AVIATION FUELS - UPDATE

Kyle Martin

Vice President, European
Affairs, GAMA
kmartin@gama.aero

EASA GA TeB/CSTG Meeting
10th November 2025

REACH TEL AUTHORISATION UPDATE

BACKGROUND: TIMELINE

TEL added to REACH Authorisation List (Annex XIV)

3 primary EU 100LL Fuel providers have applied for REACH Authorisation for TEL

Authorisation Application approved by:
1) ECHA
2) Member States (REACH Committee)
(Sunset date: 1st May 2025)

Authorisation Application Approved:
EU 100LL supply secure until 2032

Authorisation Application Rejected:
EU production of 100LL must end by 1st May 2025

100LL will have to be imported into the EU from USA (no other suppliers exist in EMEA region)
=> Cost increase

Note: REACH restriction only affects the TEL additive and its handling in the 100LL production process. The distribution and use of 100LL is not affected due the low concentration in the blended fuel

TEL: REACH Authorisation Application Status

Fuel Supplier / Applicant	ECHA RAC+ SEAC Opinion		REACH Committee Outcome			Review Period
	Outcome	Adoption Date	Vote Date	Result	Adoption	
Shell	Consensus - no minority positions	28-Aug-24	11-Jun-25	97%	15-Sep-25	30-Apr-32
Trafigura (Puma)	Consensus - no minority positions	29-Nov-24	25-Aug-25	100%	Pending	30-Apr-32
Warter	Consensus - no minority positions	02-Dec-24	25-Aug-25	100%	Pending	30-Apr-32

Conclusion: 100LL Avgas production and supply in EU is permitted until at least 2032

UNLEADED AVGAS DEVELOPMENTS

Development of Unleaded Avgas Solutions

- The development of unleaded Avgas solutions for the General Aviation fleet is being driven by the US market (largest GA fleet)
- There is currently no “ban” on 100LL in the US at Federal or State level
- The US Environmental Protection Agency (EPA) did issue an “endangerment finding” in October 2023 => any subsequent ban would require regulation/rulemaking by EPA/FAA.
- The FAA together with the fuels industry and GA stakeholders partnered to for the EAGLE (Eliminate Aviation Gasoline Lead Emissions) initiative in 2022.
- The goal is to replace 100LL Avgas in the US market by the end of 2030
- Therefore, the same could be possible for the European market in the early 2030s

APPENDIX:
LATEST BRIEFING FROM EAGLE INITIATIVE

EAGLE's Goal and Partners

"Eliminate the use of leaded aviation fuels for piston-engine aircraft in the United States by the end of 2030 (2032 for Alaska) **without adversely impacting the safe and efficient operation of the existing fleet."**

AOPA your freedom to *fly*

AAAE

GAMA

ICAS

EAA THE SPIRIT OF AVIATION

VERTICAL AVIATION INTERNATIONAL

FEDERAL AVIATION ADMINISTRATION

NBAA

NASAO National Association of State Aviation Officials

API American Petroleum Institute

NATA

Issues Affecting Continued Availability of 100LL

Significant Uncertainty About the Continued Availability and Use of Leaded Avgas (100LL)

- Environmental Factors
  - EPA Endangerment Finding & EPA/FAA Rulemaking
  - California / State, Community & International Actions
- Economic Factors
  - Single Supplier of Tetra-ethyl-lead (TEL) Additive

GA Will Eventually Have to Transition to Unleaded Avgas

- Potentially Significant Impact Upon Existing GA Fleet & Operations
- Need to Incentivize & Support Development of Viable Unleaded Avgas and Strategy for a Safe & Smart transition

EAGLE Objectives

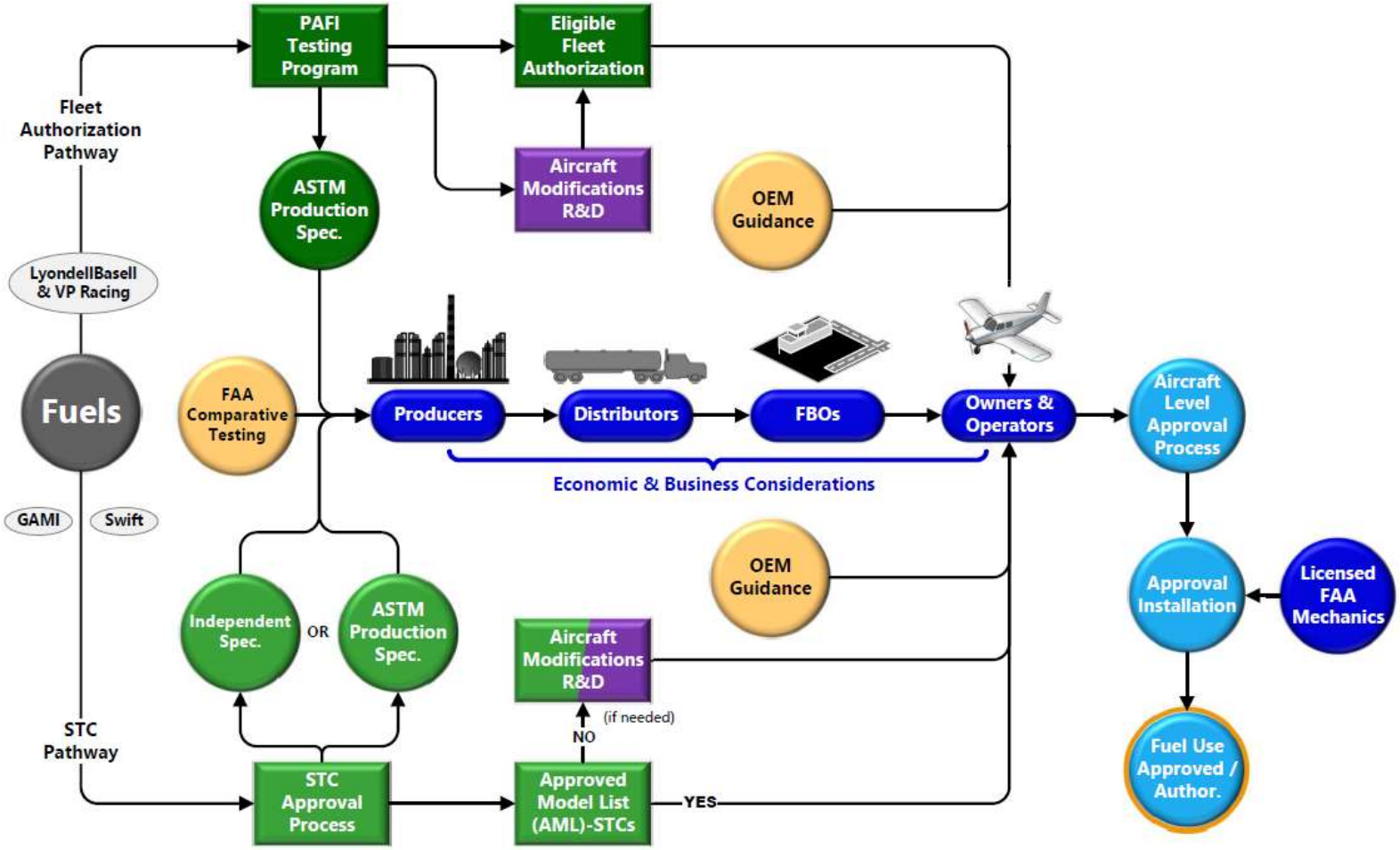
- Facilitate Stakeholder Support for the Development and Deployment of Viable Replacements for 100LL
- Research and Develop Technical Solutions to Mitigate the Potential Impacts on the Existing GA Fleet
- Inform the Regulatory & Policy Processes to Safely and Smartly Transition to a Viable Unleaded Replacement
- Protect the Availability of 100LL During the Transition

EAGLE Objectives

What Is a Viable Unleaded Replacement for 100LL Avgas?

- Safety
  - Engines & aircraft must continue to meet FAA airworthiness requirements
  - Components of a new fuel must be acceptable for use
- Production & Distribution
  - Understanding of fuel to make business decisions for supply to end user aircraft
  - Can be produced and distributed in quantities and locations to meet U.S. need
- Consumer Use and Continued Operational Support
  - Economically reasonable for consumers
  - Manufacturer understanding of fuel for continued technical & warranty support

Transition to Unleaded Aviation Gasoline – "Big Picture"



Two Paths For FAA Safety Approval for Use of Fuel

Supplemental Type Certificate Process

Traditional FAA aircraft type certification

Fleet Authorization Process - PAFI

FAA aviation fuel fleet authorization process established by Congress through a collaborative industry/government testing program

Unleaded Fuel Development – Stakeholder Understanding of New Fuels

- **STC Process** – Proprietary between applicant and FAA
  - Applicant Controls Visibility of Tests and Evaluations
  - Applicant Controls Visibility of Company Fuel Specification

- **Fleet Authorization - PAFI Process** – Collaborative Industry/FAA
  - Aircraft/Engine OEMs and Key Stakeholders Directly Involved (TAC)
  - Establish Agreed Testing Requirements & Technical Review of Data

- **ASTM Consensus Standard Process**
  - Industry Custom & Practice for ALL Transportation Fuels (Aviation, Automotive, etc)
  - ASTM Production Specification Supports Commercialization

Unleaded Fuel Update – GAMI's G100UL

- FAA Approved Model List STC (AML STC) – All Certified Piston Engine Airplanes
  - SE01966WI Part 33 Engine AML STC includes all FAA type-certificated spark-ignition piston engines
  - SA01967WI Part 23 Airplane AML STC includes all type-certificated fixed-wing airplanes

- Project for Rotorcraft Airframe STC ongoing (Engines approved)
- Vitol Aviation has produced 1.3 million gallons of G100
- G100UL currently available at Reid-Hillview-CA, Watsonville-CA, Tupelo-MS, Refugio County-TX, Ada-OK

Unleaded Fuel Update – Swift Fuels 100R

- Obtained ASTM D8603 Production Specification for 100R Unleaded Avgas
- FAA issued initial **100R** STCs for airframe and engines:
  - SE4651CH Part 33 Engine STC for Lycoming IO-360-L2A engines
  - SA04652CH Part 23 Airplane STC for Cessna 172 R/S
  - AML-STC expansion of engines/airplanes to cover same scope as UL94 expected by Q1 2026

- 5 U.S. Flight Schools Using 100R for Cessna 172 R/S training fleet
  - Originally announced Jan 2025 by California's San Carlos Flight Center (SCFC)
- Southern Illinois University (SIU) conducting operational comparison of 100R and 100LL
- Sept 2025, five airfields are now approved in Europe at Germany, Netherlands, Austria, and Belgium

Unleaded Fuel Update – Lyondell/VP Racing UL100E

LyondellBasell/VP Racing's UL100E

- Fuel evaluation testing being conducted under joint FAA/Industry Piston Aviation Fuels Initiative (PAFI) Test Program
  - Status of materials, engine & aircraft testing at flyeagle.org (scheduled completion Sept 2026)
  - FAA Fleet Authorization planned Spring 2027

- ASTM International Task Force Developing Industry Consensus Production Specification
  - Peer review of research reports on materials compatibility and performance testing

2024 FAA Reauthorization Act

•**SEC. 827. EAGLE INITIATIVE** – This section requires the FAA to continue to partner with industry and other Federal government stakeholders to carry out the Eliminate Aviation Gasoline Lead Emissions Initiative (EAGLE Initiative) through the end of 2030. This section specifies that the FAA shall take such actions as may be necessary to facilitate:

1) the **safe elimination of the use of leaded aviation gasoline by piston-engine aircraft by the end of 2030** without adversely affecting the safe and efficient operation of the piston-engine aircraft fleet.

2) the **approval of the use of unleaded alternatives to leaded aviation gasoline for use** in all piston-engine aircraft types and piston-engine types.

3) the **implementation of the requirements relating to the continued availability** of aviation gasoline.

4) efforts to make unleaded aviation gasoline **widely available** for purchase and use at airports, and

5) the **development of a transition plan** in consultation with industry and the EAGLE initiative.

Facilitating Transition to Unleaded Fuel

- **FAA Developing National Transition Plan Toward Unleaded Replacement for 100LL**
  - Draft to be released in Federal Register for review & comment (expected 2025Q4)

- **FAA Conducting Comparative Assessment of ALL Unleaded Fuels**
  - Independent & standardized testing of materials, detonation & performance
  - Facilitate understanding & confidence through “apples-to-apples” data comparison
  - Planned completion Summer 2026

QUESTIONS?