



# Beyond 100LL

## Manufacturer, Operator, Airport Discussion

GA Avgas Coalition Briefing  
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# Members of Industry Avgas Coalition

## GA Aircraft Operators

- AOPA – Aircraft Owners and Pilots Association
- EAA – Experimental Aircraft Association
- NBAA – National Business Aviation Association

## GA Aircraft Manufacturers

- GAMA – General Aviation Manufacturers Association

## Avgas Point of Sale - Fixed Based Operators

- NATA – National Air Transportation Association

## Avgas Producers

- API – American Petroleum Institute
- NPRA – National Petrochemical & Refiners Association

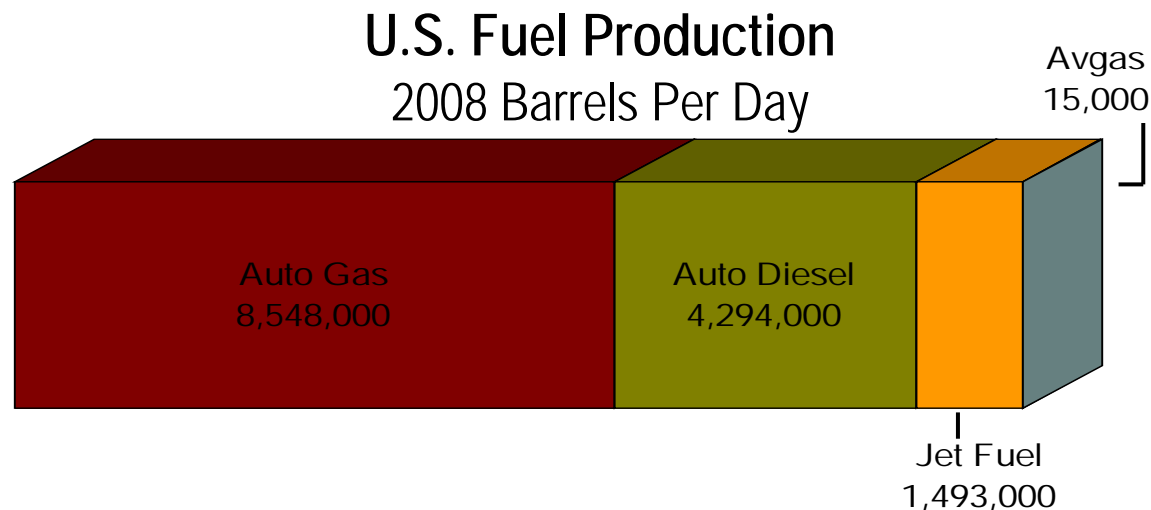
# Problem

- ▶ Significant uncertainty about the continued availability and use of leaded avgas (100LL)
  - Economic and environmental factors
  - GA will eventually have to transition to an unleaded avgas
    - There is no “drop-in” replacement for 100LL that meets the needs of the entire fleet of piston-engine aircraft

# Factors Affecting Long-Term Availability of 100LL Avgas

## Economic

- ▶ There is no assurance of long-term supply of leaded avgas
  - Currently a single supplier of tetra-ethyl-lead (TEL) additive
- ▶ Avgas is specialty chemical or niche fuel
  - Very low volume - accounts for 0.1% of all transportation fuel



# Factors Affecting Long-Term Availability of 100LL Avgas

## Environmental

- ▶ Significant reductions by all other sources of lead
  - Aviation is now largest source (over 45%)
- ▶ 2006 petition by *Friends of the Earth* to regulate GA lead emissions under the Clean Air Act
- ▶ EPA regulatory actions on lead

**Source Sectors of Lead Emissions in the U.S.**

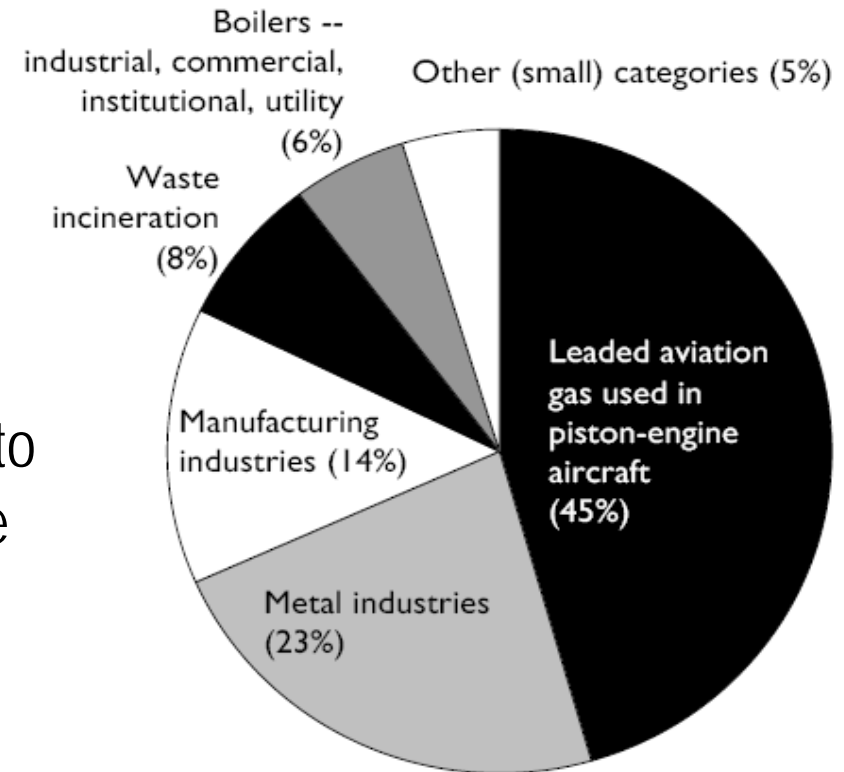


Chart based on EPA's 2002 National Emission Inventory (NEI) with modifications documented in Tom Pace's 05/01/08 memorandum and Marion Hoyer's 05/12/08 and 05/14/08 memoranda to the docket.

# This is Not a New Issue

Clean Air Act results in phase-out of leaded auto fuel

20 years of R&D for a “drop-in” high-octane unleaded fuel

- ▶ A “drop-in” fuel requires NO modification or FAA approval for each aircraft
- ▶ Lab tested more than 200 unleaded blends
- ▶ FAA full-scale engine tests on 45 high-octane unleaded blends

## Finding

- ▶ No “drop-in” unleaded replacement for 100LL has been identified

# EPA Regulatory Actions on Lead

## National Ambient Air Quality Standards (NAAQS) for Lead

- > Final rule issued October 2008
  - In response to court order mandating update
  - 10x increase in stringency (from 1,500 ng/m<sup>3</sup> to 150 ng/m<sup>3</sup>)
  - Monitoring required near:
    - Major sources – over 1 ton per year
      - ◆ Additional NPRM issued December 2009 proposed .5 ton per year in order to include more GA airports
    - Populated areas – over 500,000 people
  - Compliance schedule
    - 2010 State monitoring/measurement equipment in place
    - 2012 Designation of attainment/non-attainment areas
    - 2013 State plans to reduce lead emissions approved by EPA
    - 2017 State must comply with NAAQS for lead standard

# EPA Regulatory Actions on Lead

## National Ambient Air Quality Standards (NAAQS) for Lead (cont.)

- > Each state will look to reduce all sources of lead in non-attainment areas
  - Increased stringency on stationary source standards
    - Lead smelting, battery recycling, metal processing, etc.
  - Actions to address the largest source of lead – GA aircraft/airports
    - Request EPA/FAA standard for lead emissions from aircraft
      - ◆ If not, states may consider other approaches
  
- > Raises significant concerns for GA
  - Affect availability of avgas at airports
  - Restrictions on piston airplane operations or access
  - Sway public/political support to maintain GA airports



# EPA Regulatory Actions on Lead

## Advanced Notice of Proposed Rulemaking (ANPR)

- > EPA issued ANPR on lead emissions from GA aircraft on April 28, 2010
  - In response to *Friends of the Earth* petition
  - Completely independent and separate from NAAQS for lead
  
- > Beginning of “endangerment finding” process under Clean Air Act
  - NPRM expected in approximately 6-18 months
  - Final finding expected in approximately 12-24 months
    - Determine whether lead emissions from aircraft “cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare”
  
- > Clean Air Act requirements for aviation emissions
  - Required steps in rulemaking will take several years to complete
    - EPA endangerment finding
    - EPA regulation setting emission standard (must consult FAA for safety & noise)
    - FAA regulation implementing emission standard

# EPA Regulatory Actions on Lead

## Advanced Notice of Proposed Rulemaking (ANPR) (cont.)

- > ANPR recognizes significant technical and logistical challenges
  - No replacement available for high-octane avgas
  - Size of existing fleet and potential safety implications
  - Specialty fuel production and distribution requirements
- > ANPR request for comments/data
  - Piston-engine aircraft operations and lead emissions
  - Is there sufficient data for EPA to make an endangerment finding
  - Approaches to transitioning to an unleaded avgas
- > EPA “endangerment finding” on lead from GA raises concerns about other possible impacts
  - Restrictions on piston airplane operations or airport access
  - Sway public/political support to maintain GA airports

# Avgas Coalition developing a Future Avgas Strategy & Transition Plan

**Objective:** Establish a process to identify the most viable unleaded solution to replace 100LL by taking into account:

- ▶ Aviation safety
- ▶ Environmental improvements
- ▶ Technical feasibility/aircraft operations
- ▶ Economic impact
- ▶ Fuel production, distribution and cost

**Strategy:** Proactive response to EPA regulatory actions

- ▶ Near-term – support State compliance with NAAQS
- ▶ Long-term – address endangerment finding

## Future Avgas Strategy and Transition Plan (FAST)

**Near-Term:** Provide near-term reduction of lead emissions from GA to support State compliance with NAAQS

**Now:** Assessment of lower-lead content in 100LL fuel

- ▶ CRC research report due September 2010
  - Determine how much reduction in maximum TEL content is possible
  - Completely drop-in. No actions needed by operators

**1-2 Years:** ASTM change to current avgas specification (D-910) to reduce maximum lead content (i.e. 100VLL "Very-Low-Lead")

**2013-2015:** Introduction of very-low-lead content 100LL Fuel

- ▶ EPA/FAA regulation to mandate lower-lead avgas

# Future Avgas Strategy and Transition Plan (FAST)

**Long-Term:** Development and transition to an unleaded avgas replacement for 100LL

## Phase 1 Establish FAA-led public-private partnership

- ▶ Develop and implement an integrated FAA alternative fuels program

## Phase 2 Identify viable unleaded avgas specification

- ▶ Evaluate current D910 fuel specification to determine which parameters can be adjusted (octane, vapor pressure, distillation curve, density, etc)
- ▶ Assessment of candidate high-octane fuels to determine viability
  - ▶ Safety performance, impact on aircraft, and long term availability

## Phase 3 Develop and approve an ASTM fuel specification

# Future Avgas Strategy and Transition Plan (FAST)

**Long-Term:** Development and transition to an unleaded avgas replacement for 100LL (Cont.)

## Phase 4 Certify new production aircraft to new fuel specification

- ▶ Would require dual certification for unleaded and 100LL Avgas

## Phase 5 EPA/FAA regulate transition to unleaded avgas

- ▶ Transition timeline dependent upon level of impact
  - FAA approvals and certifications necessary for safety
  - Avgas production and distribution infrastructure
- ▶ Regulation may need to consider special provisions if there are portions of the fleet that cannot transition within the timeline

# Avgas Coalition Activities

## Congress

- ▶ High interest due to potentially significant impact
- ▶ Appropriation of \$2M in the FAA's 2011 research and development budget for GA alternative avgas
  - ▶ Report language expressing importance of this activity and requesting future budgets reflect resources necessary
- ▶ FAA Reauthorization Bill – proposed language  
Development and implementation of an integrated unleaded avgas program

# Avgas Coalition Activities

## Comments to EPA ANPR

- ▶ EPA Has Inadequate and Insufficient Data to Make an Endangerment Finding
  - Additional, Rigorous Study is Required
  - EPA Is Not Required to Make an Endangerment Finding
- ▶ Avgas Coalition committed to development and transition to an unleaded avgas
  - Near term reductions in lead emissions through very low lead
  - Transition to unleaded avgas will require significant qualification and FAA approval/certification activities
  - Calling for FAA and EPA to establish public-private partnership to develop and implement an integrated unleaded avgas program





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