

Review on:
“Consolidating and stepping up aviation’s climate ambition: a comprehensive definition of a climate neutral air transport system”, JECTS, 2026, by Peerlings and Paletti.

In their paper, Peerlings and Paletti present definitions of a climate neutral air transport system. The paper highlights numerous goals and targets from regional to global organisations and from aviation associations, carving out that many of these are inconsistent or lack clear definitions. The authors then attempt to make these definitions clear, considering life cycle, time and different sectors of the air traffic system as well as some implications regarding implementation. Generally, I think this is a good and important paper and I advise its publication in JECATS, it adds value to the understanding of how future action in aviation should be framed in climate targets as well as in roadmaps from various sorts of organisations. However, I found a few points the authors should take into consideration for the final version, here and there an effort should be made to make the paper more applicative in terms of ‘how’ the goals should be accomplished, meaning to name the relevant stakeholder(s) to take action for the particular point and to lay out the plan how this could be incentivized and/or how a monetized system could clarify the consequences of action vs. inaction. The other point that is clearly too thin here is the consideration of the EU non-CO₂ MRV or an alike system that could be integrated in monetization (ETS) for the non-CO₂ climate effects. Non-CO₂ climate effects are so central in aviation and will be so in the future that they need to have a prominent spot in these goals, targets and roadmaps, and this is in my view not yet adequate in the present form of the paper. But see my points below for clearer descriptions of my suggestions, and please also consider the minor and technical issues.

Major comments:

- L33-34: This is wrong. It is not an alternative to metrics to express it in terms of a temperature change, expressing it as such is a metric, e.g. ATR is the absolute temperature response. Please re-write carefully. (see e.g. Grewe et al. 2014, 10.1016/j.atmosenv.2015.02.039, Dahlmann et al. 2025, 10.5281/zenodo.16355780, Megill et al., 2024, 10.1038/s43247-024-01423-6)
- I have some recommendations to make table 1 more easily accessible for the reader:
 - Make extra columns for ‘year’ and for ‘geographic scope’.
 - Provide again the full names of the abbreviations here.
 - Separate the ‘aviation’-related visions from the more general national or regional ones.
- The MRV system from the European Union is mentioned in a footnote, only, noting that non-CO₂ effects are to date only relevant for monitoring and reporting, but not included in the EU-ETS allowances system. While this is true, it is not enough treating it this way in the present paper because the MRV system is designed to be integrated into the ETS

at some point in some way (see Grewe et al. 2026, 10.1038/s43247-026-03265-w for a discussion on this), and hence this needs to be discussed here in much greater detail, as the visions and strategies will have to include the non-CO₂ effects in a monetized way if this happens. Note here that the EU has already released plans for establishing allowances for contrails in particular.

- The paper in general, and particularly Sect. 4.2, could benefit from some additional discussions on monetization, i.e. putting a price on CO₂ and CO₂-equivalent emissions representing social costs. With such a discussion, the bronze, silver, gold and platinum strategies could be more easily put into perspective with regard to their value. When you write, the platinum goals would not get broad support, then why is that so? Because expenses to reach the goals are not well juxtaposed to expenses for not reaching the goals? Maybe this goes somewhat beyond the scope of the paper, but some discussion on it could do the paper good to achieve a more tangible form.
- It took me a while to understand what the authors want to say with figure 1, and then I was rather disappointed by the message. There should be ways to depict the main messages of the figure more intuitively. Please have another thought about it.
- In Section 5.3 I was missing a more applicative description of the procedures with regard to the stakeholders involved. Who monitors? Who acts? What responsibilities do airlines, airports, countries, authorities and other entities have? Shall this be done rather via incentivisation or penalisation? Shall this be based on an economic ETS-type of system?

Minor comments:

- L12 and L14: “climate effects of GHGs and non-CO₂ effects” is not a proper separation of the physical effects, as some non-CO₂ effects are indeed GHGs (e.g. water vapour, and to some degree also NO_x-induced ozone and methane effects play in here). So for example “climate effects of CO₂ and non-CO₂ emissions” could do the trick.
- L13: “The proposed definition” could be explained a little more, e.g. that it includes several targets for various time periods etc.
- L16-17: This last sentence dangles in the air at the end of the abstract and cannot really be comprehended. Moreover, as one of my major points touches the topic, it should be revised.
- In light of the above and possible changes during the review, I’d suggest to generally revise the (second part of the) abstract to some degree.
- L22-23: it feels misplaced to write ‘since the 2010s’, when the reference is 2019, which still is within the 2010s.
- L28-29: I think citing merely these 3 references to prove ‘notable growth over the last few years’ is somewhat too simple. Especially when the most recent one is 3 years old (‘the last few years’?). Moreover, awareness has grown notably at least over the last decade.

- L31: The point here rather is that the non-CO₂ effects are a lot more complex than the CO₂ effect.
- L138: Which document?
- L162: 'emissions remain unaccounted for'. As you give the answer below, this is about removal/compensation or such. Do they really hide this piece of information?
- L206: Only semantics, but multiple different goals and targets could be achieved if the one aimed for is clearly the most ambitious one (if the goals are conflicting, not, of course)
- L211: Why especially from the European perspective?
- L323-325: Can you explain how these historic emissions shall be neutralized? Carbon air capture? Planting trees? Any kind of technical compensation mechanisms, or rather a monetizing system or something else? Anything specific?
- L334: Say why the platinum would not get broad support! By whom?
- L335-337: I think this sentence, as is, does not make sense. Not quite sure what the authors want to say here. Please rephrase.
- L430-431: But the present paper fails to do that too! Who is responsible for realising the emissions reductions?
- L435: Let alone non-CO₂ as well? This needs to be CO₂-equivalents, and possibly even discuss CO₂ and non-CO₂!
- L440-443: You forgot the direct climate effect of water vapour (H₂O) emissions here. The effect may be small today, but this might change in the future.
- L456: I find the example here somewhat odd, because 'weight reduction' would in my view anyway be a measure that is categorized under "new technologies". Unless the weight reduction is simply done by allowing less passenger luggage or so.
- L461-462: I advise to remove this sentence, it should remain being 'warming cirrus'. This sentence implies that using cooling contrail cirrus clouds could be used to compensate some of the warming climate effects. However, this is to date with the given uncertainties and level of scientific understanding much too far away from being actionable and bears huge risks of unintended climate warming (with large probabilities and large unintended effects).
- L510: ...all GHG and non-CO₂ **climate** effects...
- L511-512: ...GHG and non-CO₂ **climate** effects...

Technical issues:

- L126: remove 'definitely'

- L127: $\text{NO}_x \rightarrow \text{NO}_x$
- L132: ZEMA $\rightarrow$ ZEmA?
- L137: leadership $\rightarrow$ policy
- L169: $\text{SF}_6 \rightarrow \text{SF}_6$
- L254: Remove double comma ', '
- L276: neutrality $\rightarrow$ neutral
- L430: Add year to Brazzola citation.
- L520: 'whether leave key topics unattended'. Please check if this is grammatically right, it reads odd.