Implementing SSJF in Practice: Challenges & Key aspects to consider

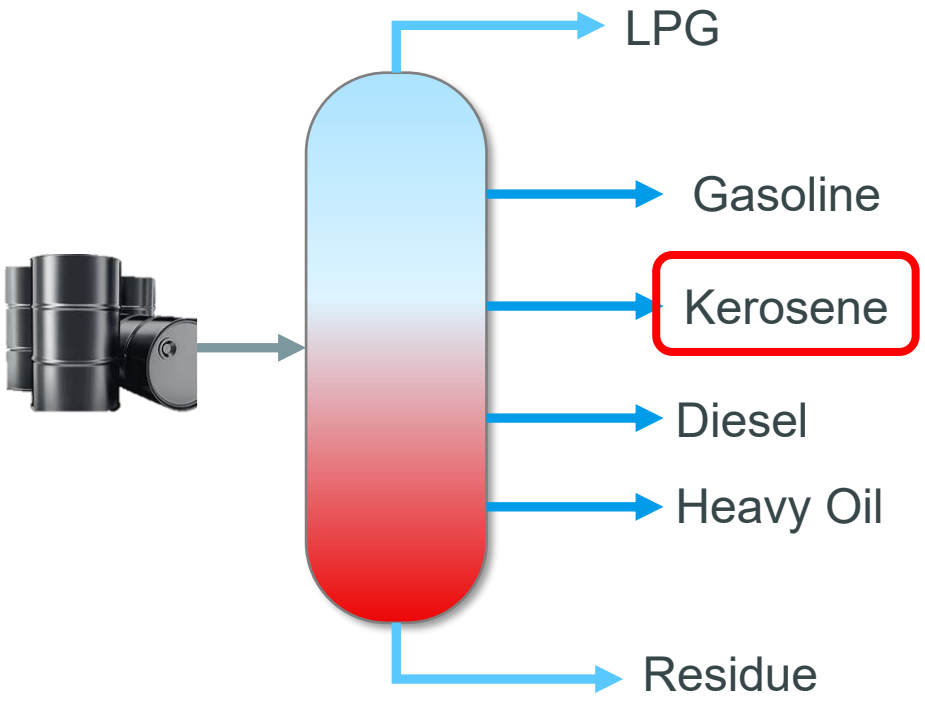
CONCAWE Meeting 2026

C. Doucet – 2026 October

Agenda

1. Evolution on responsibilities
2. Evolution on products
3. Logistic complexity and implication on blending
4. Routes towards 100% SAF implications
5. Documentation available for the industry

Before : only “simple” fossil Jet fuels produced in refineries !



Jet fuel derived from fossil origin

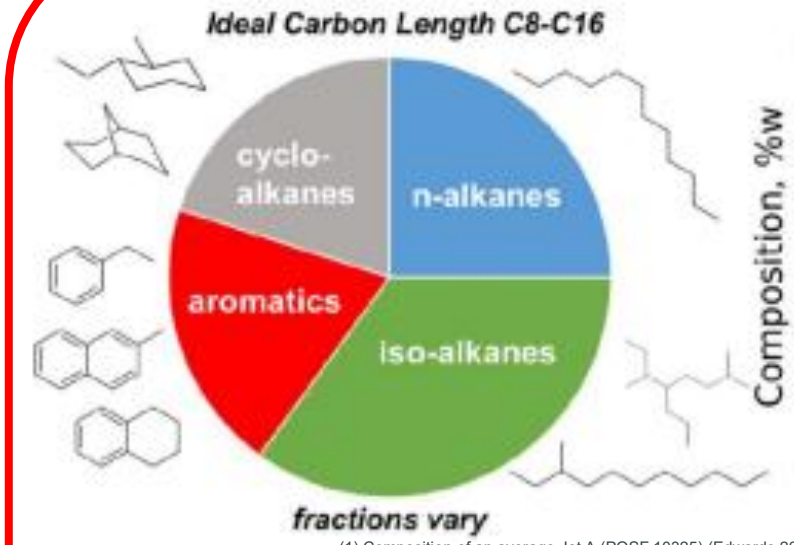
Complex mixture of hydrocarbons (alkanes, alkenes & aromatics)

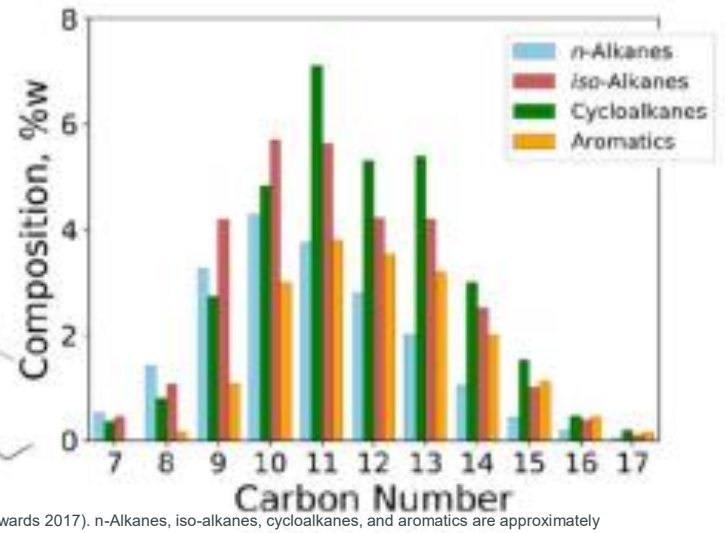
Characterized by its distillation range & carbon distribution

Main standards: ASTM D1655 & DEF STAN 91-091

Flash Point

Freezing point





(1) Composition of an average Jet A (POSF 10325) (Edwards 2017). n-Alkanes, iso-alkanes, cycloalkanes, and aromatics are approximately normally distributed across the carbon number range. A molecule with 11 to 12 carbons is approximately average (Holladay et al., 2020).

Aromatics are limited to 25%

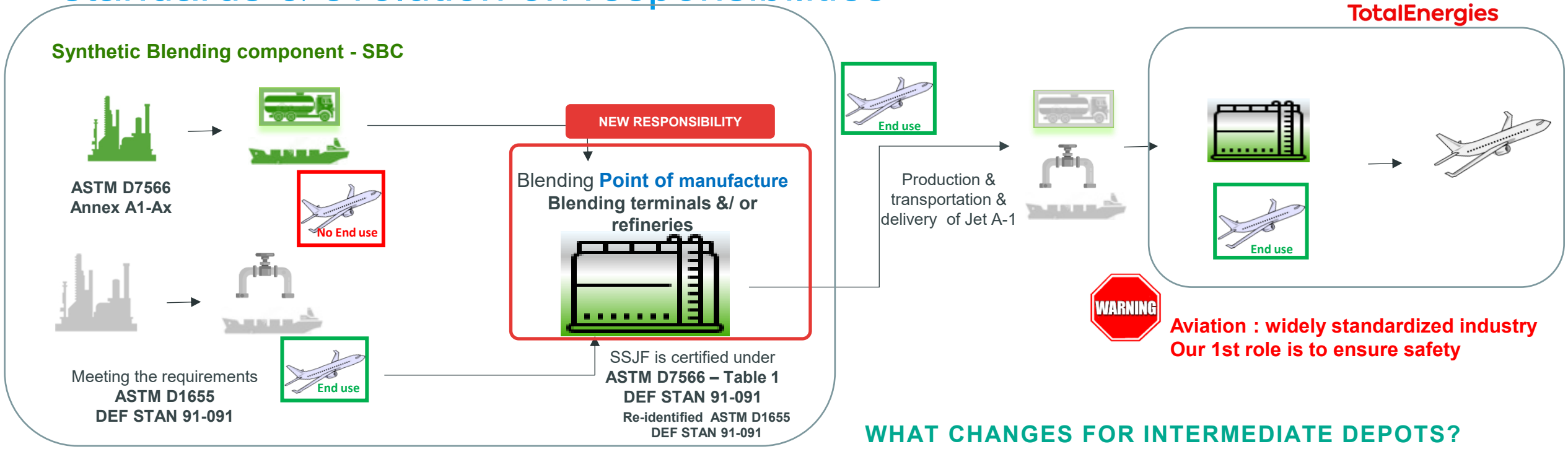
Olefins and heteroatoms are limited (not allowed)

- Olefins (<1%) (gum formation)
- S, N, O containing (limited allowance)

Pie chart adapted from Tim Edwards

Now…more complex situation with new products, new standards & evolution on responsibilities

TotalEnergies



WHAT CHANGES FOR INTERMEDIATE DEPOTS?

TRADITIONAL ROLE

Maintain fuel quality

- Protect product quality during storage and transfer
- Apply established handling, sampling and recertification controls

EVOLVING ROLE

Become a point of manufacture

- Control the blending recipe and demonstrate homogeneity
- Certify the new batch against D7566 Table 1
- Understand SBC characteristics, composition and limits

ENABLERS

Build capability

- Training and awareness of personnel
- Extend quality assurance responsibilities
- Implement EI 1533 requirements and guidance

SBC : Synthetic Blending Component
SSJF : semi-Synthetic Jet Fuel = SATF : Synthetic Aviation Turbine Fuel

What a pity : Not all properties aligned between SBC and Jet A-1

SBC blending is a quality-by-design exercise - not a simple volumetric calculation

KEY SPECIFICATION DIFFERENCES

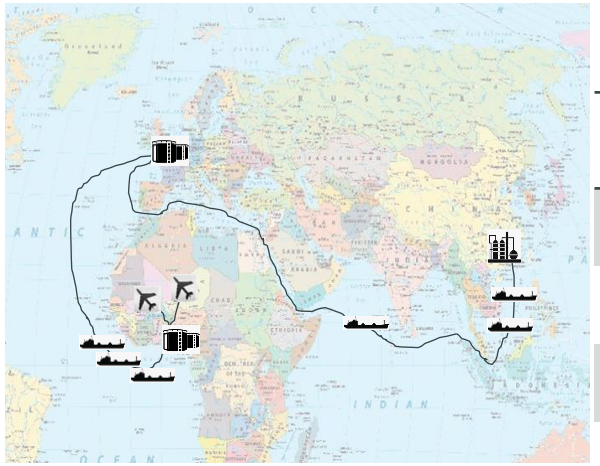
PROPERTY	SBC ASTM D7566 ANNEXES	JET A-1 DEF STAN / ASTM D1655	ASTM D7566 BLEND
Density	730–840 kg/m³	775–840 kg/m³	775–840 kg/m³
Minimum aromatics	No minimum[1]	No minimum	**8% minimum**
Lubricity	No limit	Only for “hard” jet fuels	0.85 mm
Distillation T90–T10	5–40°C	No limit	40°C minimum
Distillation T50–T10	No limit	No limit	15°C minimum
Freezing point	–40°C maximum	–47°C maximum	–47°C maximum
Flash point	38°C minimum	38°C minimum	38°C minimum
Viscosity at –40°C	Not measured	Not measured	12,0 cSt maximum

[1] 8% minimum for Annex A8.

WHAT DOES THIS MEAN FOR BLENDING

1. **Feedstock-dependent incorporation** — The blend ratio depends on both fossil Jet A-1 quality and SBC properties.
2. **Property knowledge is essential** — Some properties do not blend linearly; assumptions may be misleading.
3. **Not every Jet A-1 is suitable** — Available quality information varies along the supply chain (CoA – CoQ – RT).

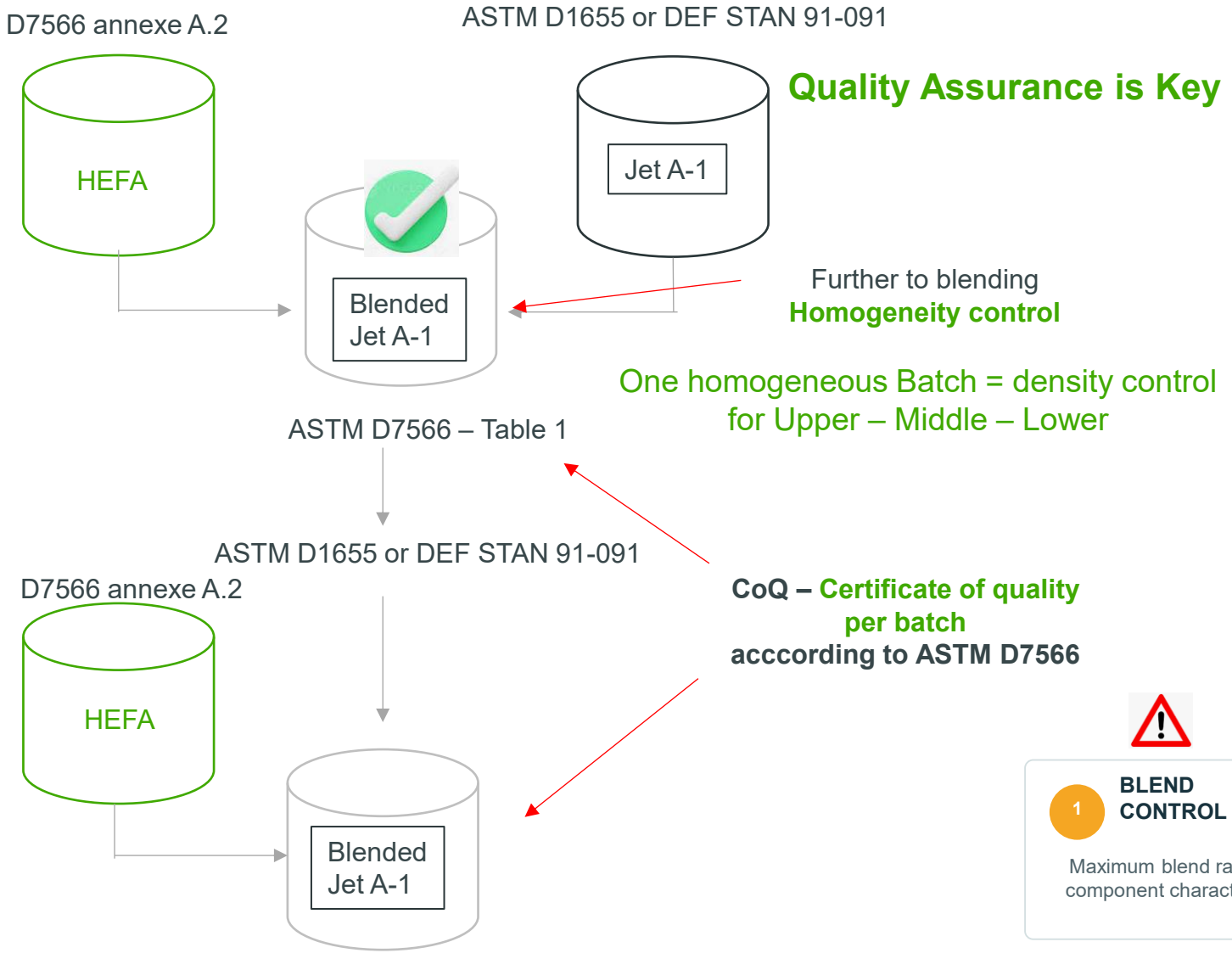
Logistic complexity



Extract recertification test requirements

- Distillation
- Flash point
- Density at 15°C
- Freezing point

….. A challenging journey…. and at the end, SSJF is Jet A/Jet A-1

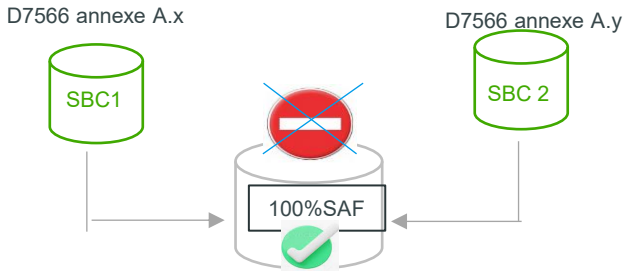


BLENDING TERMINAL CHALLENGES

CAPACITY	Dedicated capacity for receiving, blending, settling and dispatch
SEGREGATION	Aviation-compliant design with positive segregation between grades
PROCESS CONTROL	Controlled blending and demonstrated homogeneity
CONTINGENCY	A recovery plan for any off-specification blend
LAB ACCESS	Timely access to laboratories for product testing
COMPETENCE	Qualified personnel able to issue the Certificate of Quality

1. **BLEND CONTROL** — Maximum blend ratio and component characteristics
2. **HOMOGENEITY** — One batch: upper, middle and lower density checks
3. **VALIDATION** — Certificate of Quality issued for each batch

Towards new challenges …100% SAF…

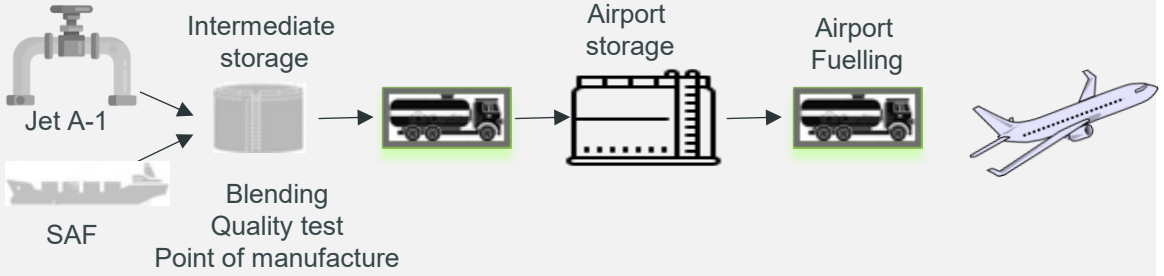


Drop-In

- Physical issues :

> Fully compatible with current engine & fuel system design

> No operational impact on logistics and infrastructure



- Standards issues :

> Jet A-1 grade

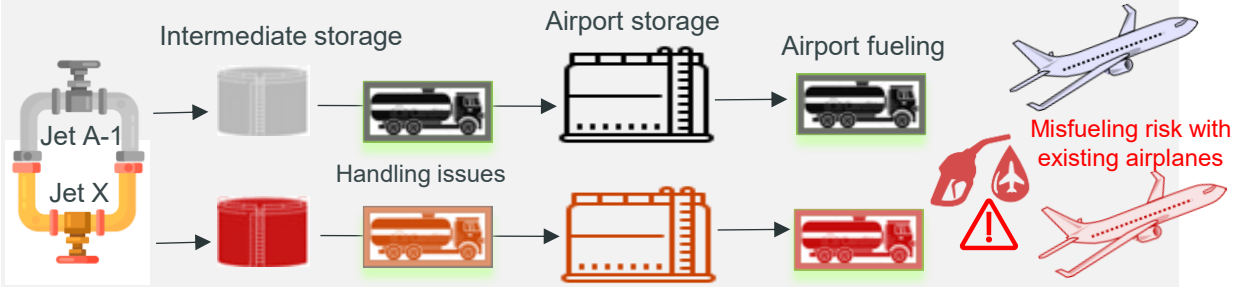
> Extension of current ASTM D7566 Specification

Fully paraffinic fuel

- Physical issues : 2 segregate logistical flows

> Not fully compatible for all existing engines and aircraft

> Operational impact on logistics and infrastructure



- Standards issues :

> New fuel grade (e.g., “Jet-X”) & new specification

> Full segregation for the new grade

→ Logistics & distribution issues not to be omitted when we consider future evolutions

→ Vigilance for airport in case of multiple grades availability

Not all SBC combinations follow the same specification route

The applicable route depends on the approved pathway, the blending components and the certification basis for the final fuel.

1 STANDARD BLENDING ROUTE

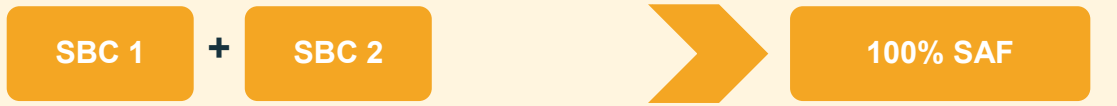
One qualified SBC is blended with conventional jet fuel within the applicable annex limit.



Certify against ASTM D7566 Table 1 → Jet A / Jet A-1

2 100% SAF when applicable

Under discussion – specification will include additional specific characteristics compared to SSJF



Certify against ASTM D7566 when available Jet A / Jet A-1

3 In between….

What about blending SBCs before blending with jet A-1?



Not feasible today

What about enabling greater blending flexibility while maintaining a robust, pathway-based safety and fuel-quality framework?

JIG - TID 4 Technical document on SAF



What does TID 4 cover?

01 Definitions & applicable standards

02 Co-processing

03 Blending, certification & release

04 Handling & transportation

05 Sustainability evidence & PoS certificates

Available on jig.org

Free for JIG members

EN FR DE ES JP

Document covering useful information from production to delivery

EI 1533: Quality assurance for SAF and SBCs



What does EI 1533 cover?

01 SBC manufacture to ASTM D7566

02 Co-processing controls

03 Blending, certification Blending, certification & release release

04 Storage, handling Handling & transportation transportation

05 SSJF quality through delivery to airports

Available from energyinst.org

Published February 2025

Supplement to EI/JIG Standard 1530

One reference document covering essential quality controls from SBC manufacture through delivery to airports

Factors to consider when implementing new aviation fuels

TotalEnergies

Manage the transition

- Move beyond a single, familiar fossil Jet A-1 supply model.
- More complex situation with new products, standards and evolving responsibilities.

Trained people

- Ensure requirements are understood at every supply-chain step.
- Support stakeholders with clear aviation-specific guidance.

Blending

- SSJF quality depends on both the SBC and the fossil Jet A-1.
- Lower aromatic content may constrain the achievable blend ratio.

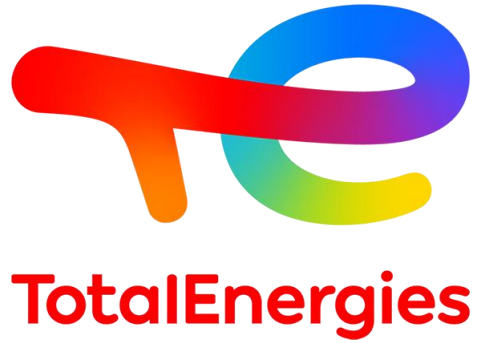
Quality assurance

- Define robust blending, sampling and release controls.
- Demonstrate a homogeneous, on-spec product before release.

Prepare for 100% SAF logistics

- Anticipate multiple grades, segregation and product identification.
- Adapt storage, transport and airport distribution arrangements.

Safe implementation depends on aligned specifications, operational controls and accountabilities across the full supply chain.



Thank you