

EU ETS Non-CO2 MRV Comments

- 1) We understand that the DG CLIMA has not incorporated hardly any of the recommendations made by ASD to the CCEG on the 7th February 2024. Please see Appendix 1 for the full list of recommendations.
- 2) Scope : Whilst we recognise that a broad scope of flights is important for the MRV results (especially transatlantic), it is recommended that the scope should remain mandatory for intra-EU flights (as per the current 'stop-the-clock') and voluntary for airlines to report on extra-EU flights to third countries.
- 3) Complexity : The latest MRR methodology is very complex, especially relating to the 37 different inputs/outputs in Annex IIIa. This would induce a significant reporting burden, especially as some data is either difficult to source (i.e. outgoing longwave, fuel content, etc) or is simply not available today. When we consider this is 'per flight', this would require huge efforts in both reporting, as well as data management and storage, that is simply not compatible with a January 2025 start date (For example, a large operator could perform around 700,000 flights per annum). In addition, the verification process of such data by third parties will be extremely complex to manage.
- 4) Inconsistency : Integration of the MRV (as it stands today) into the wider EU-ETS MRR leads to conflicts in implementation in some areas e.g. mass balance approach (impossible to define actual fuel content on tank for A/Ls), SAF flexibility mechanism etc.
- 5) Modelling : The Commission proposes to keep time horizons of 20, 50 and 100 years in the record which is positive. On the other hand it imposes GWP as the single metric of choice, which is debatable and may (or may not) hamper mitigations measures.
 - The very recent 2023 review¹ by Lee et al on non CO2 mitigation means discusses the issues with using GWP100 as a climate metric for aviation in the context of policy making, hedging the risk that "emissions targets do not reflect warming outcomes" when using it for aviation short term forcings. It advocates instead for the use of temperature or warming-equivalent metrics.
 - A clear target of the sector is to deploy operational measures to avoid contrails and optimize the flight trajectory with the objective of minimizing the climate impact, yet at the moment it is unproven that GWP is an efficient or the better metric for such operational mitigation means. So keeping the choice of metric open, in order to take into account the results of research programs such as CICONIA, would be prudent.
- 6) Conflict of Interest : We have concerns about the lack of diverse scientific input and underscores the need for involvement from various EU-based scientific groups to ensure a balanced and comprehensive assessment of aviation's climate impact. We also believe this model should be open source and transparent. Considering the provider of

¹ [Uncertainties in mitigating aviation non-CO₂ emissions for climate and air quality using hydrocarbon fuels - https://pubs.rsc.org/en/content/articlehtml/2023/ea/d3ea00091e](https://pubs.rsc.org/en/content/articlehtml/2023/ea/d3ea00091e)

the proposed climate model is also part of the consortium advising the Commission, we consider this to be a clear conflict of interest.

- 7) In summary we believe this text is being rushed through the legislative process and is not technically or operationally robust to meet the timeframe currently proposed.

Appendix 1

ASD Comments made to the CCEG on the 7th February 2024 on the EU ETS MRV Concept Note

KEY ASPECT/ISSUE: Scope of the MRV

Observation or Question Raised: “the scope of monitoring and reporting of non-CO2 aviation effects is on routes for which emissions are monitored under the EU ETS Directive, i.e. full scope”.

Proposal: Whilst we recognise that a broad scope of flights is important for the MRV results (especially transatlantic), it is recommended that the scope should remain mandatory for intra-EU flights (as per the current stop the clock) and voluntary for airlines to report on extra-EU flights to third countries.

KEY ASPECT/ISSUE: Flexibility to Accommodate MRV Results and Improving Science

Observation or Question Raised: “Flexibility to accommodate MRV results and improving science. Regularly, the MRV framework should be reviewed and, as appropriate, lead to greater precision.” (end of page 3)

Discussion:

- We welcome that the concept note explicitly recognizes the need to keep the MRV flexible, to be able to incorporate latest scientific developments and continuously improve the framework.
- The flexibility principle should be implemented from the start of the MRV. This could give the possibility, between 2024 and 2027, to fund scientific work through specialized research organisations in the EU to improve climate modelling and improve knowledge in the EU.
- There is a risk of false contrail avoidance and risk of CO2 increases with actually no non-CO2 benefit with remaining uncertainties, e.g. in weather forecasting. This also underlines the need to integrate new science into the model/MRV as it gets available.

Proposal:

Projects of 2 to 3 years duration should be dedicated:

- To closing the knowledge gap on ice crystals nucleation for low emissions of particles and implementing the knowledge improvement into CoCIP (Note that CoCIP is at the moment strongly updated in pyContrails, implemented by a consortium based in US and involving US entities).
- To update the microphysics schemes and atmospheric chemistry models in the available ESM (Earth System Model) to reflect the current state of the art.

- Evaluate the feasibility to perform a multi-model calibration of the aCCF, to avoid them being based solely on one climate / atmospheric chemistry model (ECHAM5), considering that many other models exist.
- If feasible, implement the multi-model calibration and publish it in open source.
- Improve uncertainties in weather forecasting.

This would allow to start, and after 3 to 5 years, to have a very robust platform, collaboratively designed by EU scientific entities, validated by a large panel of scientists and experts and provided with open-source licence as a common interest tool. Historical MRV captured data should be reanalysed when updating the climate impact models. The model used to assess contrail climate impact should be periodically updated to reflect evolving scientific understanding.

KEY ASPECT/ISSUE: Weather Data

Observation or Question Raised: Weather data.

Discussion: The text says that *most* of the "weather-dependent data" can be retrieved from weather forecasting services - so which (if any) of the listed parameters are they envisioning coming from on board measurements? Weather models used to be the same between operator and authority - but what about between operators? How does the weather model get certified?

Proposal: We recommend using a single source for weather data, ECMWF which is European. This will allow consistency between reporting and results.

KEY ASPECT/ISSUE: Fuel Flow and Other In-Flight Emissions

Observation or Question Raised: Fuel Flow and other in-flight emissions.

Proposal:

· A standard should be set on the way to measure or calculate fuel flow and other in-flight emissions. If some performance models are to be advised they should be made available for all aviation stakeholders and free of charge, without any restriction.

- Soot particles need to also be in the emissions inventory.

KEY ASPECT/ISSUE: Verification

Observation or Question Raised: "Once the underlying data is verified, the verifier should use the same calculation approach as the one used by the aircraft operator, to produce CO₂e to be crosschecked against the ones reported."

Discussion:

- The “Verification and assessment” step consists in verifying that the reported weather and aircraft trajectory data are accurate. A verification of the actual climate impacts, or simply the fact that reported flights have actually produced persistent contrails, is out of scope. In general the scientific validation of the models used to compute climate impact is left out, which appears to be a concern in terms of fairness and accuracy, for a scheme ultimately intended to be integrated in the EU ETS.

- The verifier should use the same calculation method (presumably the same weather and/or contrail model?) but this isn't going to achieve an independent verification of the actual climate impact.

- How will the verifier be determined? The process needs to be explained.

Proposal:

- Define a standard that is consistent for all the operators. Or a standard aiming at reducing the burden of operators while being rigorous enough. This would simplify the system.

- A separate validation work could be carried out to compare model output to satellite imagery and to build confidence in the output of the model (a lot of this has already taken place). We wouldn't need to do satellite imagery validation of each and every flight for MRV purposes, provided that we have reached a certain level of confidence in the model.

KEY ASPECT/ISSUE: CoCIP and aCCF

Observation or Question Raised: CoCIP and aCCF models

Discussion:

- As already expressed in meetings, we note that the evaluation has been made by the authors of the model themselves which raises a concern on neutrality.
- At the moment, CoCIP and aCCF are the only models that evaluate a 4D flight by flight climate impact, based on actual trajectories, atmospheric and weather conditions. However the validation of aCCFs is still an active area of research, which puts in question the early adoption of this model.
- CoCIP and aCCF are primarily developed and controlled by the DLR. This raises concerns about the lack of diverse scientific input and underscores the need for involvement from various EU-based scientific groups to ensure a balanced and comprehensive assessment of aviation's climate impact.
- “CoCiP emerges as a valuable tool capable of predicting and mitigating the climate impact associated with contrails”: this still has to be proven. Literature is not so enthusiastic. Other point: the model does not seem to be currently able to reliably account for the low levels of nvPM (left part of Kärcher diagram).
- Is aCCF standing for algorithmic or aircraft climate change functions? The paper uses both. We believe it is algorithmic.

Proposal:

- Although the DLR is strongly involved in these models, further improvement could be brought by other EU-based scientific consortia.
- We endorse the use of CoCiP and aCCFs and suggest new science to get added in as it becomes available.

KEY ASPECT/ISSUE: Open AirClim

Observation or Question Raised: Open AirClim model

Discussion:

- “All three models are open-source and available for free.”: open AirClim is not yet available in open source (see annex 3) and thus cannot be tested by third parties. All other models in the initial proposed panel are already available and can be used by third parties. Unless a preliminary version of the open AirClim model were made available, it is not possible to independently judge the relevance of the choice, which in our view is a blocking point in a scientific approach.
- “The models are user-friendly and involve a simpler computational process.” (in annex 3 summary): here again we can only believe the designers of the model themselves, which raises a concern regarding impartiality.

KEY ASPECT/ISSUE: GWP as a Metric for CO2 Equivalent and Model Selection

- **Observation or Question Raised:** Using flexible climate metrics for MRV is good - keeping 20, 50 and 100 years in the record.

KEY ASPECT/ISSUE: Simplified Location-Based Approach vs. Weather-Based Approach**Discussion:**

- The simplified location-based approach is likely inadequate to accurately reflect flight by flight non CO2 impacts, mainly due to its incapacity to reflect the real weather seen in operations, of major importance to adequately reflect especially contrails formation and persistence. In particular it appears incompatible with the accuracy needed to adequately account for operational contrails avoidance, while its timely implementation and incitement should be a policy objective. It may be argued that such an approach may have a positive impact on climate “on average”, but this has not been proven. As such, this simplified scheme appears barely better than a blanket CO2 multiplier approach, while causing some burden for operators and authorities.
- The more complex "weather based" approach seems to be more scientifically robust in principle. Yet the technical reporting conditions defined in the concept appear to have several

flaws, especially w.r.t. meteorological data were a “single source of truth” approach should be preferred; and for some of the requested engine & aircraft data which is either unavailable or may pose confidentiality issues. The industry is available to provide more details on the perceived shortcomings of the proposed approach.

KEY ASPECT/ISSUE: Centralization of Calculation Process for Aircraft Operators

Observation or Question Raised: The question raised is about the practicality and efficiency of having aircraft operators perform their own calculations for 4-D trajectory, fuel-flow at each waypoint, and aircraft tail-number. Is it necessary for the aircraft operator to perform calculations?

Proposal: It is suggested that submitting this data and allowing a centralized system to perform calculations might be more effective. The aircraft operator would submit 4-D trajectory, fuel-flow at each way point, and aircraft tail-number (and hence aircraft type and engine type) and then let a centralised system do the calculations on behalf of all airlines. This would ensure consistency. And as the tool is updated to reflect evolving scientific understanding, it is easier to migrate all airlines to the latest model at the same time.

KEY ASPECT/ISSUE: Prioritization of NOx in the MRV Framework

Observation or Question Raised: The relative importance of NOx emissions in the MRV.

Discussion:

- NOx should be considered a second priority in the MRV due to emerging science suggesting its impact could even be neutral.
- This approach is based on the idea of building upon the work EASA will have already done with CO2 ECO labels, providing a foundation for further calculations and assessments.