



SECOND-HALF 2026 OUTLOOK
VOL. 02 / AVIATION

AVIATION / MID-YEAR OUTLOOK

Decarbonizing *Aviation* with C3

Clean jet fuel is not a technology problem, it's a financial challenge. The plants won't get built until buyers commit, and so far they haven't. In this report we look at what H2 2026 and beyond will bring — and how Carbon3 (C3) can help accelerate progress.

EXECUTIVE SUMMARY

The diagnosis is settled: *the financing infrastructure is not yet built.*

By mid-2026 aviation decarbonisation is stuck in a coordination problem. Producers will not build without buyers signed up in advance; airlines cannot carry the clean-fuel premium alone; and corporate buyers will only pay for cuts they can defensibly claim under CSRD or SBTi. So no one moves first, and the capital stays on the sidelines — by mid-2025 the pipeline held 144 announced projects but only seven had cleared the decision to build. The missing piece is financial infrastructure: a marketplace that pools corporate climate budgets into the long-term purchase contracts producers need to raise money. That is what Carbon3 (C3) provides — the allocation and reporting layer that turns scattered corporate spend into committed SAF offtake.

PART I

WHERE DOES AVIATION DECARBONISATION
ACTUALLY SIT?

A sector priced, mandated *and stalled.*

This part sets out the state of the sector entering H2 2026: its size and growth, the rising compliance cost, and the financing constraint that seven 2025 reports each name in their own way.

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PART II

WHERE DOES C3 FIT?

Carbon3 is the way *to solve* *these problems.*

This part shows how Carbon3 unblocks the financing constraint. It is the marketplace that aggregates buyer demand, allocates each verified credit to one buyer, and retires it once — while verification stays with ISCC CORSIA, RSB and ISO 14064-3.

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PART III

WHAT DOES IT LOOK LIKE IN PRACTICE?

Two illustrative deals.

Two worked examples show the model in practice: a long-haul Singapore e-SAF book-and-claim for corporate travel, and DHL freighter SAF in Asia-Pacific allocated to shippers with Scope 3 targets.

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PART I / THE STATE OF PLAY

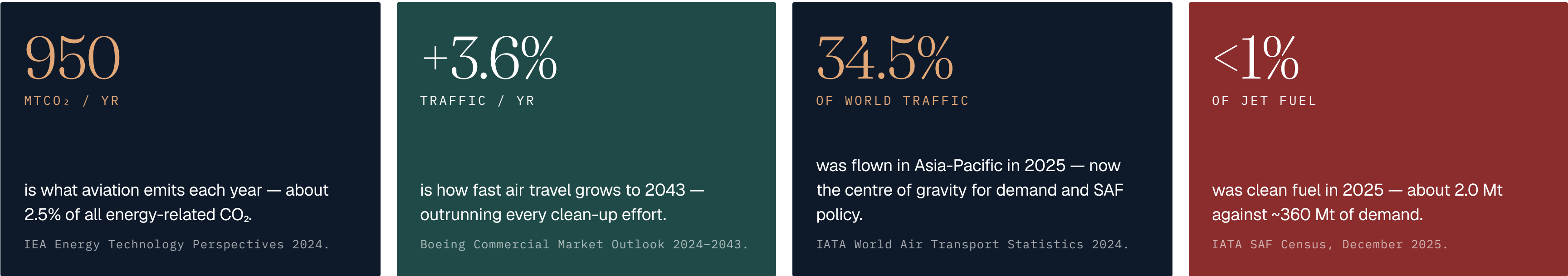
I Where aviation decarbonisation *actually sits* entering H2 2026.

Aviation decarbonisation is now priced and mandated, supplied with too little fuel, and stalled at the point where capital has to commit. This part walks through the sector one challenge at a time — drawing on the major 2025 reports — then connects them.

THE SECTOR AT A GLANCE

A USD 1 trillion industry, growing fast — and short of the one fuel *that can clean it up*.

Aviation is one of the hardest industries to decarbonise. Emissions keep rising as traffic grows, while clean jet fuel (SAF) — the only lever that can cut emissions this decade — still covers under 1% of demand. Net-zero by 2050 is settled policy (ICAO Resolution A41-21); the problem is the widening gap between that target and a clean-fuel supply still stuck below 1%.



CARBON IS NOW A DATED, PRICED LINE ITEM

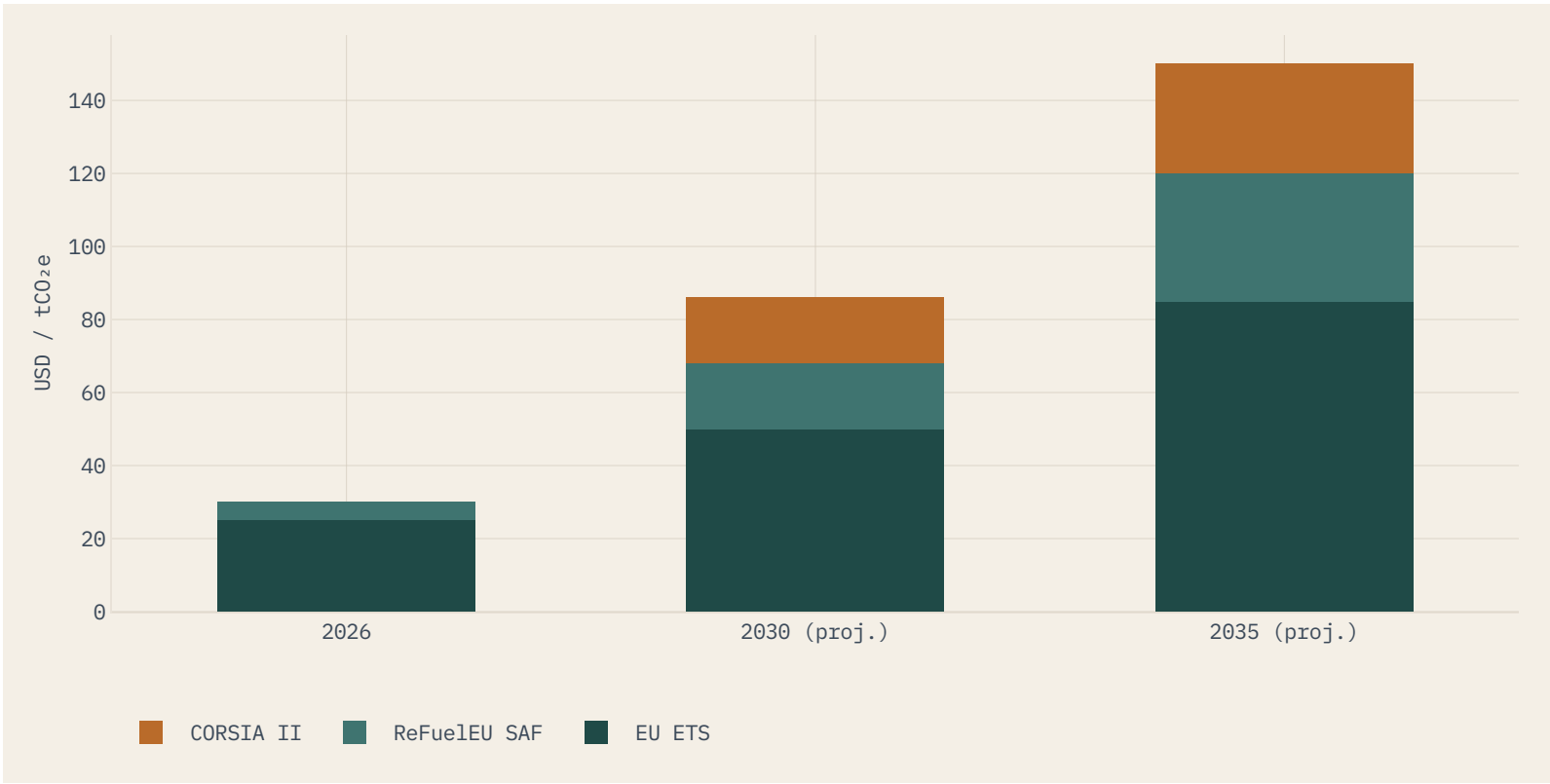
From 1 January 2026, the carbon cost on a long-haul flight out of Europe *roughly quadruples by 2035*.

THE WORLDWIDE COMPLIANCE MAP

INSTRUMENT	2026 STATUS	CARBON-EQUIVALENT COST, 2026
EU ETS Aviation Dir. (EU) 2023/958	Full auctioning; free allowances ended 31 Dec 2025	EUR 75–95 / t
ReFuelEU Aviation Reg. (EU) 2023/2405	2% SAF blend, EU departing flights	~EUR 4–8 / t fuel
UK SAF Mandate SI 2024/1187	3.6% blend (up from 2% in 2025)	GBP 4.70 / L buy-out
CORSIA Phase I → II ICAO A41-22	Voluntary; mandatory from 2027 at 85% of 2019 baseline	USD 18–35 / t
Singapore levy + mandate CAAS	1% mandate live 1 Jan 2026	SGD 3–16 / pax
US §45Z PTC 26 U.S.C. §45Z	Active through end-2029 (OBBBA 2025)	up to USD 1.75 / gal

Sources: European Commission ETS Aviation Implementation; OJEU L 2023/2405; UK DfT SAF Mandate Response 2024; ICAO A41-22; CAAS Sustainable Air Hub 2024; US Treasury §45Z 2025; ICE EUA Dec-26 (Apr 2026).

ONE LONG-HAUL FLIGHT OUT OF THE EU (USD / TCO_{2e} OF FUEL BURN)



The table lists every major regime worldwide; the chart stacks only the three that apply to one flight leaving the EU. The UK, Singapore and US measures bite on flights touching those markets. The cost is policy-set and rising — so for airlines and corporate buyers, *not* securing low-carbon fuel is now a dated, growing bill, not a future risk.

IATA & WORLEY

"The main barrier to reaching the airline industry's goal of net zero CO₂ emissions by 2050 is the slow pace of technology rollout that would enable SAF to be produced from varied sources, and not the availability of feedstock."

— IATA PRESS RELEASE, 23 SEPTEMBER 2025 · [IATA.ORG](https://www.iata.org)

WHAT IT MEANS

IATA and Worley's *SAF Technology Rollout* study (September 2025), updating the September 2024 IATA Net Zero Roadmaps, finds the real bottleneck through 2030 is building the plants, not finding the raw material. Walsh, in the same release: **"if SAF production is prioritized then feedstock availability is not a barrier... We need shovels in the ground now."**

In other words: there is enough raw material. What is missing is built factory capacity for the newer fuel routes — turning waste alcohol, captured CO₂ or biomass into jet fuel (the ATJ, Fischer-Tropsch and power-to-liquid pathways). None of those plants get built until a buyer has signed up in advance.

→ The reports that follow trace why those buyers have not yet signed up at the scale producers need.

INTERNATIONAL ENERGY AGENCY

"we have revised down the e-fuel forecast because there have been no final investment decisions (FIDs) for e-kerosene projects in the European Union to meet 2030 ReFuelEU aviation targets."

– IEA RENEWABLES 2025, RENEWABLE TRANSPORT · [IEA.ORG](https://www.iea.org)

WHAT IT MEANS

The IEA's *Renewables 2025* (October 2025, Renewable transport chapter) cut its forecast for synthetic jet fuel sharply. The reason: not one such plant in Europe has been given the final go-ahead to build (a final investment decision) — yet that capacity is what ReFuelEU's 2030 rule demands. Synthetic kerosene is now expected to make up **only 5% of 2030 SAF production**, because only Europe requires it. Demand is not the problem; the decision to build is.

From 2030, ReFuelEU forces airlines to use at least 1.2% synthetic jet fuel. Meeting even that floor would need plants under construction today. None are.

→ Europe's synthetic-fuel gap is the sharpest case — and a preview of the wider build-decision problem.

WORLD ECONOMIC FORUM

"Executives highlighted the availability and cost of SAF as the biggest challenge affecting progress on decarbonizing aviation during 2025."

– WEF GLOBAL AVIATION SUSTAINABILITY OUTLOOK 2025, §2.1 · [REPORTS.WEFORUM.ORG](https://reports.weforum.org)

WHAT IT MEANS

In the WEF's *Global Aviation Sustainability Outlook 2025* (March 2025), aviation executives ranked SAF supply and cost as the single biggest blocker on decarbonisation. The same chapter notes the corollary: **"the number of [SAF offtake] agreements, as well as their volume and average tenor, has been reducing since they peaked in 2022."** The deals to buy SAF — both how much they cover and how many years they run — have been shrinking since 2022, exactly when the sector needs the opposite.

Short contracts do not get plants financed. A new SAF plant needs a buyer locked in for 7 to 15 years. Letting companies pay today for fuel used on someone else's flight (book-and-claim) is the closest thing the market has to that long contract.

→ If executives rank cost the top blocker, the contract that funds capacity is what needs fixing.

MISSION POSSIBLE PARTNERSHIP

"If the rate of conversion seen in the last six months were to continue, it would take approximately 40 years for all announced projects to begin construction."

— MPP GLOBAL PROJECT TRACKER INSIGHTS, JUNE 2025 · MISSIONPOSSIBLEPARTNERSHIP.ORG

WHAT IT MEANS

MPP's *Global Project Tracker* (June 2025 Insights) counts 22 SAF plants running today, 7 given the final go-ahead to build, and 144 announced but going nowhere. At the rate projects moved forward over the prior six months, clearing that backlog would take roughly 40 years. The same release calls for **"a five-fold increase in investment, along with concerted action from governments, financial institutions and corporate buyers"**.

Most of the 144 stall at the build decision because the buyers signed up so far are too few, and their contracts too short, to support a bank loan for the plant.

→ The pipeline exists; the conversion rate does not — and that gap is financial.

ICCT

"A limited supply of sustainable feedstock for currently commercialized SAF pathways means the majority of this production will rely on advanced technologies not yet deployed at commercial scale."

– ICCT, JULY 2025 · [THEICCT.ORG](https://www.theicct.org)

WHAT IT MEANS

The ICCT's *Industry perspectives on advanced SAF* (July 2025, white paper ID 373) finds that most future SAF has to come from production routes that do not yet run at full commercial scale. Only one route — HEFA, made from waste fats and oils — produces in real volume today, and it is running out of raw material. The newer routes (waste alcohol, captured CO₂, biomass) each have to grow from almost nothing to millions of tonnes a year by the mid-2030s.

What holds these routes back is **financing**, not technology. The chemistry already works at pilot scale; what is missing is a way to connect committed commercial buyers to the new plants so they can raise the capital to scale. On subsidies alone, the economics do not yet close.

→ These not-yet-commercial routes are exactly where a committed buyer makes the difference.

TRANSPORT & ENVIRONMENT

"European aviation has a growth problem: the sector plans to grow at uncontrollable rates, at a time when it is meant to reduce its emissions."

– T&E STATE OF EUROPEAN TRANSPORT 2025 · [TRANSPORTENVIRONMENT.ORG](https://transportenvironment.org)

WHAT IT MEANS

T&E's *State of European Transport 2025* (aviation chapter), with its January 2025 companion *Down to Earth*, argues that European air traffic is set to grow faster than current rules can cut its emissions. Flights are on track to roughly double by 2050. ReFuelEU's target — 70% clean fuel by 2050 — sets the share of fuel that must be clean, but does nothing to slow how much flying happens.

If total jet fuel use grows faster than the clean-fuel share, the rule alone never bends the emissions line down. Any voluntary scheme therefore has to add cuts on top of what the rules already force.

→ Growth reframes the problem: the mandate caps share, not absolute demand.

UK CLIMATE CHANGE COMMITTEE

By 2050, residual UK aviation emissions are offset using permanent engineered carbon removals, with the sector accounting for around **60%** of total engineered removals — roughly 22.7 MtCO₂e on aviation alone.

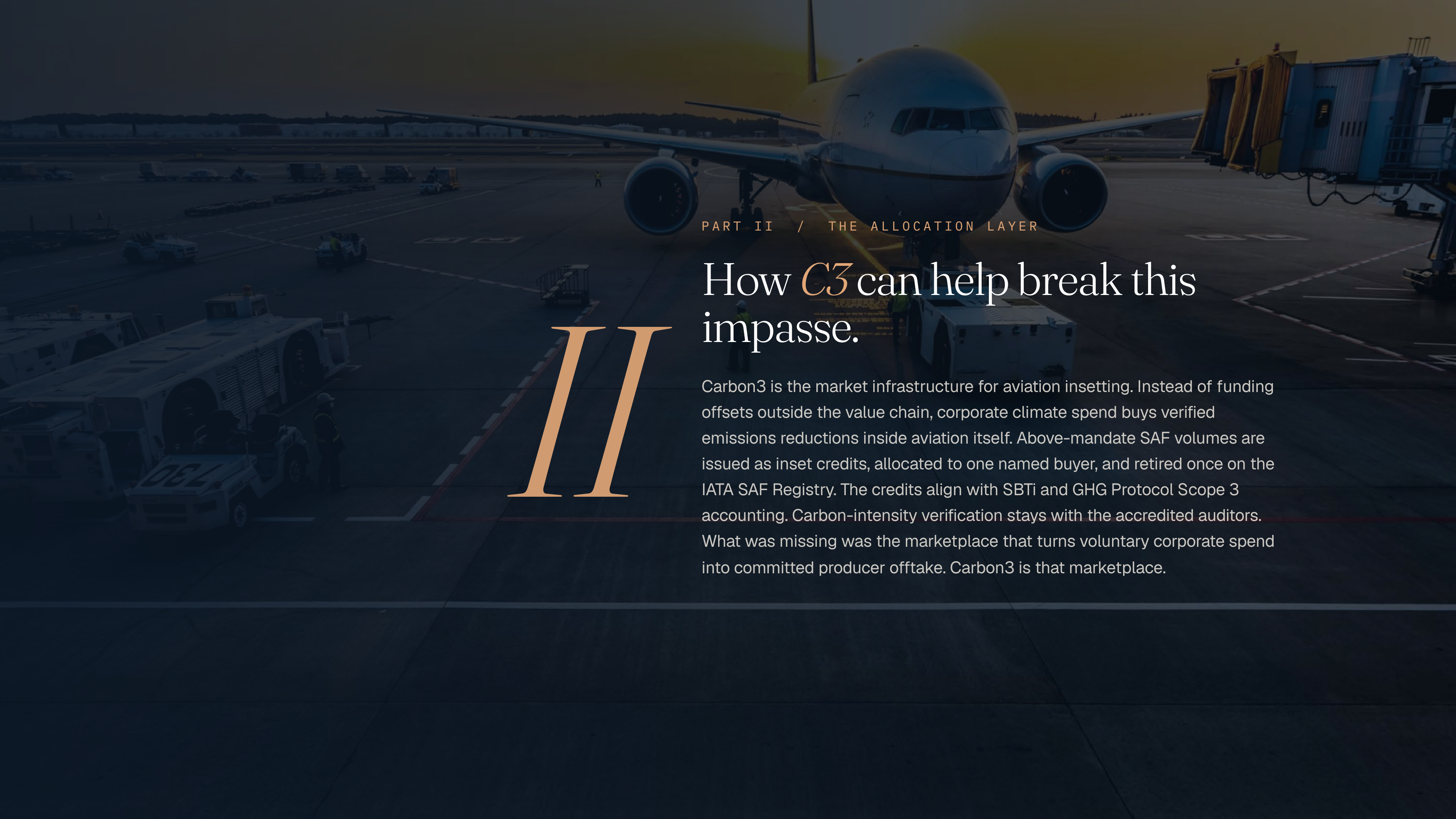
— UK CCC, SEVENTH CARBON BUDGET (FEB 2025), AVIATION PATHWAY · [THECCC.ORG.UK](https://theccc.org.uk)

WHAT IT MEANS

The UK Climate Change Committee's *Seventh Carbon Budget* (February 2025), in its Balanced Pathway scenario, leans heavily on engineered carbon removal — technology that pulls CO₂ back out of the air — to cover aviation. SAF reaches only **17% of UK aviation fuel demand by 2040**, short of the government's 22% goal. Flying less closes part of the gap; the rest falls to engineered removal.

Engineered removal will still be needed and has real value — but it is scarce and expensive. Cutting a tonne inside aviation today is one fewer tonne to remove later, so a company funding an in-sector cut eases the national removal burden, not just its own emissions count.

→ Seven reports, one diagnosis: the blocker is financing. Part II shows how Carbon3 unlocks it.



PART II / THE ALLOCATION LAYER

How *C3* can help break this impasse.

II

Carbon3 is the market infrastructure for aviation insetting. Instead of funding offsets outside the value chain, corporate climate spend buys verified emissions reductions inside aviation itself. Above-mandate SAF volumes are issued as inset credits, allocated to one named buyer, and retired once on the IATA SAF Registry. The credits align with SBTi and GHG Protocol Scope 3 accounting. Carbon-intensity verification stays with the accredited auditors. What was missing was the marketplace that turns voluntary corporate spend into committed producer offtake. Carbon3 is that marketplace.

WHAT CARBON3 IS

A marketplace that turns corporate climate spend *into committed SAF offtake.*

Carbon3 is the market infrastructure for aviation **insetting** — financing emissions reductions inside the value chain rather than buying offsets outside it. When a producer lifts SAF above any mandate, the verified carbon saving is issued as an inset credit. Carbon3 will **aggregate** demand for those credits from corporate travel programmes, freight forwarders and cargo shippers, **allocate** each credit to one named buyer, and **retire** it once on the IATA SAF Registry.

The credits are built to satisfy GHG Protocol Scope 3 accounting and SBTi near-term targets, so a buyer can disclose the reduction under CSRD. What the market was missing was not a standard or a verifier — it was the layer that converts scattered corporate spend into a contracted offtake a producer can take to a bank.

WHAT C3 DOES

- Aggregates above-mandate SAF demand
- Allocates each verified tonne to one buyer
- Retires it once, on the registry
- Reports it for Scope 3 disclosure

WHAT C3 IS NOT

- Not a verifier — that is ISCC CORSIA, RSB, ISO 14064-3
- Not an offset broker
- Not a fuel producer or airline
- Not a substitute for primary abatement

One verified tonne in. *One buyer. Retired once.*



WHERE THE VALUE CHAIN CONNECTS / AVIATION 2026

THE GAP AND THE LEVER

Where aviation decarbonisation is stuck, *and how Carbon3 can help unblock it.*

CHALLENGE

IATA / WORLEY · SEPT 2025 Tech rollout, not feedstock, is the blocker.
IEA RENEWABLES 2025 · OCT 2025 Zero synthetic-fuel build decisions to meet ReFuelEU 2030.
WEF · MARCH 2025 Purchase-contract length falling since 2022.
MPP TRACKER · JUNE 2025 40 years to break ground at current pace.
ICCT · JULY 2025 Advanced SAF routes stuck on financing, not chemistry.
T&E · 2025 Growth outpaces emission cuts in Europe.
UK CCC CB7 · FEB 2025 Aviation = ~60% of UK engineered removals by 2050.

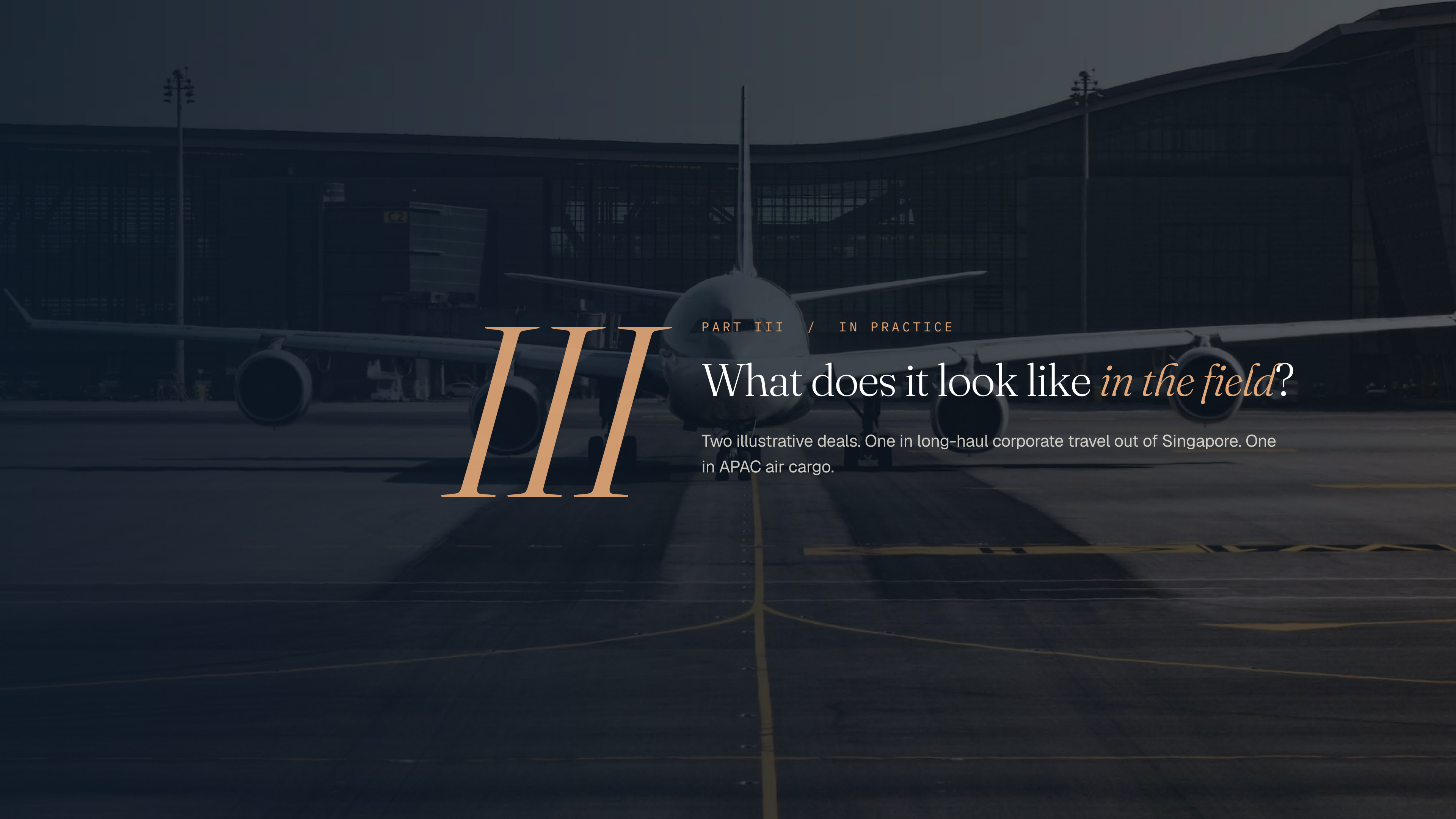
WHAT YOU DO THROUGH CARBON3 → THE EFFECT

Commit to above-mandate SAF before a plant is built. The producer then walks into the bank with demand already in hand.
Sign a multi-year forward contract at today's voluntary price. It covers a third to a half of the cost gap — enough to make a plant bankable.
Lock in a five-to-ten-year contract through the marketplace. The demand for long supply already exists; Carbon3 gives it a place to land.
Route your climate budget into the shared marketplace. Producer supply on one side, pooled corporate demand on the other, matched in one place.
Pay the premium for the harder fuels. It covers most of their extra cost and pulls them from announced into built.
Attach a verified reduction to a specific flight. Voluntary cuts can then grow on top of the mandate as traffic rises.
Buy an in-sector cut today. Each tonne is one fewer left to scarce, expensive engineered removal later.

ONE TONNE. COUNTED ONCE.

From producer to corporate buyer, *through a single ledger.*





III

PART III / IN PRACTICE

What does it look like *in the field*?

Two illustrative deals. One in long-haul corporate travel out of Singapore. One in APAC air cargo.

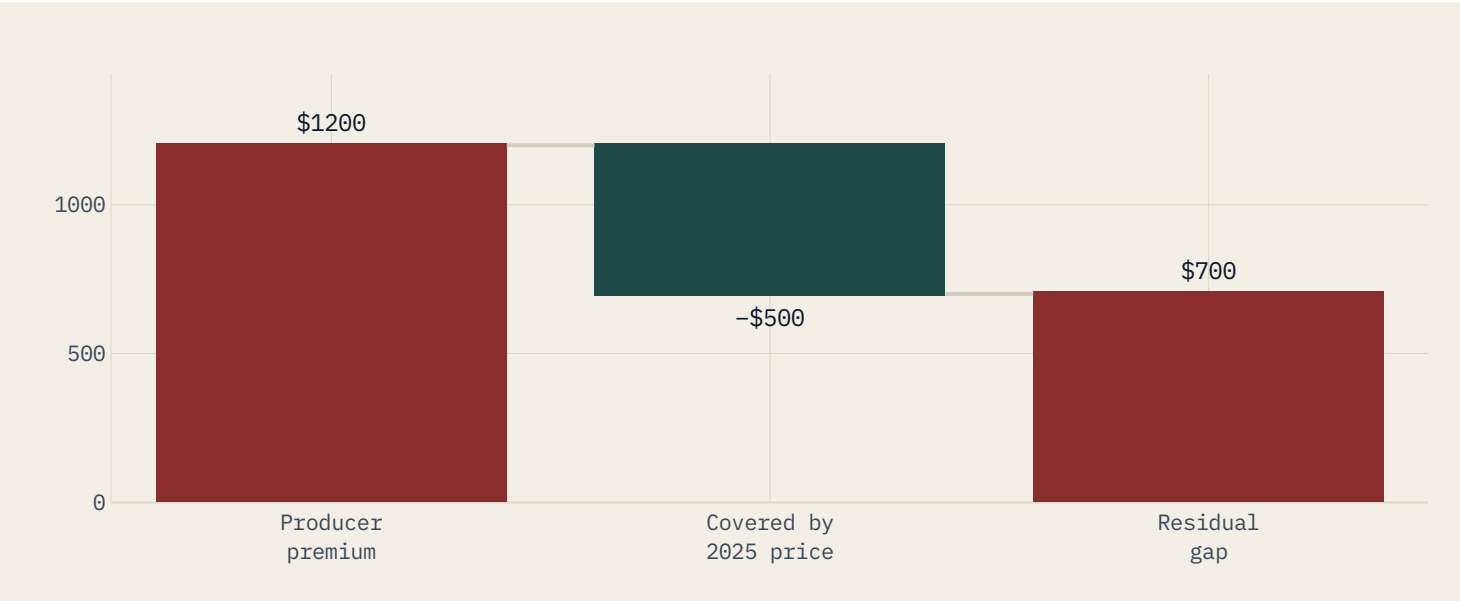
ILLUSTRATIVE DEAL · LONG-HAUL CORPORATE TRAVEL

A long-haul *e-SAF deal* out of Singapore.

A single batch of synthetic jet fuel is lifted at Singapore, above and beyond any mandate. An accredited auditor (ISCC CORSIA / RSB) confirms the carbon saving versus conventional Jet A. Carbon3 then allocates those verified tonnes across a **pool of corporate-travel buyers** — global firms with heavy long-haul demand out of Singapore — each receiving a share proportional to the premium-cabin volume it actually flew.

Each buyer claims **only its own share, once**, as a Scope 3 Category 6 (business-travel) reduction. The tonne is retired on the IATA SAF Registry and cannot be re-sold or re-claimed. Synthetic jet fuel costs about US\$1,200 per tonne of CO₂ more than the fuel it replaces; the question is how much of that gap the voluntary market closes.

CLOSING THE E-SAF PREMIUM (USD / tCO₂e)



2025 VOLUNTARY PRICE · LONG-HAUL E-SAF

US\$350–650 / tCO₂e

Where this number comes from: it is what corporate buyers actually paid for these above-mandate reductions on the voluntary book-and-claim market in 2025 — the observed transaction range tracked by BNEF and Sylvera, not a Carbon3 forecast. At that price the market covers 30–55% of the US\$1,200 gap, enough to clear the deal without subsidy.

01 · THE BATCH

ABOVE-MANDATE FUEL, AUDITED

One e-SAF batch beyond Singapore's 1% mandate and any supplier blend. Carbon saving verified by a third party; fuel that the mandate already requires is excluded, so only the extra counts.

02 · THE SPLIT

ALLOCATED ACROSS A BUYER POOL

Verified tonnes are shared among several corporate-travel buyers, each in proportion to the premium-cabin long-haul volume it flew out of Singapore. No single buyer claims the whole batch.

03 · THE CLAIM

ONE BUYER, ONE TONNE, RETIRED ONCE

Each buyer claims its share as a Scope 3 Cat 6 reduction and discloses it under CSRD. The registry retires the tonne so it cannot be counted twice.

Illustrative structure. Sources: Neste Tuas · CAAS Sustainable Air Hub 2024 · Microsoft Environmental Sustainability Report 2024 · BNEF SAF Tracker Q4 2025 · Sylvera Q4 2025.

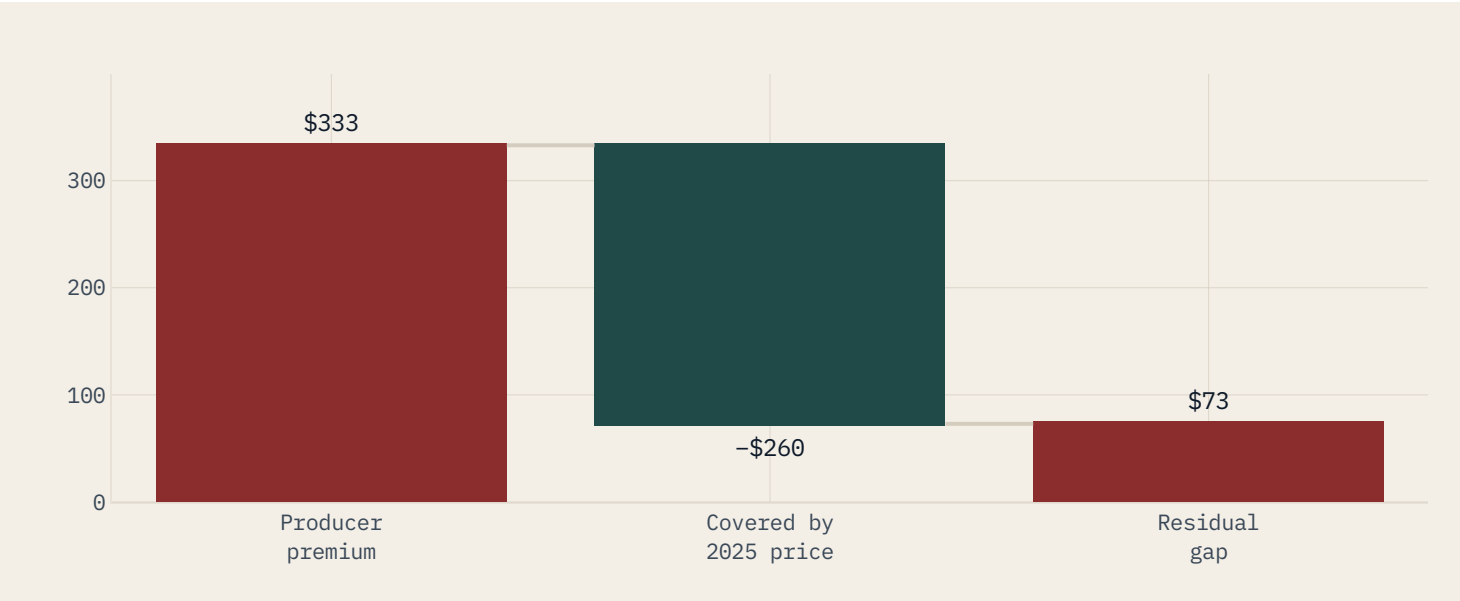
ILLUSTRATIVE DEAL · AIR CARGO

An air-cargo deal across *DHL's APAC network*.

DHL flies its own freighter network across Asia and sells customers a low-emission cargo service. The same company is both the airline burning SAF and the buyer paying for it — one counterparty from end to end, which makes this the cleanest insetting chain in aviation.

An auditor confirms the CO₂ saved on each flight. Carbon3 allocates those verified tonnes **shipment by shipment** to the brands whose goods were on board — each claims its share as a Scope 3 Category 4 reduction. The fuel is cheaper than synthetic, so the premium is smaller, about US\$333 per tonne of CO₂.

CLOSING THE CARGO SAF PREMIUM (USD / tCO₂e)



2025 VOLUNTARY PRICE · AIR-CARGO LANES

US\$200–400 / tCO₂e

Where this number comes from: the price freight shippers actually paid for dedicated-freighter book-and-claim reductions in 2025, as tracked by BNEF and Sylvera. At that price the market covers 60–95% of the US\$333 gap — the deal closes on its own economics, not as a sustainability write-off.

01 · THE FUEL

ABOVE-MANDATE SAF AT THE HUB

HEFA + ATJ blend lifted at HKG / ICN beyond any blending obligation, under DHL's GoGreen Plus, with audited per-shipment volumes.

02 · THE ALLOCATION

PER-AWB, PER SHIPPER

Verified delta tonnage is split at flight-leg level (ISO 14083:2023 + GLEC 3.1) and routed to each shipper's share of the freighter's cargo.

03 · THE CLAIM

SCOPE 3 CAT 4, RETIRED ONCE

Shippers with SBTi targets — Apple, Amazon, automotive OEMs — claim their share against transport emissions; the registry retires it once.

Illustrative structure. Sources: DHL GoGreen Plus Methodology 2024 · ICAO CORSIA fuel-burn factors · ISO 14083:2023 · GLEC 3.1 · Apple, Amazon sustainability reports 2024 · BNEF SAF Tracker Q4 2025 · Sylvera Q4 2025 · Argus Biofuels Apr 2026.

THE POSITION

2026 sets the first time-bound business case *for SAF offtake at scale.*

By 2026, the regulatory architecture is in place across every major aviation market. Pricing on emissions is set. SAF mandates and incentives are dated and binding. The registry to track every claim is live.

Science and policy are no longer the open questions. **What remains open is commercial. Which counterparty captures the value as the sector decarbonises?**

An airline that starts treating above-mandate SAF as a revenue line in 2026 funds a meaningful share of its 2030 fleet renewal out of operating cash flow rather than its balance sheet. A shipper or travel buyer locking long-dated insets at today's prices hedges what will be a much steeper supply-chain transport bill by the middle of the next decade.

C3 · THE POSITION

The allocation, marketplace and reporting layer above the verifiers.

Carbon3 sits one layer above the existing accredited standards. The auditors do the verification work. Carbon3 routes each verified tonne to one corporate buyer's supply-chain ledger and retires it once.



THE POSITION

Aviation will decarbonise *inside its own supply chain*.
Carbon3 is the market infrastructure for it.

AUTHORS

Ilja Nevolin
C3 CO-FOUNDER

ilya@carbon3.net

Paul Cruickshank
C3 CO-FOUNDER

paul@carbon3.net

Chris Chatterton
C3 CO-FOUNDER

chris@carbon3.net

*"The challenge in aviation
decarbonisation is not technology, but
financing it — fairly distributing the
green premium and benefits across the
value chain."*

– CARBON3, 2026 AVIATION OUTLOOK

STAY IN TOUCH

carbon3.net

linkedin.com/company/c3org

WHAT THIS BRIEF IS BUILT ON

Reports cited, *plus the standards layer*.

Every gap quote is taken verbatim, or in one case closely paraphrased, from a public 2025 report with the source URL alongside it. The standards in the right-hand column are referenced throughout the deck but are not themselves the subject of the brief.

REPORTS CITED

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Transport & Environment — State of European Transport 2025, Aviation.

[TRANSPORTENVIRONMENT.ORG](https://transportenvironment.org)

UK Climate Change Committee — Seventh Carbon Budget (CB7), February 2025.

[THECCC.ORG.UK](https://theccc.org.uk)

STANDARDS, REGISTRIES AND SUPPORTING DATA

Verification standards (third party) — ISCC CORSIA, RSB EU RED, ISO 14064-3, ISO 14083:2023.

Allocation and reporting standards — GHG Protocol Corporate Value Chain (Scope 3); SBTi Corporate Net-Zero Standard v1.2; CSRD ESRS E1; ISSB IFRS S2; IATA Aviation Net Zero Tracking 2024; GLEC Framework 3.1.

Registries — IATA SAF Registry (live 2026); ICVCM Core Carbon Principles (2024).

Regulators referenced — European Commission (Directive (EU) 2023/958; Regulation (EU) 2023/2405); UK DfT (SI 2024/1187); ICAO (A41-21 LTAG; A41-22 CORSIA); US Treasury (26 U.S.C. §45Z; OBBBA 2025); CAAS Singapore (Sustainable Air Hub 2024); METI Japan; MOLIT/MOTIE Korea.

Market data referenced — BNEF Aviation Decarbonization Outlook 1H 2025; Sylvera VCM Outlook Q4 2025; S&P Global Platts CORSIA Q1 2026; Argus Biofuels April 2026; IATA SAF Census December 2025; IATA Annual Review 2024; Boeing CMO 2024–2043; Cirium Fleet Forecast 2025; T&E Down to Earth Jan 2025.

Corporate disclosures referenced — Microsoft 2024 Environmental Sustainability Report; Apple Environmental Progress Report 2024; Amazon Sustainability Report 2024; Neste Q4 2024 results (Tuas); DHL GoGreen Plus Methodology 2024.

Methodology · each gap quote is verbatim from the report's primary URL (CB7 is a close paraphrase across the Balanced Pathway figures). The 2025 voluntary price ranges are observed book-and-claim transaction ranges reported by BNEF and Sylvera — what corporate buyers actually paid — not Carbon3-modelled outputs. Verification work is performed by accredited third-party auditors.