Ozone NAAQS
Regulatory Impact Analysis

Briefing for Clean Air Act Advisory Committee: Mobile Sources Technical Review Subcommittee

September 19, 2007

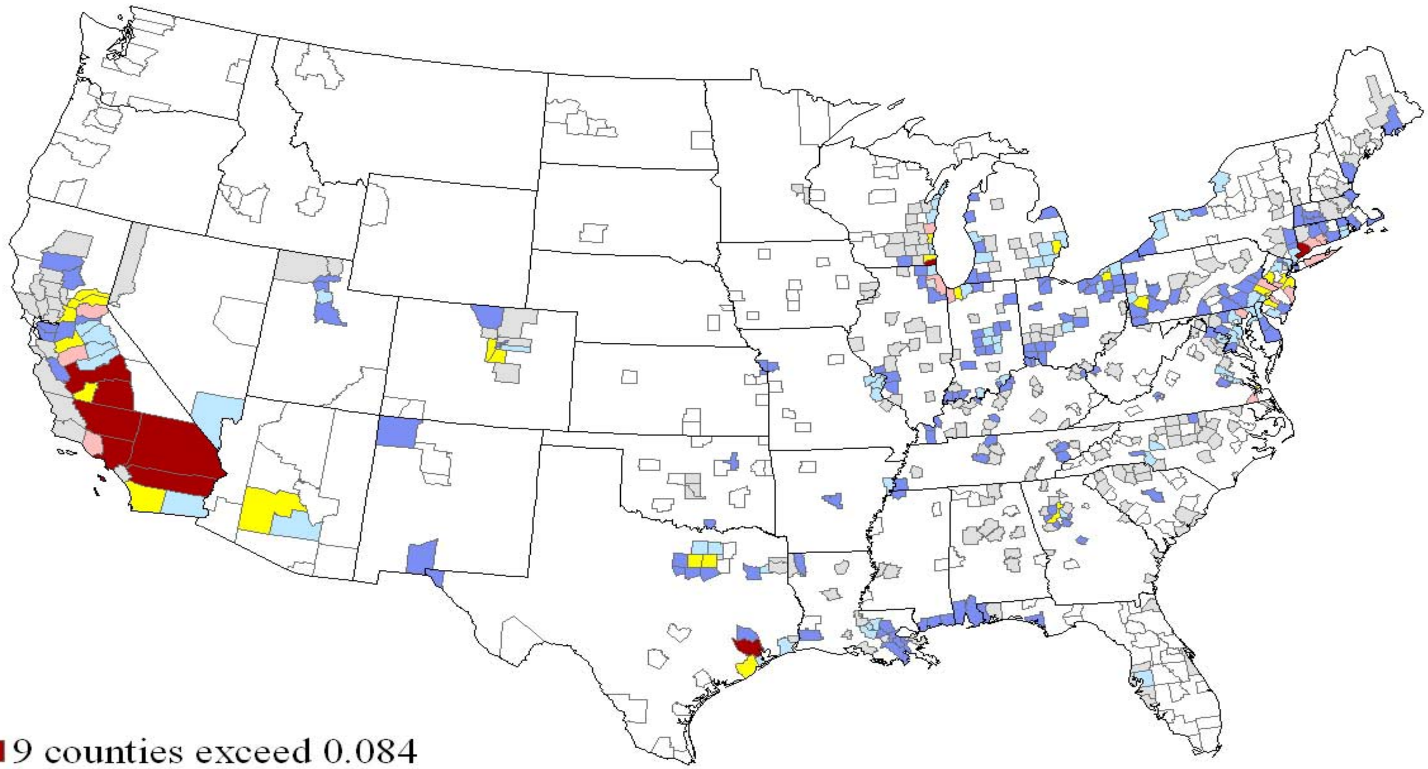
Purpose and Background on the RIA

- EPA analyzed the benefits and costs of reducing pollution to meet alternative ozone NAAQS standards
  - This is the RIA – Regulatory Impact Analysis
- The benefit and cost analysis is required by Executive Order 12866
- The benefit and cost analysis is not used when selecting the proposed ozone standards
  - The Clean Air Act bars EPA from considering costs in setting or revising any national air quality standard

Control Strategy Design

- Baseline for analysis
  - **All final rules (e.g. Clean Air Interstate Rule, the Clean Air Mercury Rule, the Clean Air Visibility Rule, the Clean Air Nonroad Diesel Rule, the Light-Duty Vehicle Tier 2 Rule, the Heavy Duty Diesel Rule, etc)**
  - Projected reductions from forthcoming regulations (e.g. Locomotive and Marine Vessels and for Small Spark-Ignition Engines)
  - Rules assumed for attaining revised PM2.5 standards (to prevent double counting)
  - Reductions needed to attain current ozone standard
- RIA proposal analysis
  - Modeled hypothetical control scenario to attain a tighter alternative primary standard of .070 ppm, partial extrapolation for areas not modeled to attain
  - Extrapolated results for .065, .075, .079 ppm

Projected Ozone Air Quality in 2020 After Application of Known Controls



- 9 counties exceed 0.084
- 15 additional counties exceed 0.079 ppm for a total of 24
- 26 additional counties exceed 0.075 ppm for a total of 50
- 76 additional counties exceed 0.070 ppm for a total of 126
- 154 additional counties exceed 0.065 ppm for a total of 280
- 211 counties meet 0.065 ppm standard for a total of 491
- monitored in 2003 - 2005 but not projected

Calculating Benefits

- Ozone analysis
  - Included mortality in primary benefits estimate
  - Estimated an array of morbidity endpoints, including hospital admissions, school absences, and worker productivity among others
- $PM_{2.5}$ analysis
  - Estimated co-benefits from nitrogen oxides (NOx) emission reductions
  - Estimated same health effects as 2006 $PM_{2.5}$ RIA

Calculating Costs

- We calculated costs using a “two-step” approach

- First, for known (well-demonstrated) controls: we calculate engineering costs, which are the costs to the affected sources of installing and operating emissions controls.

- Second, we applied two procedures to estimate costs for tons of extrapolated emission reductions for areas where applying known controls was not sufficient to get them into attainment with a particular alternative standard

Summary of Benefit and Cost Results - 0.070 ppm

- The RIA estimates a standard of 0.070 ppm would prevent the following additional adverse health effects:
  - 780 cases of chronic bronchitis,
  - 2,300 nonfatal heart attacks,
  - 7,600 hospital and emergency room visits,
  - 2,000 cases of acute bronchitis,
  - 30,000 cases of upper and lower respiratory symptoms,
  - 16,000 cases of aggravated asthma,
  - 890,000 days when people miss work or school, and
  - 2.7 million days when people must restrict their activities because of symptoms.

- EPA estimates costs of implementing a standard of 0.070 ppm would range from a low of $10 billion to a high of $22 billion

- The benefits range could be as low as $2.5 to $24 billion per year or as high as $9.7 to $33 billion per year

Summary of Benefit and Cost Results - .075 ppm

- The RIA estimates a standard of 0.075 ppm would prevent the following additional adverse health effects:
    - 470 cases of chronic bronchitis,
    - 1,400 nonfatal heart attacks,
    - 5,600 hospital and emergency room visits,
    - 1,200 cases of acute bronchitis,
    - 17,500 cases of upper and lower respiratory symptoms,
    - 9,400 cases of aggravated asthma,
    - 675,000 days when people miss work or school, and
    - 2 million days when people must restrict their activities.

- EPA estimates costs of implementing a standard of 0.075 ppm ranges from a low of $5.5 billion to a high of $8.8 billion

- The benefits range could be as low as $1.5 to $15 billion per year or as high as $7.3 to $22 billion per year

Estimating “full attainment”: California is Special

- Some areas in California are not expected to be in attainment for new standard in 2020
- Los Angeles and San Joaquin nonattainment areas not likely to be required to meet current standard until 2024
- Approach for presenting “full attainment”
  - Show progress required by 2020, including reductions through 2020 for Los Angeles and San Joaquin nonattainment areas
  - Show estimate of additional future reductions needed in California beyond 2020

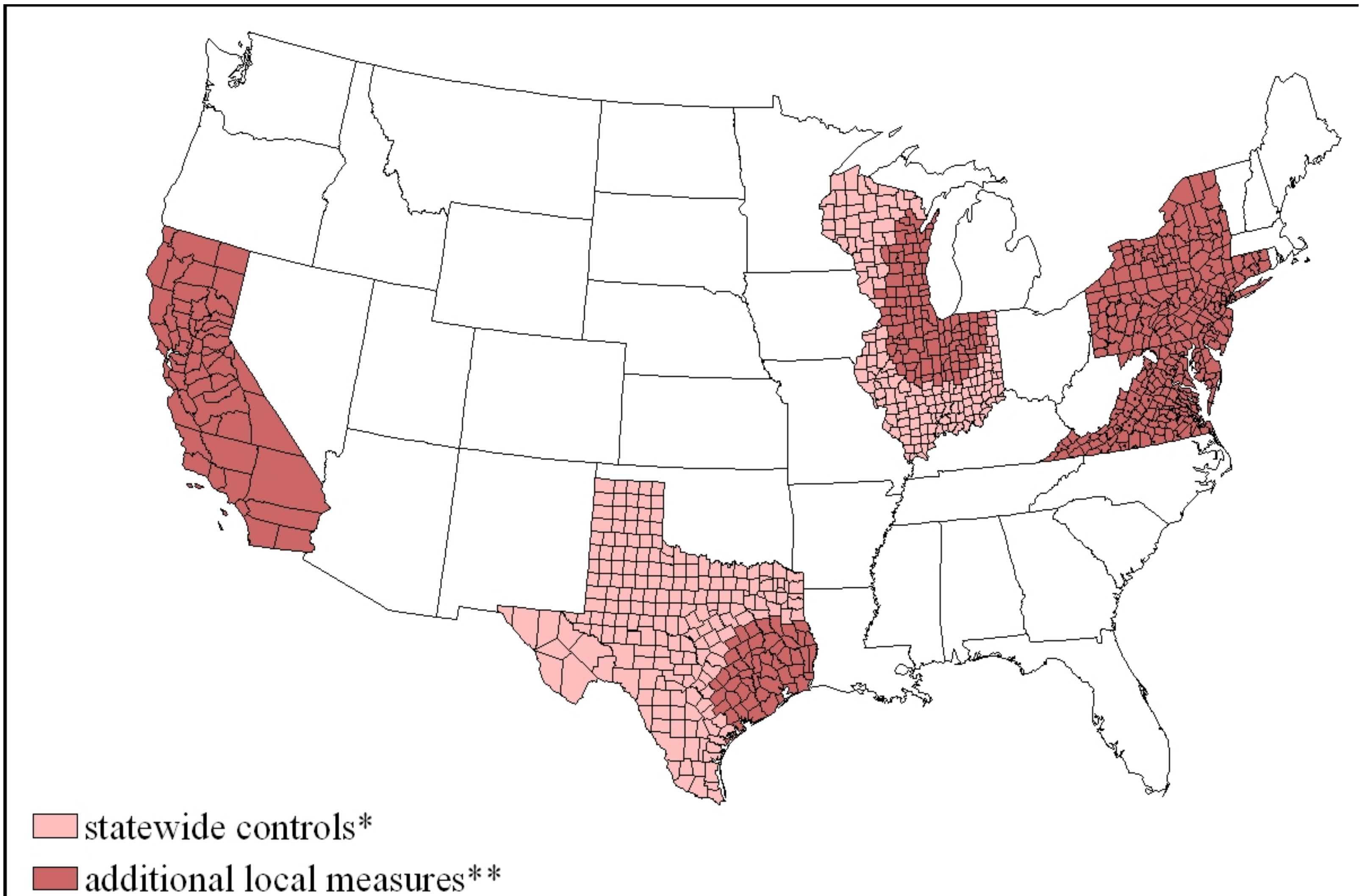
Mobile Source Control Strategies Modeled for the <u>Preliminary</u> Ozone RIA

1. Long-Duration Idling for Long-Haul Heavy Duty Trucks
   – Truck stop electrification, and auxiliary power units, generator sets, or direct-fired heaters can effectively eliminate most emissions from long duration idling
2. Low RVP Fuels
   – Lower RVP (Reid Vapor Pressure) helps to reduce VOCs, which are a precursor to ozone formation
   – This control measure represents the use of gasoline with a RVP limit of 7.0 psi from May through September in counties with an ozone season RVP value greater than 7.0 psi.
3. Onroad Heavy Duty Retrofits
   – This strategy analyzed the NOx reductions from the use of selective catalytic reduction (SCR) technology for onroad heavy duty diesel trucks.
   – SCRs can cost-effectively produce substantially produce substantial NOx emission reductions
4. Continuous Inspection and Maintenance
   – Continuous I/M uses onboard diagnostics and radio frequency or cellular data transmission to provide more rapid identification of emission control failures
   – Strong interest from states due to substantial emission reductions and major cost-savings for consumers.
5. Commuter Programs
   – The Commuter measure in this RIA reflects a mixed package of incentives employers can use to reduce vehicle miles driven by their employees.
   – These incentives can include transit subsidies, bike-friendly facilities, telecommuting policies, and preferred parking for vanpools and carpools.

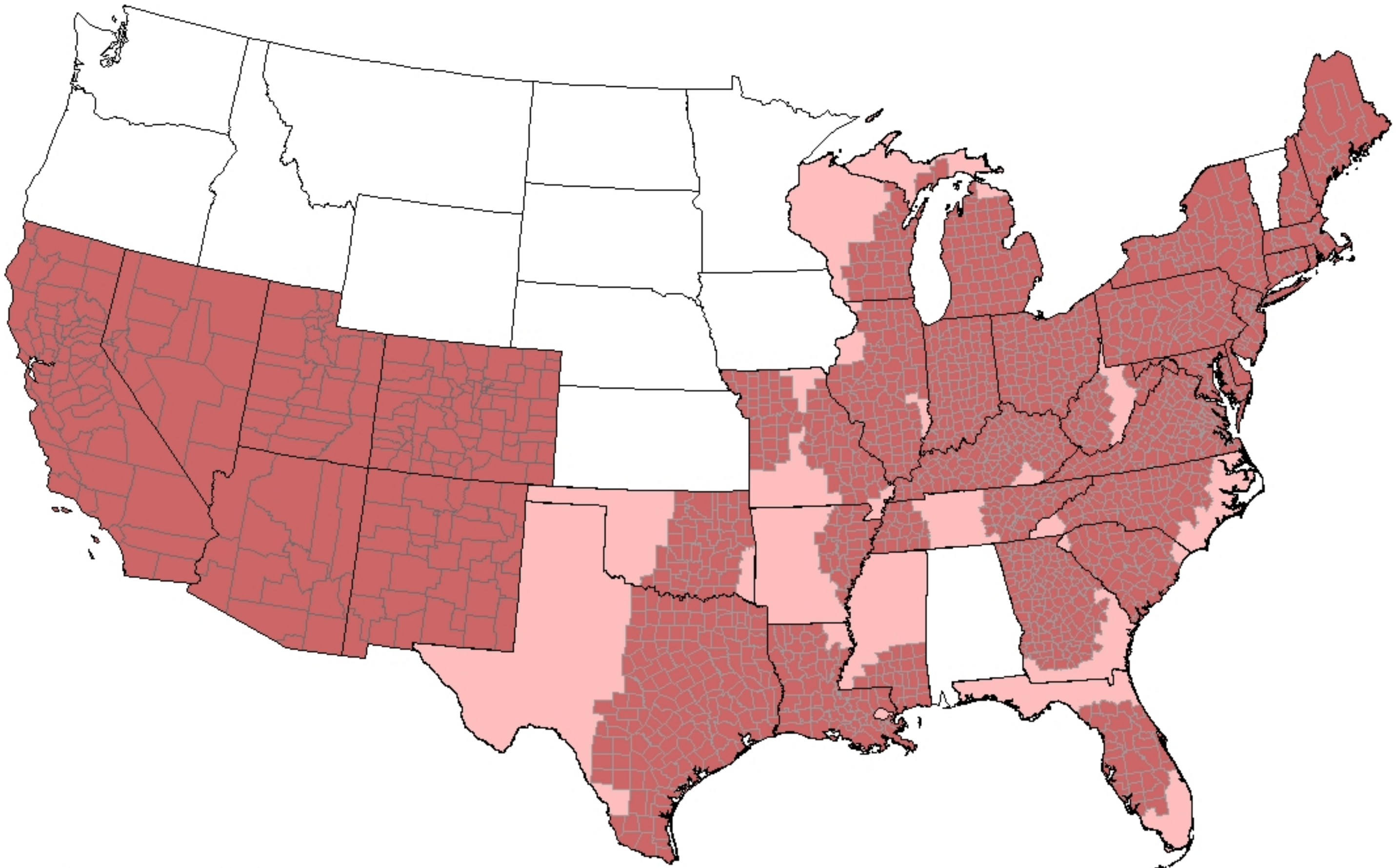
Mobile Control Strategies Modeled for the Final Ozone NAAQS RIA

1. Tier 3
   - Improved catalysts and increased use of electronically controlled air injection could reduce NOx and VOC emissions for light duty vehicles gasoline vehicles
2. Plug-In Hybrid
   - Plug-in hybrids substitute excess grid electricity for gasoline and could provide substantial emission reductions, especially for urban commuters
   - Battery technology remains a challenge, however, sufficient volumes could be achieved by 2020 to produce meaningful reductions in NOx and VOC emissions.
   - Also considered hydrogen fuel cell vehicles, but they face major impediments, and are unlikely to account for any meaningful fleet penetration by 2020
3. Improved After-Market Catalyst
   - EPA and CARB have emissions standards in place for after-market catalysts
   - More stringent after-market catalysts could substantially reduce emissions for the 3 million vehicles that require replacement catalysts each year
4. Nonroad Heavy Duty Retrofits
   - Selective catalytic reduction (SCR) technology and engine rebuilds were included in the preliminary RIA for a limited subset of the nonroad HD diesel engines
   - For the final RIA, we have expanded the type of nonroad equipment included in the analysis, and the horsepower range.

Areas Where Additional Mobile Controls Were Needed to Meet Current Standard, 0.08 ppm



Areas Where Additional Mobile Controls Were Needed to Meet the Proposed Standard, 0.07 ppm



statewide controls*

additional local measures **

Conclusions

- For most of the U.S., cost and benefits of full attainment of proposed and alternative suites of standards vary considerably depending on assumptions in costs and ozone-related benefits estimates, and are not expected to be uniform across the nation

- Preliminary results show California presents a difficult challenge for strategies to attain both the current and proposed standards
  - Our estimates for benefits and costs do not include full attainment for California

- Most of the emission reductions and costs are from control of industrial facilities that are not considered electric generating units

- Existing federal mobile source programs will help areas reach attainment

- The complete RIA is posted on the internet at www.epa.gov/groundlevelozone.