



Tier 3 Vehicle and Fuel Standards: Proposal Overview

March 28, 2013





Overview

- What is Tier 3?
- Why Tier 3?
- Overview of the Program
- Benefits and Costs



What is Tier 3?

- Systems approach to reducing motor vehicle pollution: more stringent vehicle standards enabled by gasoline sulfur control
- Creates a harmonized vehicle program
 - Coordinated with California LEV III and Light-duty GHG standards finalized last year for model years (MY) 2017-2025
 - Enables auto industry to produce and sell one vehicle nationwide
- Part of comprehensive approach to create cleaner, more efficient vehicles
 - Begins phasing in with model year 2017
 - To allow coordinated compliance with LEV III and LD GHG



Why Tier 3: Air Quality and Public Health

- Tier 3 standards would have immediate health and air quality benefits
- Will help attain and maintain ozone and PM NAAQS
 - Provides cost-effective national reductions that avoid more expensive local controls
- Reduces pollution near roads
 - More than 50 million people live, work, or go to school near major roads



Why Tier 3: Harmonized Vehicle Program

- California finalized LEV III standards last year
 - EPA issued a waiver under CAA in December 2012
- The auto industry supports Tier 3 because they want to produce and sell one vehicle nationwide
- Tier 3 is harmonized with LEV III
 - Would begin in 2017 to allow coordinated compliance with GHG and LEV III



Why Lower Sulfur Gasoline?

- Both Tier 3 and LEV III vehicle standards depend upon lower sulfur gasoline
 - Sulfur at current levels degrades the performance of vehicle catalytic converters the primary emission control system on vehicles
- Tier 3 vehicle standards not achievable without lower sulfur
- Lower sulfur also provides immediate reductions in NO_x and VOC emissions from the existing fleet
- California already has lower sulfur gasoline (as do Europe, Japan, S. Korea, and several other countries)
 - Other states prohibited from controlling gasoline sulfur on their own



Tier 3 Vehicle Standards

- Phase in between 2017 and 2025
- Tighter VOC and NOx tailpipe standards
 - 80% reduction from today's fleet average
- Tighter PM tailpipe standard
 - 70% reduction in per-vehicle standard
- Evaporative emissions standards
 - Reduced fuel vapor emissions and improved system durability
- Revised certification test fuel to better reflect in-use gasoline expected in 2017
 - Current certification test fuel has no ethanol
- Regulatory streamlining/harmonization changes in response to the President's Regulatory Review initiative



Tier 3 Fuel Standards

- Lower the average sulfur standard from 30 to 10 ppm starting January 1, 2017
 - California is already 10 ppm sulfur on average, and Europe and Japan have a 10 ppm cap
- Proposing to either maintain the current per-gallon sulfur caps (80 ppm at refinery gate, 95 ppm at retail) or lower them to 50 ppm and 65 ppm respectively



Impacts on Refiners

- Of the 111 refineries potentially impacted by Tier 3, EPA estimates that:
 - 29 are either already meeting the Tier 3 standard, or could do so with operational changes alone
 - 66 could meet the Tier 3 standard by modifying their existing equipment
 - Just 16 would have to install new equipment to comply with Tier 3
- Refiners would invest roughly \$2.1 billion



Fuel Flexibilities

- Proposing the superset of flexibilities that have proven successful in past EPA fuel programs
- **Annual average** standard with a sufficiently high per-gallon cap
- **Early credit** program to phase in the sulfur standard from January 1, 2014 through December 31, 2019
- **Relief for small refiners and refineries** <75,000 barrels per day
 - Delay of 3 years through December 31, 2019, consistent with the end of the early credit phase-in for large refiners
 - Total of 35 refineries representing a total of 10% of gasoline production
- **Economic and Technical Hardship** provisions available to all refiners
 - EPA has granted hardship relief to over a dozen refineries under past fuel regulations; many more for RFS



Tier 3 Emission Impacts

National Onroad Inventory Reductions

	2017		2030	
	Tons	Percent	Tons	Percent
NO _x	284,000	8	525,000	28
VOC	45,000	3	226,000	23
PM 2.5	NA	NA	7,500	10
CO	747,000	4	5,765,000	30
Benzene	1,625	4	8,581	36
Total air toxics	15,000	3	90,000	23

- Emission reductions will continue to grow beyond 2030 as more of the fleet continues to turn over to Tier 3 vehicles



Benefits of Tier 3

- Total Ozone and PM-related Premature Mortality Avoided:
 - 820-2,400 in 2030 (based on range of ozone and PM mortality studies)
- Other PM- and ozone-related health impacts avoided in 2030:
 - Hospital admissions and asthma-related ER visits: 3,200
 - Asthma exacerbations: 22,000
 - Upper and lower respiratory symptoms in children: 23,000
 - Lost school days, work days, and minor restricted activity days: 1.8 million
- Total Monetized Benefits in 2030 (2010\$):
 - \$8 to \$23 Billion



Summary of Costs and Benefits

- Fuel Sulfur Standard
 - 0.89 cents per gallon
 - \$2.1 billion in capital costs over 6 year phase-in period
 - Based on a detailed, peer-reviewed, refinery-by-refinery analysis
- Vehicle Standards in 2025
 - \$130 per vehicle
- Annual Cost in 2030
 - Vehicle Program: \$2.0 billion
 - Fuel Program: \$1.3 billion
 - Total Program: \$3.4 billion
- Total Monetized Benefits in 2030
 - \$8 to \$23 Billion



Other Fuel Cost Estimates

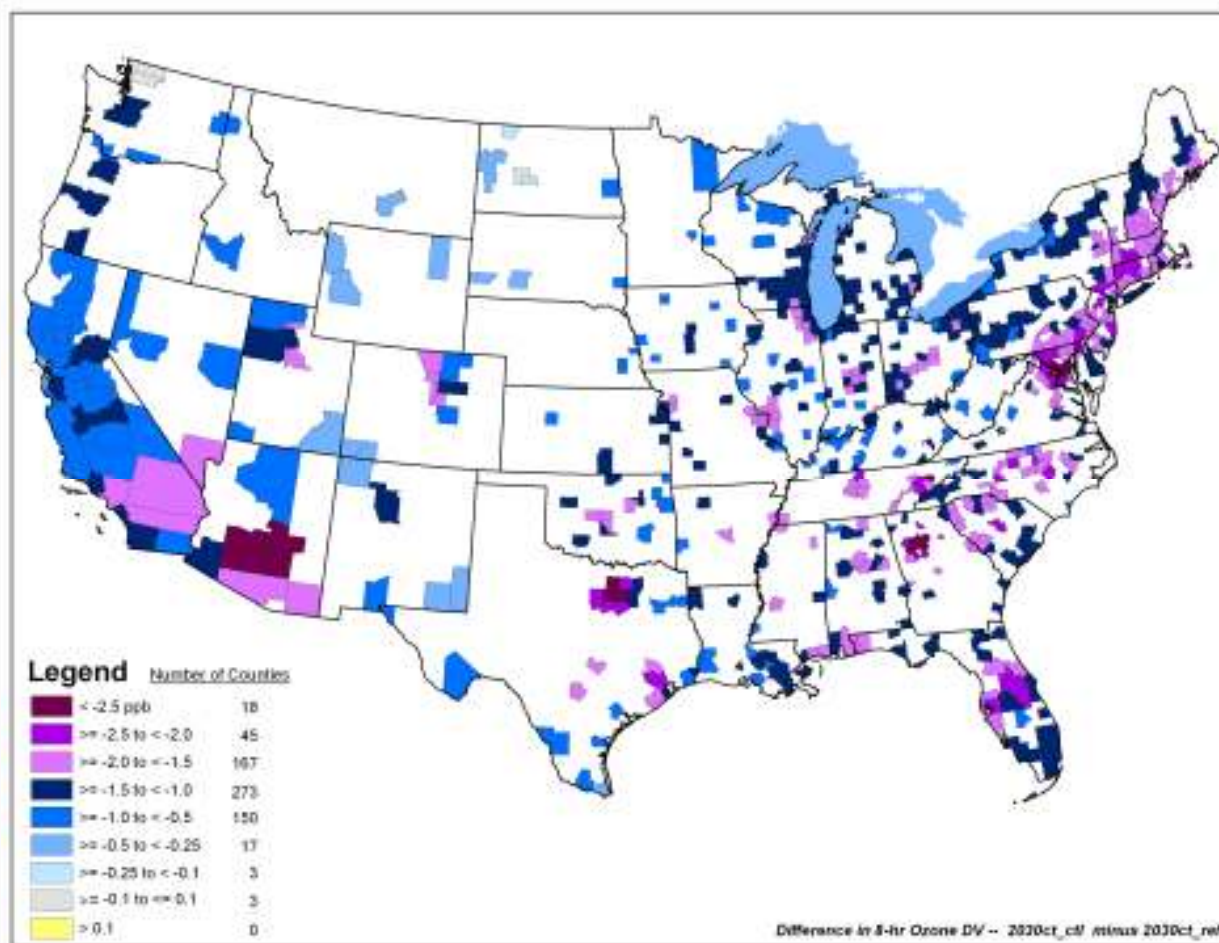
- In July 2011, API released a study by Baker & O'Brien that assumed stringent sulfur and RVP control
 - Cost of 25 ¢/gal or more for the highest cost refineries
 - Closure of 7 refineries
- In March 2012 API released an addendum that modeled a program closer to Tier 3, but still more stringent
 - Average cost of 2.1 ¢/gal
 - Cost of 6-9 ¢/gal for the highest cost refineries
 - No refinery closures
 - Average cost
- The new API study actually supports the EPA cost estimate
 - Simple adjustments to reflect plausible capital costs and accepted rates of return on investment bring API's costs in line with EPA's estimate
- Other Sources
 - Mathpro for the ICCT in Oct 2011: 0.8 ¢/gal
 - Navigant for ECTA, June 2012: Evaluated API and Mathpro studies and concluded costs should be about 1 ¢/gal



APPENDIX



Ozone Reductions in 2030 From Tier 3





PM_{2.5} Reductions in 2030 From Tier 3

