

Strengthening and coordinating support on non-CO₂ impact assessments

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Updated analysis of the non-CO₂ climate impacts of aviation and potential policy measures pursuant to EU ETS Directive Article 30(4)

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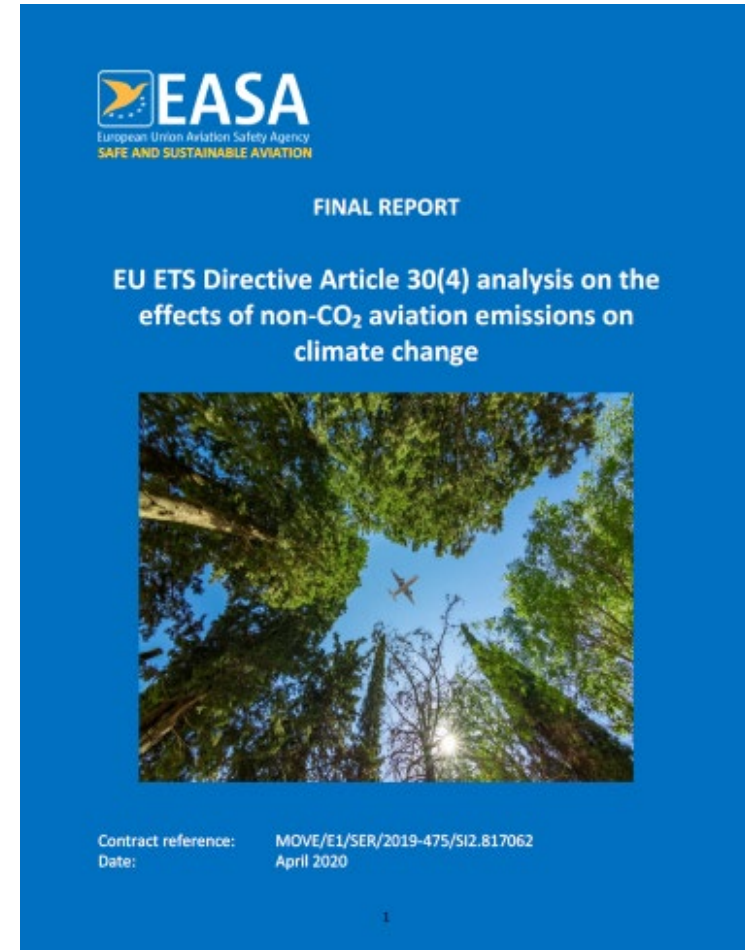


Background

- Based on **past analyses in 2006 and 2008**, the scientific understanding was not considered sufficiently mature to propose policies to address non-CO₂ impacts.
 - Since 2012, EU ETS regulates the CO₂ emissions from applicable flights, which correlates directly with fuel burn.
 - ICAO also focused on CO₂ emissions with development of an aeroplane CO₂ emissions standard and the market-based measure CORSIA.
- **Directive 2018/410 Article 30:**
 - 4. Commission shall present an updated analysis of the non-CO₂ effects of aviation, accompanied, where appropriate, by a proposal on how best to address those effects.
- **To fulfil the requirement of Article 30(4), a report was commissioned by the European Commission to the European Union Aviation Safety Agency (EASA) in 2019.**

Terms of Reference

- Report published on 23 November 2020.
- **Task 1:** Current status of science and remaining uncertainties on climate change effects of non-CO₂ aviation emissions.
- **Task 2:** Existing technological and operational options used to limit or reduce non-CO₂ impacts from aviation and related trade-off issues.
- **Task 3:** Potential policy action to reduce non-CO₂ climate impacts, pros/cons and associated knowledge gaps.
- www.easa.europa.eu/document-library/research-reports/report-commission-european-parliament-and-council



Study Team

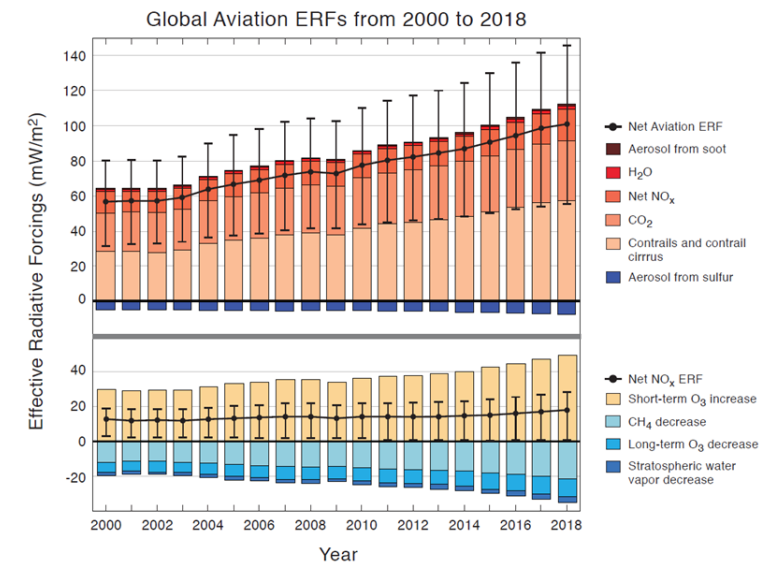
→ Project team comprised of key European climate experts.



→ Stakeholder Groups comprised of wider atmospheric scientific community, technical experts and policymakers.

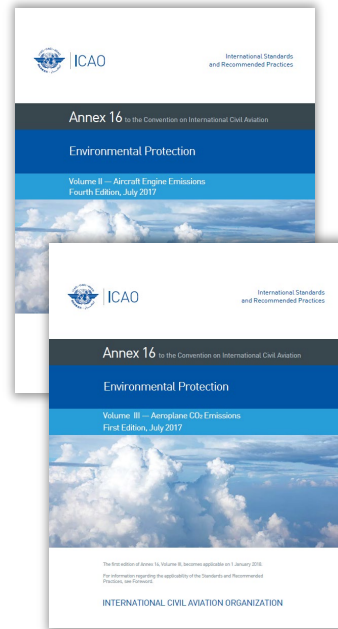
Task 1: Climate Science

- Scientific understanding on the impacts of non-CO₂ emissions has evolved over the last decade.
- Largest non-CO₂ impacts, calculated with ‘best estimates’, are from ‘**net-NO_x**’ and **contrail cirrus**, both of which have significant uncertainties in their magnitude.
- ERF from the sum of non-CO₂ impacts account for more than half (66%) of the aviation net forcing in 2018, **BUT** the uncertainty is about 8 times more than CO₂ to the overall uncertainty in the aviation net forcing in 2018.
- Greater understanding of the indirect cloud effects of soot particles and sulphur, through **aerosol-cloud interactions**, is also required.
- **GWP100** estimates an overall CO₂ multiplier of approx. 1.7 to account for future impacts of non-CO₂ impacts.



Task 2: Current policies to reduce non-CO₂ emissions

- EASA environmental certification standards, based on ICAO SARPs
 - **Aircraft engine emissions certification standards** for NO_x and soot (non-volatile Particulate Matter number) emissions.
 - Improvements in aircraft fuel efficiency generally provide a win-win situation for both CO₂ and non-CO₂ emissions. Commercial pressure recently reinforced by the **aeroplane CO₂ certification standard**.
- EASA certified engine emissions LTO data used in modelling methodologies to estimate aircraft emissions in cruise.



Task 3: Potential policy action

→ Six policy options were shortlisted to be considered in greater detail



Type of Measure		Main non-CO ₂ effect(s) addressed by the measure
Fuel	1. Reduction in maximum limit of aromatics within fuel specifications	Soot particulates and contrail-cirrus
	2. Mandatory use of Sustainable Aviation Fuels (SAF)	Soot particulates and contrail-cirrus
ATM	3. Avoidance of ice-supersaturated areas	Contrail-cirrus
	4. A climate charge	All (NO _x , water vapour, soot, sulphates, contrails)
Financial	5. NO _x charge	NO _x
	6. Inclusion of aircraft NO _x emissions in EU ETS	NO _x

Summary

- Regularly review latest scientific understanding on non-CO₂ impacts.
- Maintain and regularly review existing policy options such as ICAO environmental certification standards (CO₂, NO_x, nvPM).
 - CAEP/12 work programme (2022-2025) currently reviewing aeroplane CO₂ standard, and preparing for potential NO_x / nvPM standard setting process during CAEP/13 (2025-2028).
- Use of SAF as a potential ‘holistic’ approach with simultaneous reductions in both CO₂ and non-CO₂ emissions
 - ReFuelEU Aviation initiative developed policy options to incentivize the uptake of SAF, and was subsequently signed into law on 19 October 2023.

Summary

- Uncertainty of climate impact, and potential unintended consequences, introduces a risk for the integrity of proposed policy options.
- Further research, potentially through Horizon Europe at EU level, to:
 - increase certainty on climate impact from non-CO₂ emissions.
 - consider different metrics and time horizons that could be used to assess the impact of potential policy measures.
 - enhance existing analytical methods to estimate aircraft non-CO₂ emissions in cruise based on ICAO certified LTO emissions data.
 - enhance capability to predict accurately the formation of persistent contrails.
 - communicate on benefits of policy options based on robust data to ensure buy-in.

January 2024

**Strengthening and coordinating a European network of experts
in support to non-CO₂ emission impact assessment and policy
option assessment**

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Future work on non-CO₂ emissions

- Non-CO₂ climate impacts of aviation now high on the political agenda as demonstrated by a number of amendments on non-CO₂ to the Fit for 55 package (in particular the EU ETS).
- Multiple projects launched across various initiatives (e.g. Commission, Horizon Europe, CLEAN AVIATION, SESAR, ICAO, Non-European States, Industry) since the EASA report was published in 2020.
- Need to ensure a common understanding on best practices for assessing the climate impacts of aviation non-CO₂ emissions.

EASA future work

- Horizon Europe ‘Cluster 5 – Climate, Energy and Mobility’ project to:
 - strengthen coordination through an European network of experts in support to non-CO₂ emission impact assessment and policy option assessment;
 - consolidate recent research project results;
 - evaluate on-going/planned projects on required actions to address open issues and gaps;
 - define roadmap for enhanced impact assessment capabilities;
 - coordinate with work at ICAO level in Committee on Aviation Environmental Protection (CAEP)
 - develop content to enhance the understanding of policymakers and the public on key topics linked to the impact of aircraft non-CO₂ emissions.

- Project due to start early 2024.

Thank you

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