Global Landscape of SAF Accounting Methodology and Registry Systems

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Introduction

Sustainable Aviation Fuels (SAF) has emerged as the most pivotal solution to help aviation achieve its net-zero carbon emissions target by 2050. However, to fully realize its benefit and deploy SAF in the most cost-effective and environmentally efficient way, a global and robust accounting and reporting system needs to be adopted to facilitate SAF deployment. Such a system would need to ensure a credible accounting of SAF environmental attributes through appropriate transparency and prevention of double counting while providing verifiable data to instill confidence in SAF-associated claims. This article explores the current global landscape of SAF accounting methodology and registry systems, highlighting key methodologies and registries and the challenges of achieving a globally harmonized approach to SAF deployment and integration.

Why accounting and registry systems matter for SAF deployment

SAF supply chains are often more complex than conventional aviation fuels (CAF). SAF adoption involves not only the uplifting of physical SAF molecules into aircraft but also the claiming of its associated environmental attributes. SAF emissions reduction is accounted for on its lifecycle basis and does not occur at the tailpipe of the aircraft engines. As such, SAF can be produced and consumed in one region, but the environmental benefits can be accounted for in another words, SAF accounting can be done on a purchase basis.

In general, a fit-for-purpose SAF accounting framework would enable airlines to claim the environmental benefits from SAF purchases to meet or reduce their regulatory obligations and fulfill additional commitments. A robust SAF accounting system – or network of interoperable systems – offers the following benefits:

- Ensures immutable tracking of the environmental attributes to enable verification.
- Provides full transparency of the claims made over any specific batch of SAF.
- Prevents double counting from double issuance, usage, or claiming.
- Allows stacking of incentives to maximize opportunities to fund SAF's higher prices.

Utilizing flexible and trusted chain-of-custody mechanisms, such as mass balance or book and claim[1], can unlock additional benefits for increased efficiency in SAF production and transport:[2]

- Enables SAF production where it is most efficient.
- Provides increased demand for production facilities geographically distant from larger airports.
- Avoids unnecessary transport of SAF and feedstocks, minimizing cost and the associated incremental emissions, enabling efficient deployment.
- Promotes competition.

1 As defined by the ISO 22905:2020 – Chain of custody general terminology and models.
2 Read further about SAF accounting benefits published by IATA, which are accessible here: https://www.iata.org/contentassets/d13875e9ed784f75bac90f000760e998/iata---saf-accounting-benefits.pdf

Global landscape of SAF accounting methodology and registry systems

Over the years, the global landscape of SAF accounting systems and registries has rapidly evolved and continues to develop to support efficient SAF deployment and adoption. These systems play a critical role in tracking SAF environmental attributes and verifying SAF purchases and usage while ensuring transparency, preventing double counting, and supporting the achievement of emissions reduction targets by airlines and their customers. As governments, airlines, and fuel producers/suppliers collaborate to scale up SAF adoption, a range of registries and accounting frameworks have emerged to address the complex needs of the market. These systems are designed to provide reliable methods for documenting SAF production, transfer, transaction, and consumption, covering regulatory and voluntary compliance related to SAF. Developing and integrating these systems through a global interoperability framework is crucial for building robust and transparent SAF ecosystems that support sustainable goals and efficient SAF deployment globally.

Table 1 (Appendix) summarizes these systems to provide an overview of the global landscape of SAF registry systems and the accounting methodologies they employed.

SAF accounting methodology under the ICAO's CORSIA framework

The CORSIA Standard and Recommended Practices (SARPs) provisions recognize that jet fuel and SAF are not segregated at airports but are typically co-mingled. CORSIA-eligible fuels (CEF) can be mingled in fuel pipelines, storage terminals, and airport storage systems, all upstream from its use in aircraft. The CEF purchased by a particular airline may not be physically used in its aircraft, and it will not be feasible to determine the specific CEF content at the point of uplift in an aircraft, given the nature of the upstream supply chain. Claims of emissions reductions from using CEF by airlines are based on the mass of CEF according to purchasing and blending records[3]. Furthermore, according to ICAO Doc 9501 - Environmental Technical Manual, Volume IV, the CEF can be produced and uplifted anywhere in the world as long as they satisfy CORSIA reporting requirements by the CORSIA SARPs[4].

Key Challenges of SAF Accounting Systems and Registries

Despite tremendous progress, several challenges to achieving a globally harmonized accounting system still exist. While SAF is used for the same reason, i.e., to address emissions reduction, the methodology by which the emission reductions are accounted for across different frameworks still slightly differs. This creates confusion and market inefficiency. There's also a lack of certainty to the eligibility of accounting SAF emission reductions using Book and Claim as a chain of custody model. In particular, the Greenhouse Gas Protocol (GHGP) lack of recognition on Book and Claim remains a major barrier to unlocking corporate SAF demand. There's a high consensus that using SAF registries could help ensure traceability between physical SAF molecules and their associated environmental attributes. However, interoperability between registries is still lacking despite industry efforts to standardize data fields, reporting formats, and certificate attributes.

The game changer: The IATA SAF accounting and reporting methodology and the SAF registry by CADO

The IATA SAF accounting and reporting methodology provides airlines and SAF users with a consistent approach for accounting and reporting emissions reduction associated with SAF use[5]. Developed by over 40 airline experts worldwide, the methodology is feedstock-agnostic and technology-neutral. Moreover, the methodology complements existing international frameworks, such as the ICAO's CORSIA framework and the GHGP, while reinforcing consistency without duplicating efforts. It also

3 Note 1, Clause 2.2.4 of ICAO CORSIA SARPs, Annex 16 Vol IV, Part II, Monitoring of CORSIA eligible fuels claims
4 Clause 3.3.5.5 ICAO Doc 9501, Environmental Technical Manual, Volume IV, Use of CORSIA eligible fuels
5 The IATA SAF accounting and reporting methodology was published in Jan 2025 and can be accessed here: https://www.iata.org/en/programs/sustainability/reports/saf-accounting-reporting-methodology/

provides guidance for SAF emissions reduction in per-passenger and per-shipment calculations.

Recognizing the need for a credible, transparent, and globally interoperable accounting system, the Civil Aviation Decarbonization Organization (CADO), founded by IATA, had recently launched a global SAF registry – a purpose-built infrastructure supporting regulatory and voluntary SAF transactions worldwide[6]. The SAF registry is designed with international compatibility and interoperability in mind. Key features of the SAF registry include:

- **Follows the natural SAF value chain following the GHG Protocol philosophy:** Scope 1 and 3 emissions are properly aligned and are consistently and accurately accounted for throughout the value chain.
- **Involves all SAF stakeholders in the value chain, including all end-users:** Monitor and report SAF usage and emissions reductions effectively through a cohesive and streamlined process.
- **Supports voluntary and regulatory reporting and claiming of SAF:** Compliance with regulatory frameworks such as CORSIA and EU ETS. Ability to integrate future regulations.
- **Enables Mass Balance SAF and Book & Claim Accounting:** Flexible SAF accounting across the supply chain. Emission reduction is credited irrespective of the physical location of SAF.
- **Ensures interoperability and avoids double issuance and claiming of SAF:** Ensures data exchange with other registries, enhancing stakeholder transparency and trust.
- **Neutral governance and transparency:** The SAF registry operates as a non-profit, with a robust governance platform under CADO, ensuring neutrality, transparency, and trustworthiness.
- **Minimized cost for SAF transactions:** The system will be free to all users until April 2027. It will then operate on a cost-recovery basis.

In short, the SAF Registry by CADO provides a credible, centralized, and scalable system to unlock SAF investments and accelerate global SAF deployment and adoption.

The road ahead: Building trust and scale-up

SAF is undoubtedly one of the most promising solutions for decarbonizing the aviation sector, but realizing its potential scale requires more than just increasing its production. It requires transparent, trusted, and harmonized accounting systems and methodologies to accurately account for its environmental benefits while avoiding double counting and reducing any administrative burden associated with its accounting. The global aviation industry has the opportunity and the responsibility to lead and demonstrate the pathways in building a credible, transparent, and scalable market for SAF. Careful coordination and radical collaboration across governments, industry, and standard bodies are needed to enable the aviation industry to create a global and robust accounting framework that instills confidence and preserves integrity in the environmental benefits associated with SAF. The formulation of CADO and the SAF registry is a testament to the industry's determination to address the urgent need for a global and robust SAF accounting framework to facilitate efficient SAF deployment and unlock additional demand to increase SAF productions. ICAO Member States are encouraged to recognize and adopt SAF accounting methodologies and systems for international aviation to enable:

- The claiming of emissions reductions from SAF use toward different regulatory schemes (e.g., CORSIA).
- The tracking of the sustainability attributes and life-cycle emissions linked to the feedstock across geographies, production pathways, transportation, and use of SAF.
- The different stakeholders to claim a SAF purchase against their specific emissions scopes while avoiding double counting and double claiming any given batch of fuel.

6 Announcements of CADO (https://www.iata.org/en/pressroom/2025-releases/2025-03-24-01/) and its SAF registry (https://www.iata.org/en/pressroom/2025-releases/2025-04-03-01/). CADO is incorporated as a not-for-profit organization in Canada, with its headquarters in Montreal. IATA is the founding member of CADO, and its role will include ongoing technical support and operations. CADO governance membership is open to international organizations and companies in the SAF value chain.

Appendix

TABLE 1: Summary of Global SAF Registries and Accounting Systems

System Name	Developer(s)	Market Supported	Development Status	SAF Accounting Methodology Used	Chain of Custody (CoC) considered	Key Features/ Unique Aspects	Key Challenges	Website/ Reference
SAF Registry	Civil Aviation Decarbonization Organization (CADO) – founded by IATA	Regulatory and Voluntary	Active since April 2025	IATA SAF Accounting & Reporting Methodology (aligned with ICAO's CORSIA and GHG Protocol framework)	Physical Segregation, Mass Balance, Book and Claim (based on purchase and blending records)	Cover both regulatory and voluntary requirements Offer minimum cost for SAF transactions and operate on a cost-recovery basis Strong government support and collaboration Interoperability with other SAF registries & accounting systems Designed to align with GHGP requirements	Requires further development for enhanced functionality Requires widespread industry adoption and collaboration despite already having many stakeholder supporters.	Link
123Carbon Platform	123Carbon	Voluntary	Active since September 2022	Accounting based on the issuance of Environmental Attributes Certificates (EACs)	Book and Claim	Focus on market integrity Robust digital security and tracking features	Require further industry adoption	Link
Assure SAF Registry	4Air	Voluntary	Active since May 2023	Blockchain-enabled accounting of SAF transactions based on customers' sustainability obligations and requirements	Physical and Book and Claim transactions	Blockchain-powered (tamper-proof tracking) Decentralized verification by multiple stakeholders	Scalability and blockchain adoption Integration with legacy systems	Link
RSB Book and Claim Registry	Roundtable on Sustainable Biomaterials (RSB)	Voluntary	Active since November 2023	Voluntary Well-to-wake (WtW) accounting methodology with stringent sustainability criteria	Book and Claim	Strict adherence to RSB's robust sustainability framework and ethical standard	Cost per SAF transaction	Link

System Name	Developer(s)	Market Supported	Development Status	SAF Accounting Methodology Used	Chain of Custody (CoC) considered	Key Features/ Unique Aspects	Key Challenges	Website/ Reference
ISCC SAF Credit Transfer System	International Sustainability & Carbon Certification (ISCC)	Voluntary	Active since April 2024	Voluntary Well-to-wake (WtW) accounting methodology	Mass balance	"Plug-and-play" system that complements existing supply chain certification systems Designed closely aligned with requirements set by the Science Based Targets initiative (SBTi) and GHGP.	Requires valid ISCC trader certification	Link
SAFc Registry	Rocky Mountain Institute (RMI), Sustainable Aviation Buyers Alliance (SABA), and Environmental Defense Fund (EDF) and is operated by Energy Web.	Voluntary	Active since December 2023	Voluntary Well-to-wake (WtW) accounting methodology	Book and claim	Align with the Roundtable on Sustainable Biomaterials (RSB) Book & Claim Manual and Registry Recognition Framework requirements. Will seek other standard recognition, including ISCC and ISO	Integration with legacy systems	Link
Avelia	Shell, Accenture, American Express Global Business Travel (AMEC GBT)	Voluntary	Active since June 2022	Voluntary Well-to-wake (WtW) accounting methodology	Book and claim	Blockchain enabled Designed to help transact Shell SAF volumes	Integration with legacy systems Limited to SAF volume from Shell	Link
Union Database (UDB)	EU Commission, DG Energy, and EU ETS administrators	Regulatory	Active since January 2024	EU Renewable Energy Directive (EU RED) and EU Emissions Trading System (EU ETS)	Physical segregation and mass balance	Track SAF production in the EU under the EU RED scheme	Interoperability with other registries, including the national SAF registry	Link
ICAO CORSIA Central Registry (CCR)	International Civil Aviation Organization (ICAO)	Regulatory	Active since June 2022	ICAO accounting methodology for CORSIA-eligible fuels (CEFs)	Physical Segregation, Mass Balance, (claims based on purchase and blending records)	Used to track information submitted by individual states to ICAO to track CORSIA-related information, including CORSIA-eligible fuels	Interoperability with other registries	Link

System Name	Developer(s)	Market Supported	Development Status	SAF Accounting Methodology Used	Chain of Custody (CoC) considered	Key Features/ Unique Aspects	Key Challenges	Website/ Reference
Examples of national registry systems extended to track SAF production as well								
German Nabisy System	German Federal Ministry of Economics and Energy (BMWi)	Regulatory	Active since 2020	EU Renewable Energy Directive (EU RED) and EU Emissions Trading System (EU ETS)	Physical segregation and mass balance	Used to track SAF production and/or use in Germany	Interoperability and integration with other registries, in particular, the Union Database (UDB)	Link
French CarbuRe – The biofuel management platform	French Ministry of Ecological Transition and Solidarity	Regulatory	Active since 2022	EU Renewable Energy Directive (EU RED) and EU Emissions Trading System (EU ETS)	Physical segregation and mass balance	Used to track SAF production and/or use in France Started during French SAF mandate implementation, now ReFuelEU Aviation	Interoperability and integration with other registries, in particular, e.g., UDB	Link