Integrating aviation's non-CO_2 emissions into European policy

A path forward for policy - T&E vision

Four pillars to address non-CO_2 emissions

Climate governance

Integrating non-CO_2 effects into EU climate targets, the European Climate Law, and Nationally Determined Contributions (NDCs).

EU ETS

Expanding the scope of non-CO_2 monitoring, incentivising early movers and integrating non-CO_2 effects into the EU ETS.

ATM & Operations

Closing the operational and technological gaps and enabling the European ATM for contrail avoidance.

Fuels

Regulating jet fuel quality and chemical composition through an EU specification

Pillar 1: Integrating non-CO_2 emissions into climate targets

Climate governance

Integrating non-CO_2 effects into EU climate targets, the European Climate Law, and Nationally Determined Contributions (NDCs).

- The EU's 2040 Climate Target based on closed list of Kyoto-style GHGs, leaving out non-Co2 (like contrails, NOx, SO_2, and soot)

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- Legal pathways for integration:
  - **Phased approach:** first the acknowledgement the need to address non-CO_2 effects /forcers than followed by concrete reduction targets.
  - **EU-only route** (recommended): Amendment of European Climate Law to explicitly include aviation non-CO_2 effects
  - **International route:** Amend the Annex V list via a Commission Delegated Act. (with prior formal decision by parties to the UNFCCC/Paris Agreement)

Pillar 2: Integrating contrails in the EU ETS

Aviation non-CO_2 emissions are currently only partially monitored under the EU ETS, with an incentive scheme proposed by COM from 2029. **T&E recommendation:** gradual integration of aviation non-CO_2 emissions.

STEP 01

Monitor

Automatic expansion of the non-CO_2 MRV from 2027.

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STEP 02

Incentivise

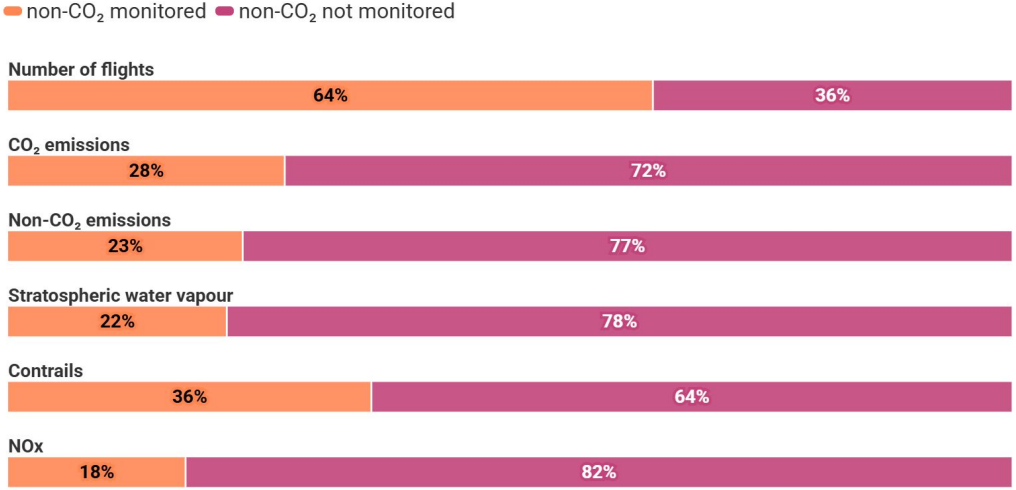
Introduction of dedicated ETS contrail allowances to reward early mitigation efforts.

Monitor: Maintain the automatic expansion of non-CO_2 MRV in 2027

- Long haul flights represent 40% of aviation non-CO_2 warming, yet remain excluded from the current MRV scope.
- Better monitoring translates to a more robust, reliable database for effective climate policy making.

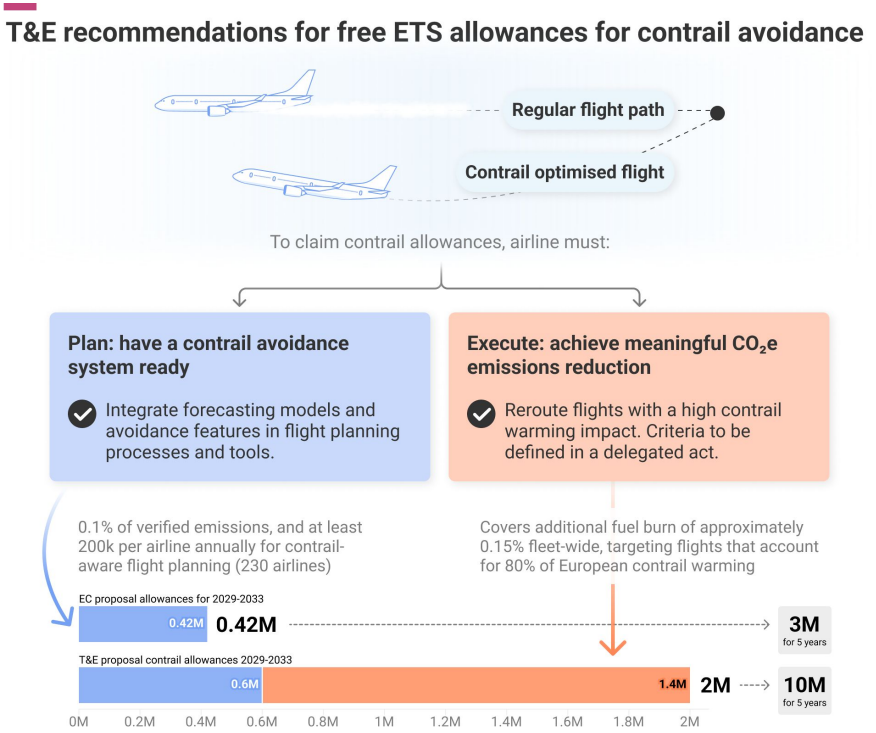
Around 75% of non-CO_2 emissions are excluded from the reduced-scope non-CO_2 MRV framework

Share of flights and contrail warming monitored in reduced-scope non-CO_2 MRV, covering intra-EEA flights and flights to Switzerland and the UK



Source: T&E (2026), based on own analysis of Spire Aviation ADS-B data for the year 2025

Incentivise airline action with contrail allowances



Source: T&E (2026) • Assumptions: coverage of all EEA departures and arrivals, 230 eligible airlines, a fuel price of approximately €1,400/t, and annual fuel-consumption growth of 1.1%.

T&E recommendation:

- **Scope:** from 5,000 km radius flights to all arriving and departing flights
- **Amount:** extension of the current allowances from 3M to 10M allowances, (200+ airlines flying in Europe could install contrail avoidance systems in their flight planning software and that at least 50% of contrail warming impact can be reduced)
- **Functioning**: combine rewarding planning and execution

Pillar 3: Integrating contrails into the European ATM system

Secure large scale trials

Conduct large-scale operational trials to prove network-scale feasibility and validate contrail forecasting models under real flight conditions.

Invest in R&D

Support R&D to improve contrail forecasting accuracy and integrate critical environmental metrics into flight planning systems (humidity forecasting, automated ATC conflict-detection tools satellite-based real-time contrail verification)

Enable the ATM

Modernize the air traffic management system (tools and processes) , updating the regulatory framework (ANS climate KPI, role of the network manager, environmental modulation of ANS charges).

Scaling contrail avoidance: the role of trials

Reducing scientific uncertainty

Benchmarks weather predictions against real-world observations to clarify trade-offs between contrail warming & fuel burn.

Validating operational feasibility

Measures airspace capacity impact and determines if trajectory changes are best made pre-flight or in-flight.

Systems & standardization

Tests software tools and contributes to the creation of necessary protocols and updated ATM processes.

Building human expertise

Trains flight dispatchers, air traffic controllers, and pilots, ensuring operational readiness for daily implementation.

Evidence-based policy

Provides empirical data to refine forecasting models and build the evidence base to inform future climate policies.

What should the EU fund?

- 10-15 mid-scale trials (each with hundreds of flights) within the next 2-3 years, with an overall budget envelope of €100M
- Start collaborative trials with ANSPs, NM, and airlines within low density airspace, then move to more dense ones.
- CAPEX cost: €8-12 million/trial to cover tool and procedure development - one-off costs.
- OPEX cost: €2-3 million/trial covering mainly OPS FTE and related fuel costs.

Policy ask: Upcoming Aviation Strategy (**Q3 2026**) where a trial for **winter 2027** could be announced.

R&D and policy

Invest in R&D

Scientific research + industrial development

- Prioritize ANSP tooling in the SESAR research and deployment programmes

Enable the ATM

New SES environment and climate KPI for ANSPs that allow for contrail avoidance : fuel-optimised with flexibility

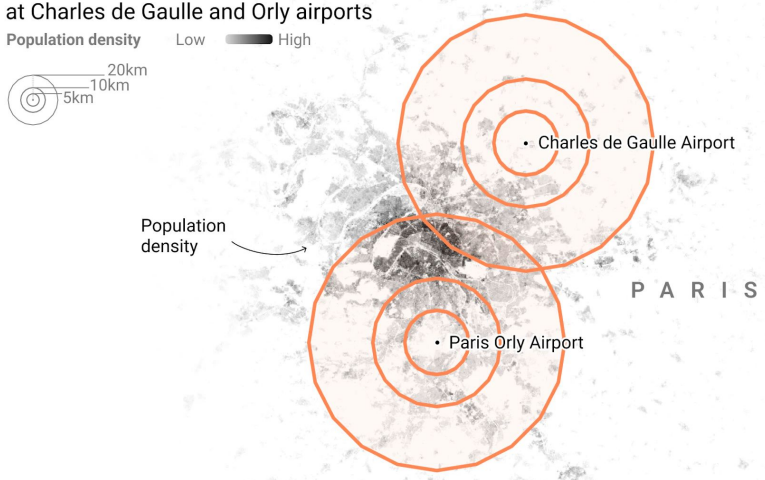
Expand the mandate of the Network Manager to contrail avoidance coordination

Pillar 4: Focus on the climate & air quality benefits with better jet fuel quality

- **Outdated jet fuel standard**: Despite the established link between jet fuel composition and aviation non-CO_2 effects, international fuel standards have remained intact since the 1970s
- **Health co-benefits:** at ground level, for people living nearby airports.
- **ReFuelEU review:** Commission to assess possible measures and present its findings to the EP Council by 1 January 2027
- **T&E recommendation:** Implementation of an EU-level fuel standard within the international framework

Phase 1: Cap aromatics while targeting hydrogen levels around current market averages
Phase 2: Gradually adjust levels with the subsequent reviews (and in line with maturing scientific understanding)
In parallel: Review of aircraft design and continue research and development in order to resolve the seal problem

Millions of Parisians affected by ultrafine particles from planes
at Charles de Gaulle and Orly airports



Note : Location based on airport coordinates. Map: Population density 2020. Schiavina M., Freire S., Carioli A., MacManus K. (2023). European Commission, Joint Research Centre (JRC)

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Thank you

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