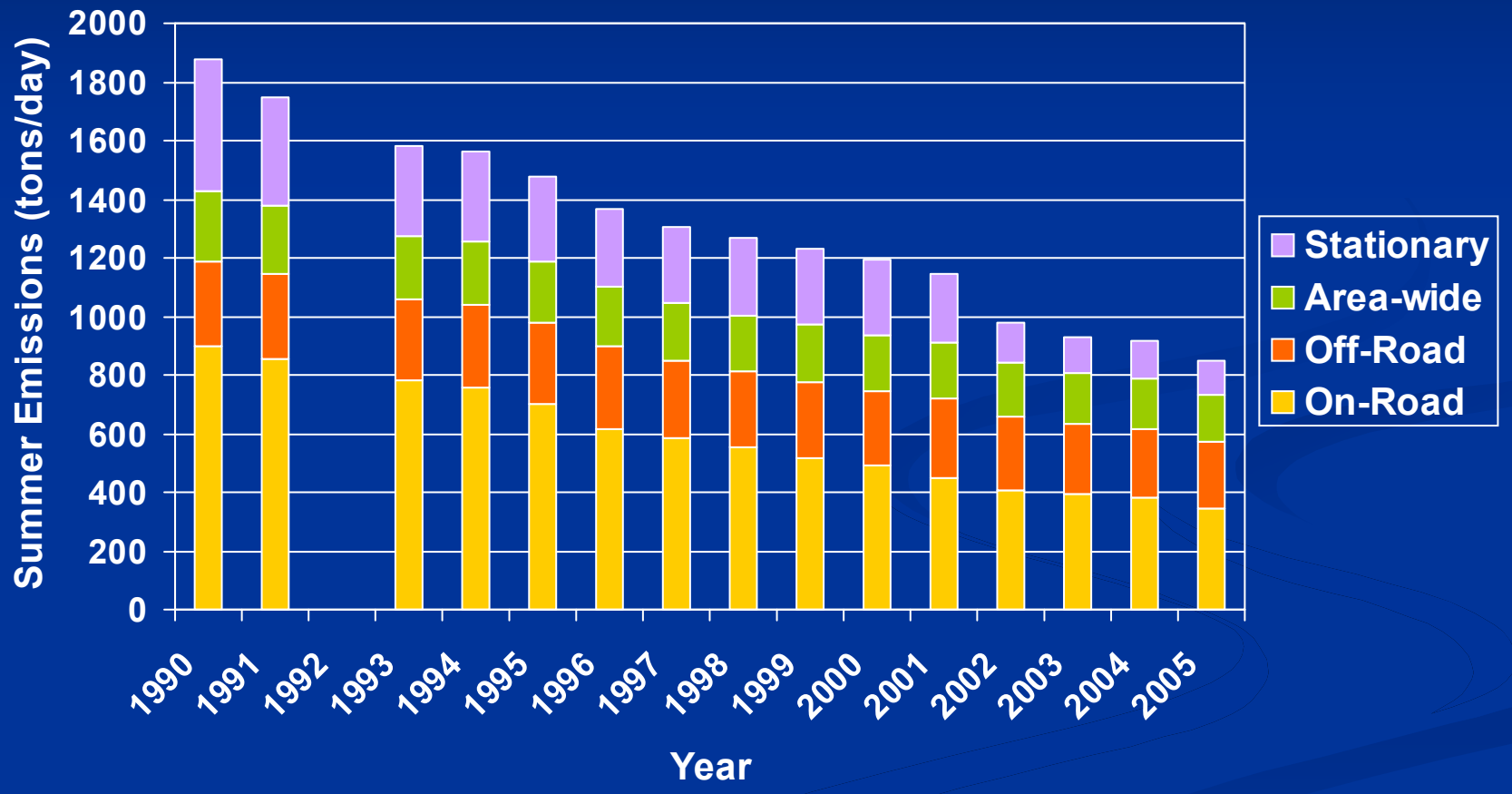
South Coast Air Basin 1990-2005 (Summer Day)



Note: Does not include biogenic emissions and ship emissions beyond 3 miles from shore

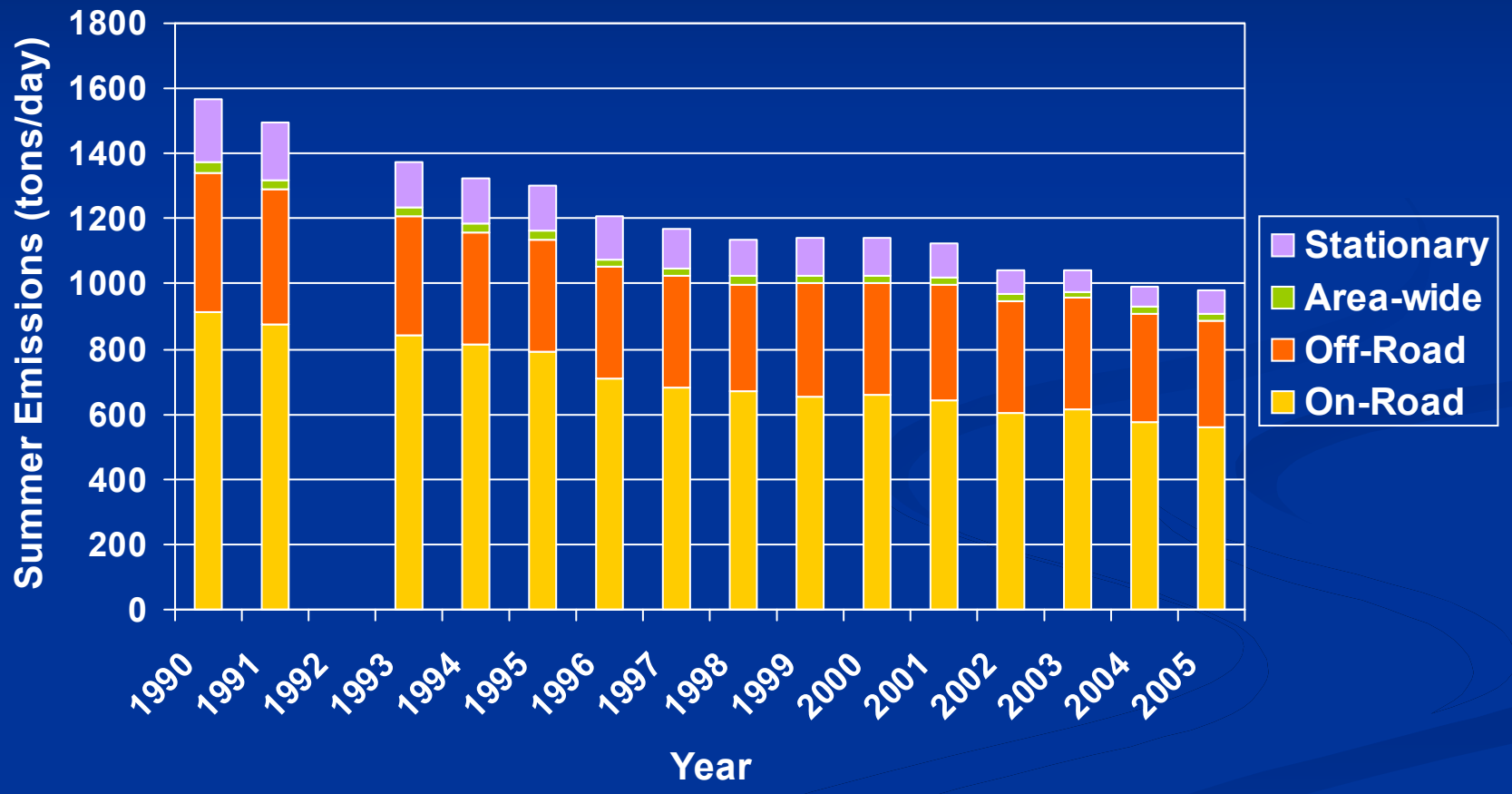
ROG Emissions Trend

South Coast Air Basin 1990-2005 (Summer Day)

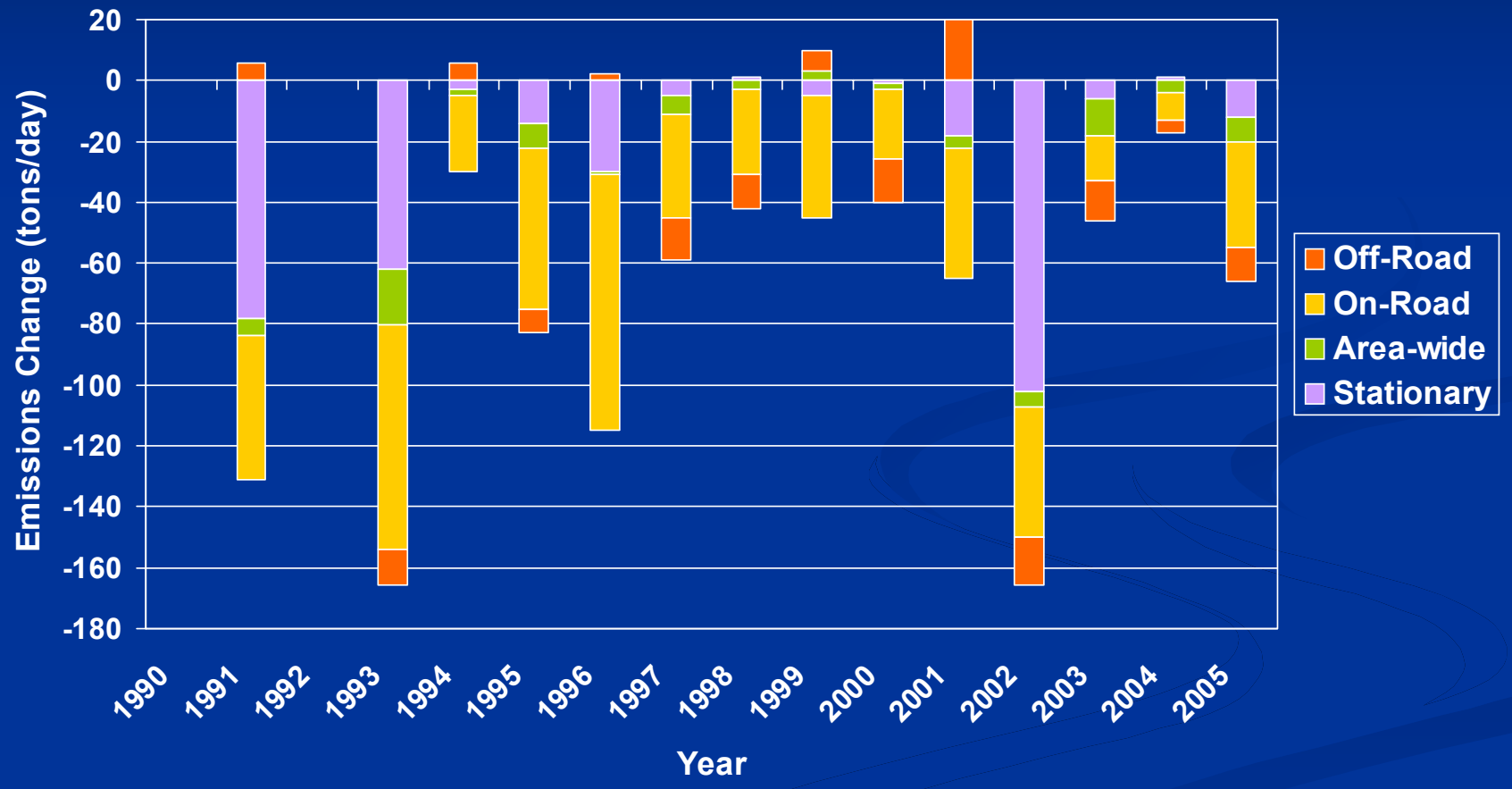


NOx Emissions Trend

South Coast Air Basin 1990-2005 (Summer Day)



Incremental Annual ROG Emissions Reductions
(reflecting year to year impacts of growth and benefits of controls)
South Coast Air Basin 1990-2005 (Average Summer Day)



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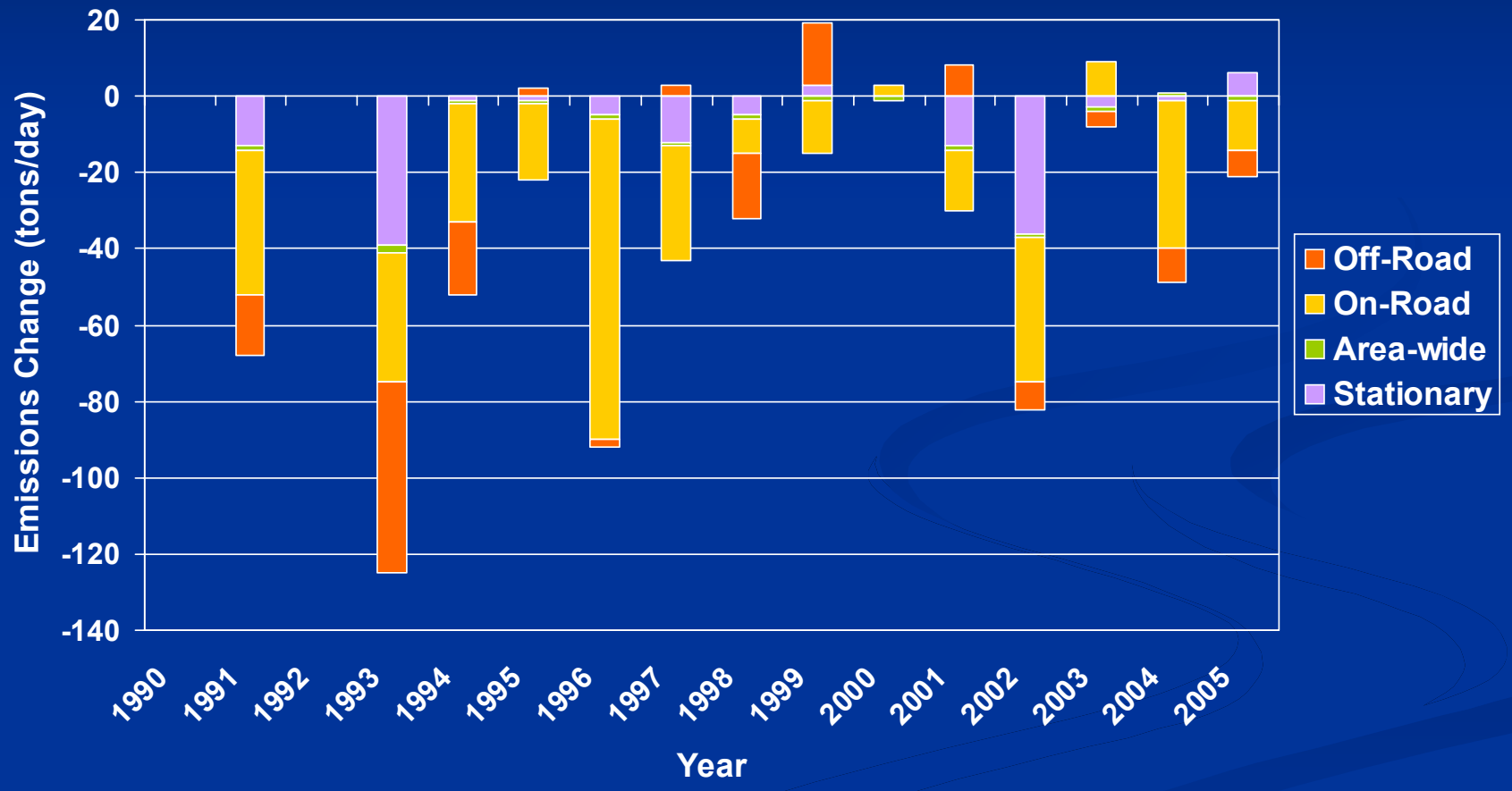
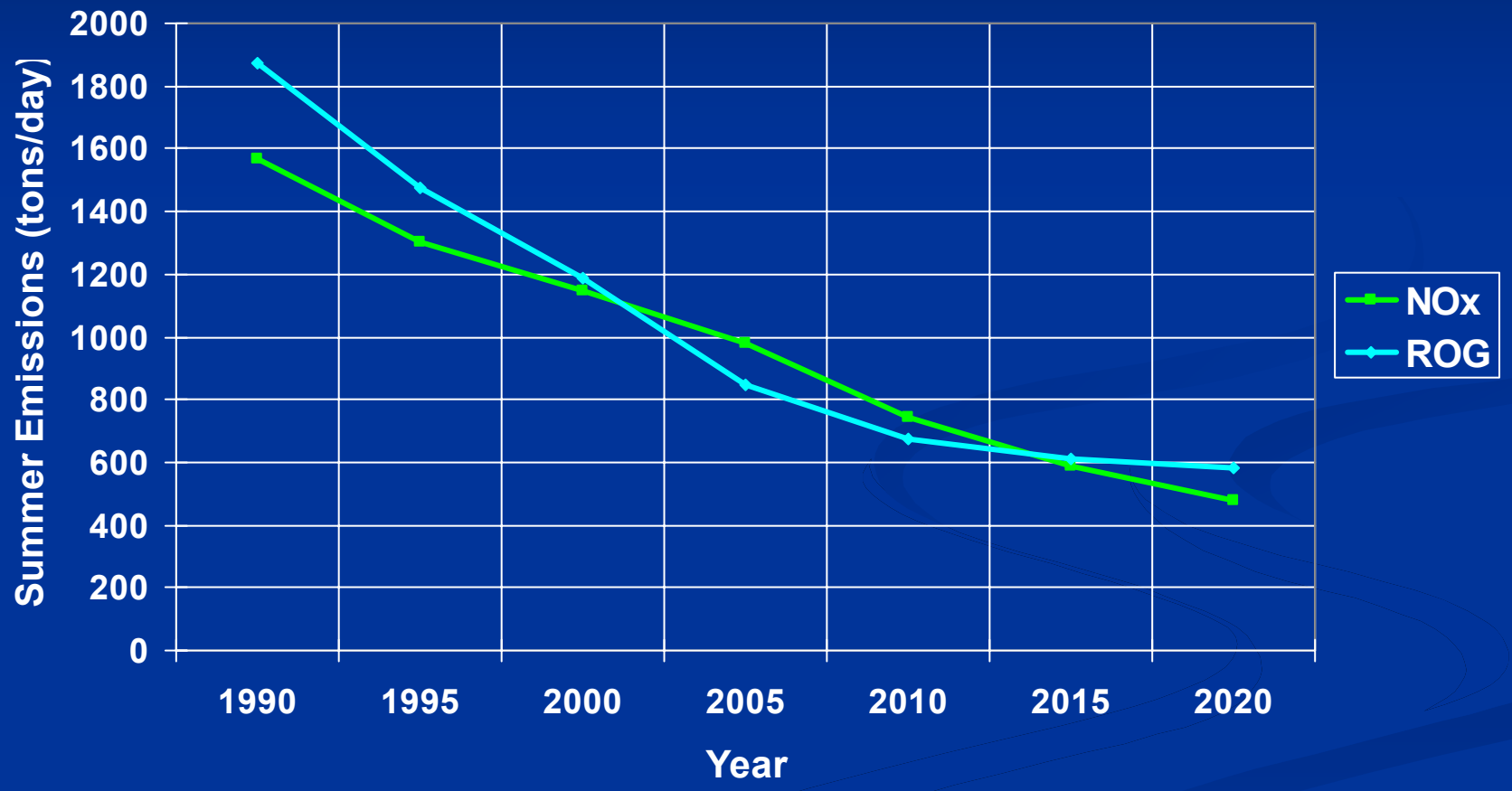


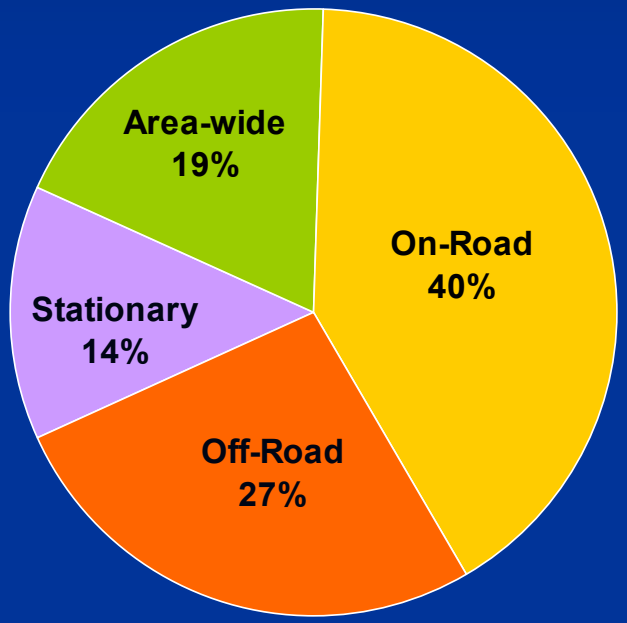
Ozone Precursor Emissions
South Coast Air Basin 1990-2020



Note: Does not include biogenic emissions and ship emissions beyond 3 miles from shore

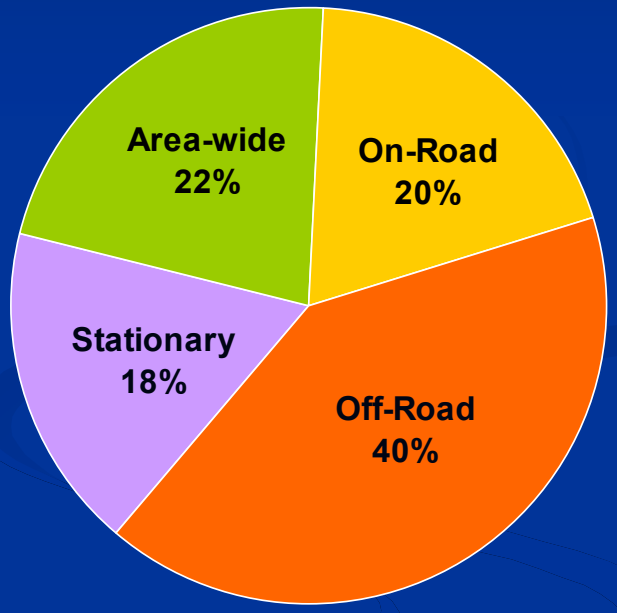
Changes in ROG Source Contributions
South Coast Air Basin 2005 and 2020 (Summer Day)

2005



842 tpd

2020



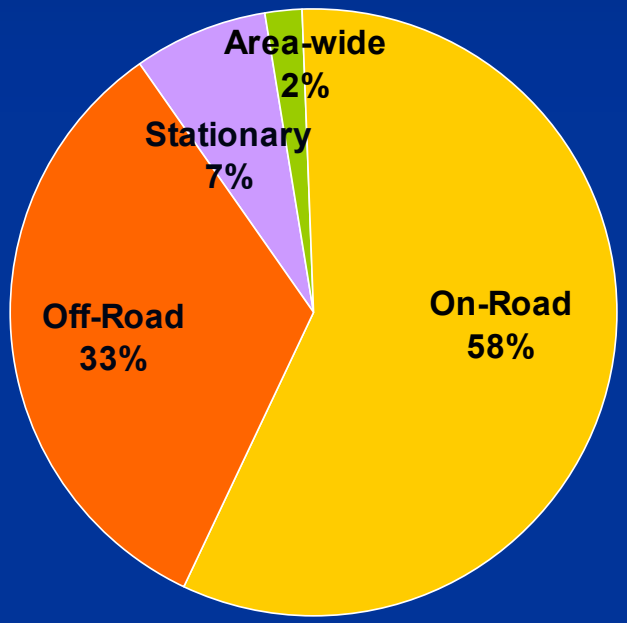
574 tpd

Top 10 ROG Sources
South Coast Air Basin 2020 (Summer Day)

			2005		2020	
2005	2020	Source Category	ROG (tpd)	%of Total	ROG (tpd)	%of Total
2	1	Consumer Products	101	12.0	112	19.5
1	2	Light Duty Passenger Cars	282	33.5	101	17.6
3	3	Recreational Boats	90	10.7	63	11.0
4	4	Lawn and Garden Equipment	50	6.0	31	5.4
5	5	Architectural Coatings (Paints)	46	5.4	30	5.3
10	6	Off-Road Recreational Vehicles	20	2.4	30	5.2
7	7	Gasoline Evaporative Losses	27	3.2	30	5.2
9	8	Non-Architectural Coatings	24	2.8	23	4.1
6	9	Heavy Duty Gas Trucks	33	3.9	16	2.7
19	10	Aircraft	*	*	*	*
		Top 10 ROG	672	79.9	436	76.0
		Other	170	20.1	138	24.0
		Total	842	100.0	574	100.0

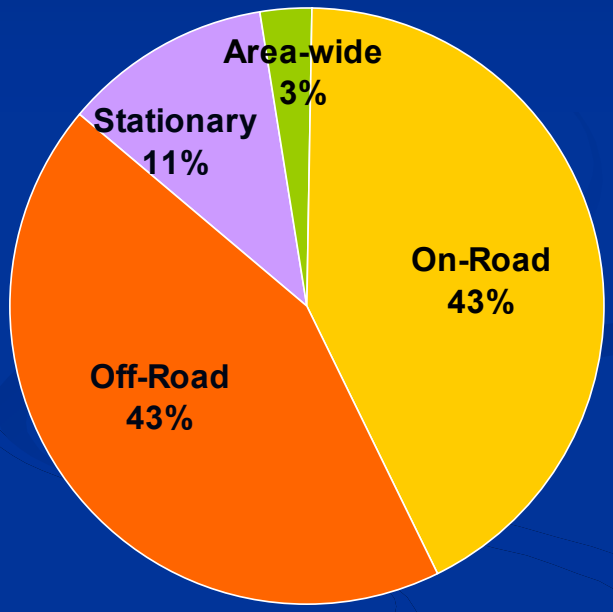
Changes in NOx Source Contributions
South Coast Air Basin 2005 and 2020 (Summer Day)

2005



977 tpd

2020



478 tpd

Top 10 NOx Sources
South Coast Air Basin 2020 (Summer Day)

			2005		2020	
2005	2020	Source Category	NOx (tpd)	% of Total	NOx (tpd)	% of Total
1	1	Heavy Duty Diesel Trucks	246	25.2	92	19.2
2	2	Light Duty Passenger Cars	243	24.9	66	13.7
6	3	Ships and Commercial Boat	40	4.1	57	12.0
4	4	GSE, TRUs, Drill Rigs, etc	98	10.0	44	9.1
3	5	Construction and Mining	104	10.7	28	5.8
12	6	Aircraft	*	*	*	*
7	7	Trains	32	3.3	26	5.4
5	8	Heavy Duty Gas Trucks	42	4.3	23	4.8
8	9	Recreational Boats	19	2.0	16	3.3
10	10	Boilers	17	1.8	14	3.0
		Top 10 NOx	842	86	366	76
		Other	134	14	113	24
		Total	977	100	478	100

Mobile Source Inventory Improvements South Coast Air Basin Impacts

- On-Road
  - Pending vehicles (ROG ↑)
  - Heavy duty truck VMT redistribution (NOx ↓)
  - Heavy duty truck emission factors (NOx ↑)
  - Ethanol permeation (ROG ↑)
- Off-Road
  - Recreational boats (ROG ↓)
  - Construction equipment (NOx ↑)
  - Ethanol permeation (ROG ↑)
  - Gas cans (ROG ↓)

Mobile Source Inventory Research

- Current
  - Light duty passenger cars (ARB Surveillance)
  - Heavy duty trucks (South Coast)
  - Alternative fuel (ARB)
  - Gas can permeation (ARB Lab)
  - Locomotive emissions (ARB with South Coast)
- Suggested
  - Heavy duty truck activity and emissions
  - Off-road ethanol permeation
  - Off-road emissions and deterioration