

VOC White Paper

Meeting #1
June 25, 2014

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Potential Scope of White Paper

- The role VOCs play in ozone and PM_{2.5} attainment strategies
 - Technical analysis, atmospheric chemistry, relationship to NO_x
- Major sources of VOCs
- Potential actions/measures for further VOC control

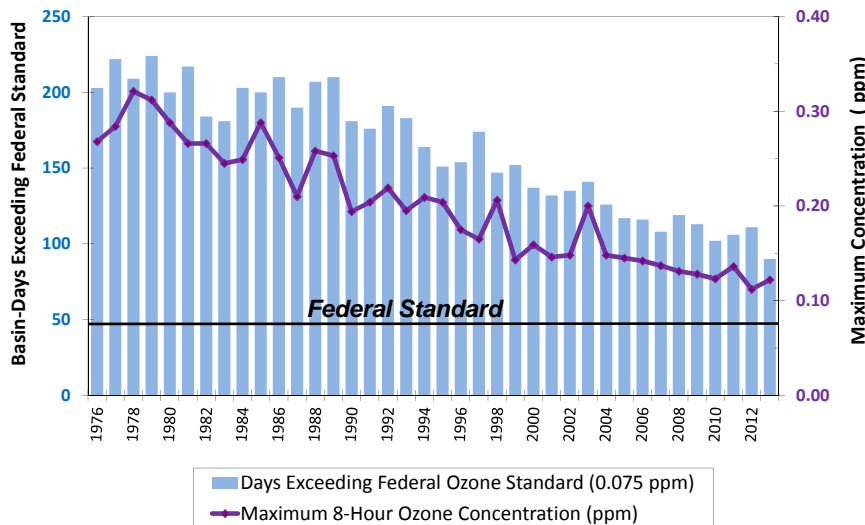
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Context – CAA deadlines

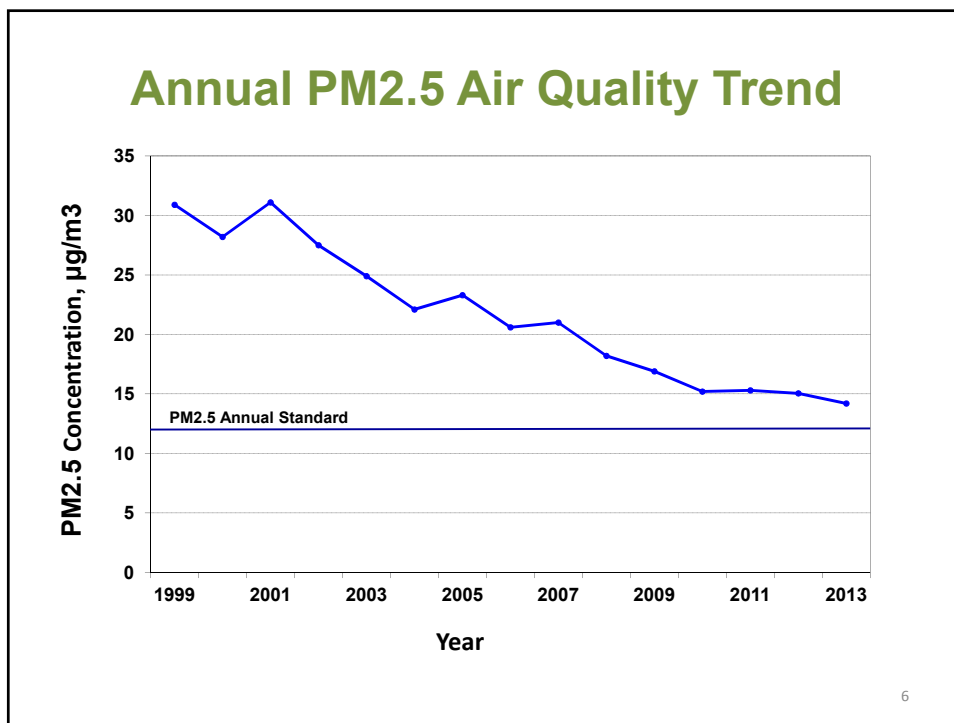
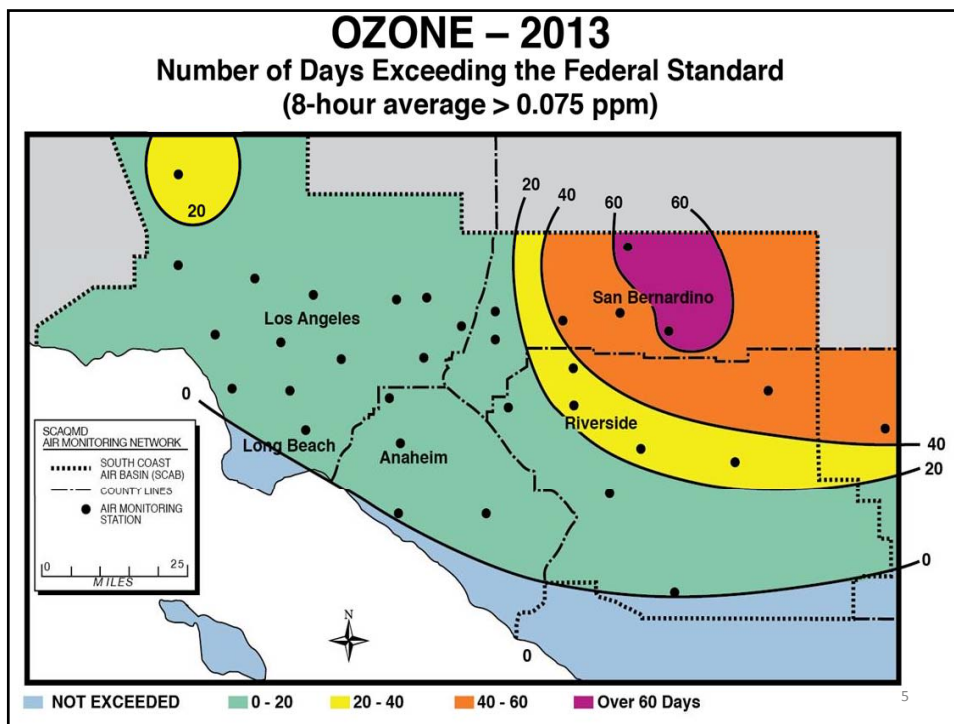
- Ozone
 - Previous Standard 8-hour average – 80 ppb
 - Commitments remain for 2013 attainment
 - Current Standard 8-hour average – 75 ppb
 - Attainment by 2032
- PM_{2.5}
 - Previous Annual Standard - 15 µg/m³
 - Attainment based on 2011-2013 data
 - Current Annual Standard – 12 µg/m³
 - Attain by 2020-2025
 - Current Daily Standard - 35 µg/m³
 - Attain by 2014 (or 2015)

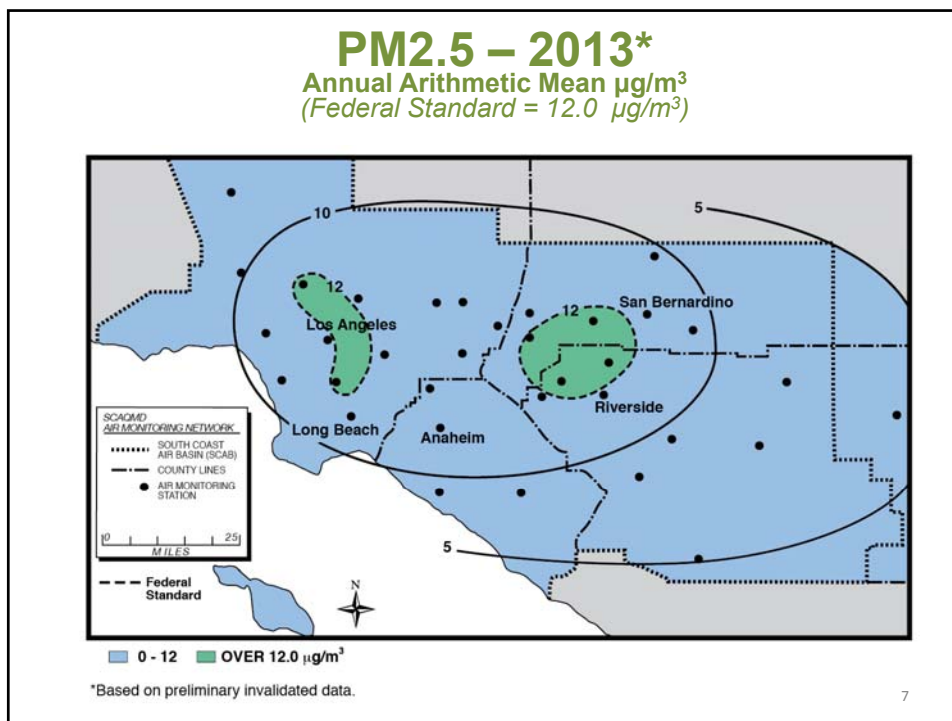
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South Coast Air Basin Ozone Trend



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Role of VOCs

- Ozone
 - Through complex atmospheric photochemical reactions with NO_x emissions and sunlight, contributes to ozone formation
- PM_{2.5}
 - Same photochemical reactions transform volatile organic gases to non-volatile solid or liquid products that contribute PM_{2.5} mass

VOC:NOx Ratio

Geographical Variations

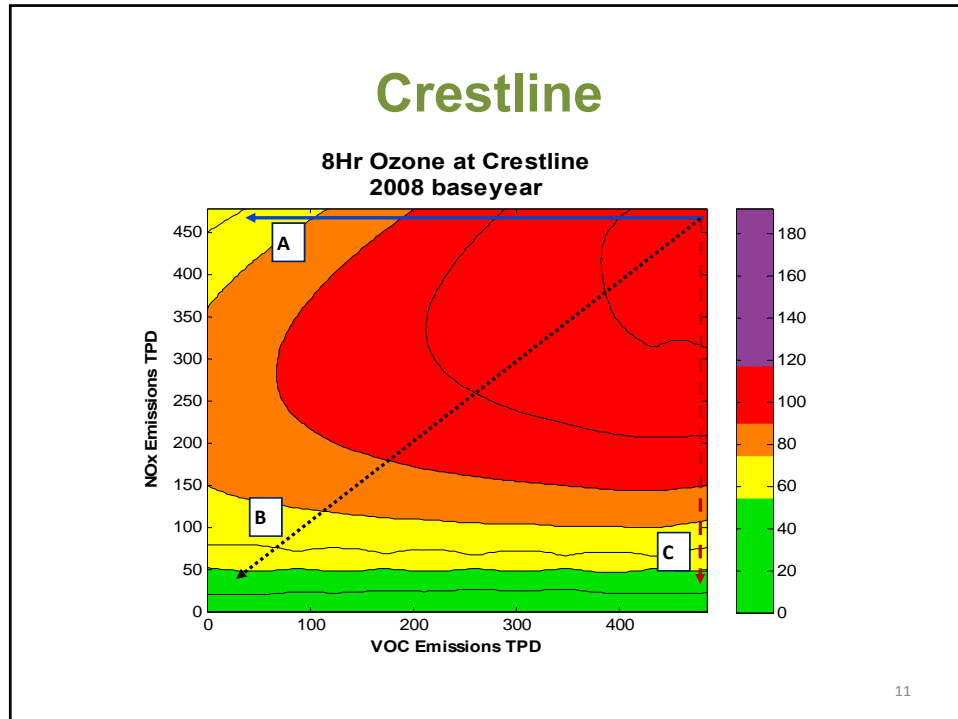
- Ozone level generally depends on sunlight, NOx level, VOC level, and NOx/VOC ratio.
- Ozone formation can be NOx-limited or VOC- limited depending on NOx/VOC ratio
- Ratio is different in different areas of the Basin
 - Inland Empire/Mountain Areas – Rural (NOx Limited)
 - San Gabriel Valley – Suburban (VOC Limited)
 - Central Los Angeles – Urban (VOC Limited)

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Paths to Achieve Ozone Standard

- VOC Control
- NOx Control
- VOC & NOx Control

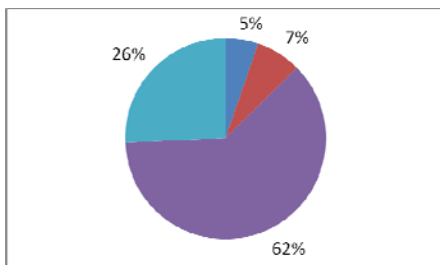
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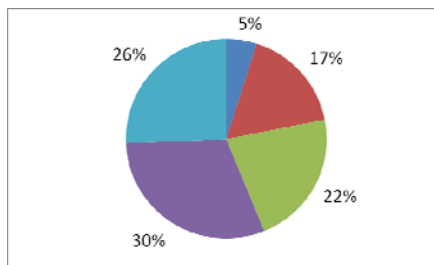
- ## PM2.5
- Primary Organic Aerosols
 - Typically from combustion sources
 - Secondary Organic Aerosols
 - Chemical Processes in the atmosphere
 - Volatiles – (e.g., C1-C11 alkanes)
 - Intermediate Volatiles – (e.g., C12-C23 alkanes)
 - Semi-Volatiles – (e.g., C24-C27 alkanes)
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2012 BASE YEAR EMISSIONS BY MAJOR SOURCE CATEGORIES

2016 AQMP NO_x – 519.3 TPD



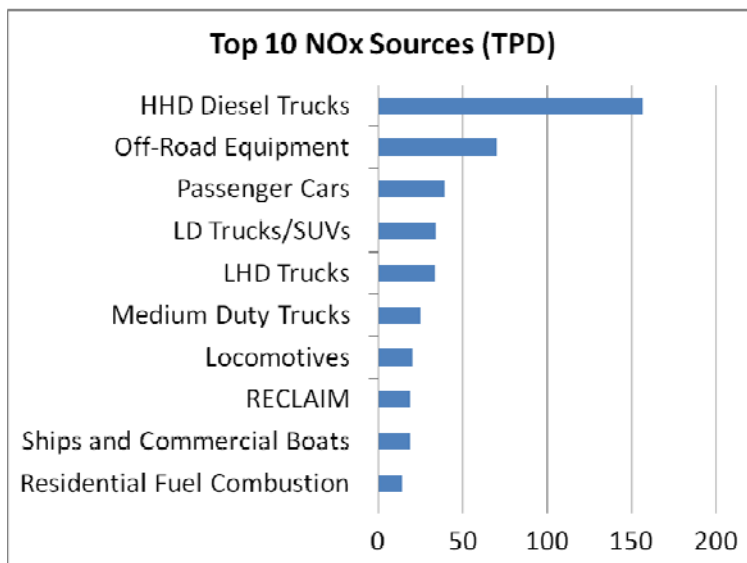
2016 AQMP VOC – 508.5 TPD



■ Point ■ Area ■ Consumer Products and Paints ■ On-Road Vehicles ■ Off-Road Vehicles

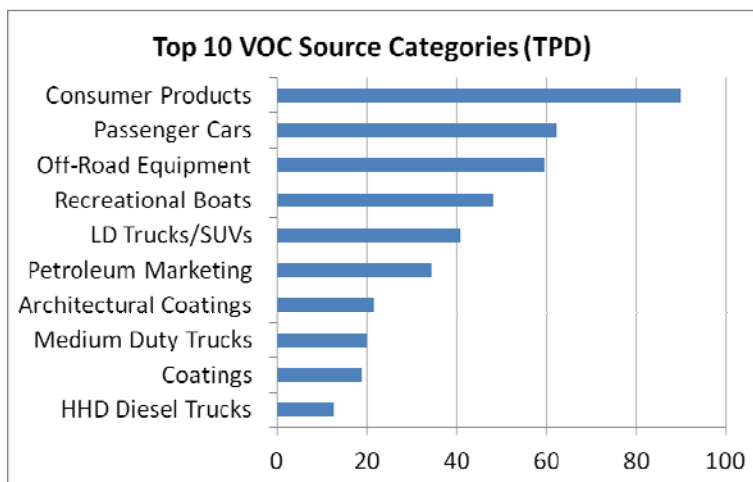
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Top 10 NO_x Source Categories



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Top 10 VOC Source Categories



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Reducing VOCs

Potential Approaches

- Additional mass-based approaches - Examples
 - Consumer Products (CARB) – VOCs and LVP-VOCs
 - Architectural Coatings
 - Solvent Cleaning
- Reactivity
- Seasonality
- Geographical
 - Enhanced Monitoring/Inspection
 - Job Training/Education
 - Incentives

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Discussion

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Potential Schedule/Next Steps

- Feedback from Working Group – July 2014
- 2nd Working Group Meeting late July
 - Detailed Outline
 - Teleconference Only?
- Release of Draft Paper – Late August 2014
- Additional Working Group Meetings – as needed
- Comments on Draft Paper – September 2014
- Final VOC White Paper – December 2014

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