Deutsche Gesellschaft für Luft- und Raumfahrt Lilienthal-Oberth e.V. Bezirksgruppe Hamburg

ROYAL AERONAUTICAL SOCIETY HAMBURG BRANCH e.V.

ZAL

Verein Deutscher Ingenieure Hamburger Bezirksverein e.V. Arbeitskreis Luft- und Raumfahrt

HAW HAMBURG

Hamburg Aerospace Lecture Series

Hamburger Luft- und Raumfahrtvorträge

HAW Hamburg in cooperation with DGLR, RAeS, ZAL and VDI invites to a lecture

Safe Landing: Aviation Workers Demand Industry to Reject Dangerous Growth

Finlay Asher, MEng, Co-founder of Safe Landing

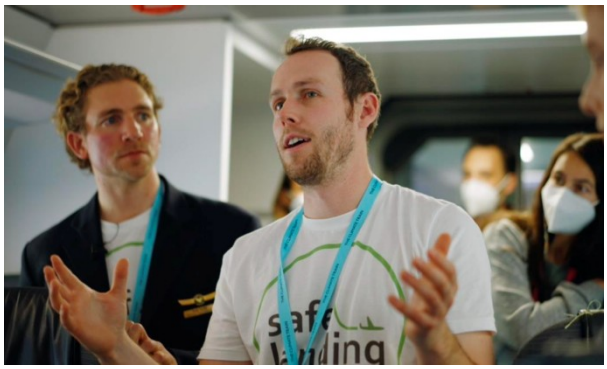
Date: Thursday, 4 May 2023, 18:00 CET

Online: https://purl.org/profscholz/zoom/2023-05-04

https://stay-grounded.org

Safe Landing (https://safe-landing.org) works internationally, but with a UK focus. It represents "climate concerned aviation professionals" including pilots, cabin crew, airport staff, engineers and factory operators and calls for early adoption of regulations to reduce emissions and a plan to support workers during any transition to secure their careers. Workers' Assemblies follow the concept of deliberative democracy to advise on political and aviation company decisions. Most technical options (new aircraft and new fuels) for reducing greenhouse gas emissions from aviation have serious limitations. Hence, technology won't safe us and cannot be an excuse to delay action. Nevertheless, some options are available now (!), but seem to be overlooked by industry, because they do not come handy: a) to fly lower (or higher) to reduce contrails, b) de-aromatization of fossil jet-fuel with hydrotreatment for both climate and health, c) to reduce air travel (with various measures). *More information attached.*

Finlay Asher graduated from the University of Edinburgh with a Master in Mechanical Engineering (MEng). He spent seven years at Rolls-Royce working on aircraft engine design. Finlay runs now 'Safe Landing' which is a group of aviation workers campaigning for long-term employment. They do this by challenging industry leaders to conform with climate science and reject dangerous growth.



DGLR / HAW Prof. Dr.-Ing. Dieter Scholz Tel.: 040 42875 8825 info@ProfScholz.de
RAeS Richard Sanderson Tel.: 04167 92012 events@raes-hamburg.de

Hamburg Aerospace Lecture Series (DGLR, HAW Hamburg, RAeS, VDI, ZAL)

DGLR Bezirksgruppe Hamburg https://hamburg.dglr.de
RAeS Hamburg Branch https://www.raes-hamburg.de
VDI, Arbeitskreis L&R Hamburg https://www.vdi.de
ZAL TechCenter https://www.zal.aero

Hamburg Aerospace Lecture Series (AeroLectures): Jointly organized by DGLR, RAeS, ZAL, VDI and HAW Hamburg (aviation seminar). Information about current events is provided by means of an e-mail distribution list. Current lecture program, archived lecture documents from past events, entry in e-mail distribution list. All services via http://AeroLectures.de.

COMMENTARY: With mounting challenges over its climate impact, is aviation's social licence at risk?

27. Januar 2023

This year begins with a re ective assessment of the aviation sector's climate credentials and the challenges it faces, write Jarlath Molloy and Finlay Asher, who point out this may not be an easy read for some, as there are many barriers to overcome. The strategy so far has been to stick our heads in the sand and ignore these, they say. Yet there are pathways to a safe landing and the costs of doing something are less than the costs of doing nothing. In this article the authors look to shine a spotlight on aviation's full climate impact and how the sector alone could put us over the 1.5°C goal of the Paris Agreement. They highlight the common failings of the sector's hypothetical decarbonisation pathways and propose an alternative to the sectors' net zero aspirational goals – which will feel radical to industry leaders but are consistent with how other sectors are setting science-based targets.

As a group of scientists, engineers, air traffic controllers, pilots and airline workers, climate change keeps Safe Landing members up at night. We worry about the future and our legacy to our children. Meaningful action and change is frustratingly slow, despite all the warnings about planetary boundaries, tipping points and the costs of inaction in response to climate and biodiversity crises. We should have the confidence to critically ask ourselves whether the sector's environmental practitioners can have any hope in terms of impact, relevance or effectiveness.

Aviation greenhouse gas (GHG) emissions reached one billion tonnes of CO_2 emissions pre-Covid and are expected to pass this again in the near future. This threshold is also known as a 'carbon bomb'. But of course the bomb is even bigger because most of the sector has historically refused to recognise its non-CO_2 emissions impact. While it is true this is more complex to measure, the data and tools exist to assess the full climate impact the aviation sector is responsible for and to confidently reduce non-CO_2 emissions.

How did we get here? This problem has been 30 years in the making. Heads of states from around the world agreed the formation of the UNFCCC in 1992 at the Rio Earth Summit and to stabilise GHG emissions in the atmosphere to "prevent dangerous anthropogenic interference

with the climate system". Action on aviation GHG emissions was deferred by giving the problem to ICAO. In 2015 the Paris Agreement refined our collective ambition to limit climate change to 1.5°C this century, with GHG emissions to peak "as soon as possible" and reach net zero by 2050.

It took exactly 30 years from the Earth Summit at Rio for governments (and industry) to set GHG emission targets for the aviation sector, in 2022, but which are still only aspirational and fall short of what is required to achieve the Paris Agreement's 1.5°C temperature goal. This was in spite of ICAO commissioning a special report from the UNFCCC on aviation's climate change impact in 1997 and a slew of scientific studies and research since then on the same topic. Despite its name, ICAO's flagship initiative known as CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) won't reduce aviation GHG emissions. Instead, it relies on offsets from other sectors to keep carbon emissions from international flights below a 2019 baseline.

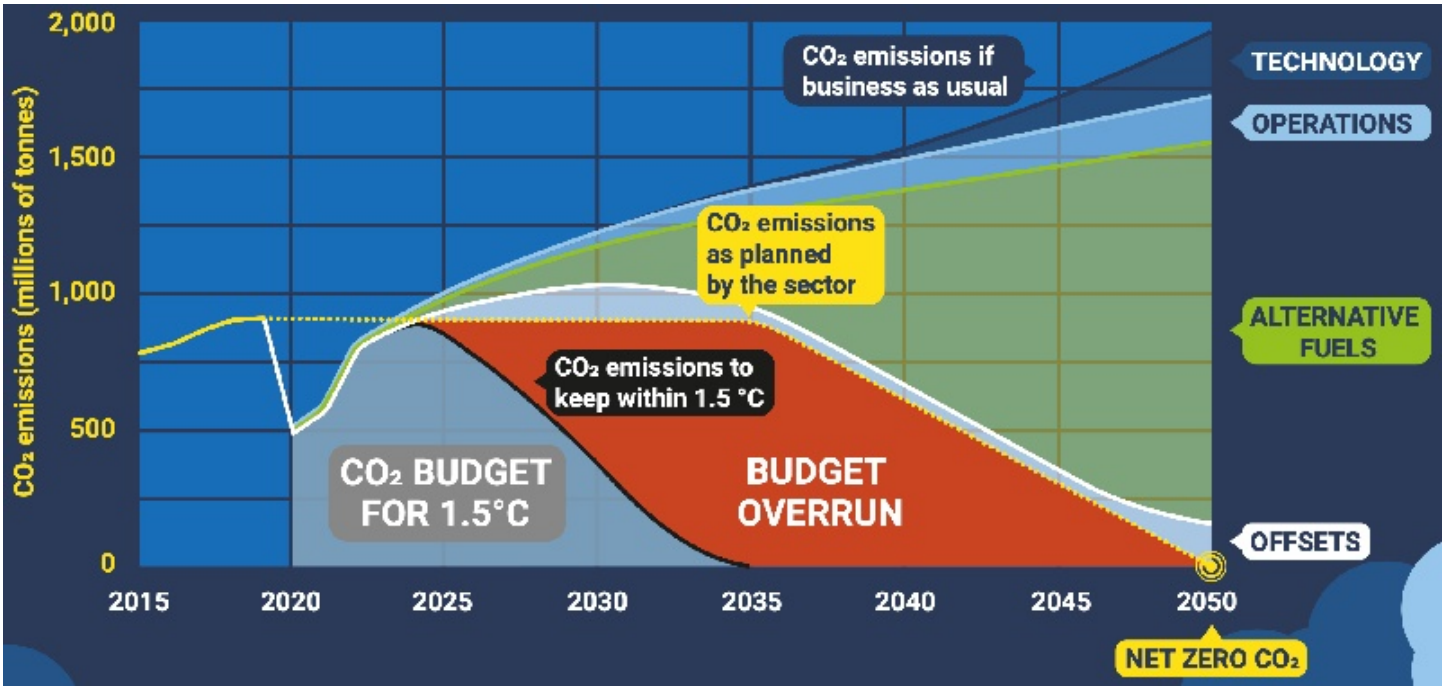
The gap to the 1.5°C temperature goal linked to avoiding the worst of climate change impacts is only 0.3°C. The aviation sectors' growth plans alone may use this up, once we count its CO_2 and non-CO_2 emissions, i.e. its full climate impact. Ratings agencies are already assessing Environmental Social & Governance (ESG) risks and performance across the sector and it's only a matter of time before attention shifts to assessing climate transition risk and the sector's prospects in a world where carbon budgets are being set, for example in the UK from the 2030s. Likewise, it's possible that CDP (formerly Carbon Disclosure Project), the Science Based Target initiative (SBTi), activist shareholders and others begin to loudly call out the sector's omission of its non-CO_2 impact and apply much greater scrutiny to the credibility of the sector's decarbonisation plans. This includes the role of offsets and the availability of sustainable aviation fuels (SAF) at the quantities required to make a material difference to the sector's GHG emissions without exacerbating climate impacts elsewhere. Continuing high profile examples of climate-related loss and damage will further catalyse public opinion and keep these issues on the agenda.

The sector is often referred to as one which is difficult to abate. This isn't entirely correct; industry leaders know how to reduce its climate impact – they have just chosen other priorities for 30 years. Two of the biggest barriers to change include groupthink and the short-term cost of change. Until this is addressed and industry leaders are incentivised to do the right thing, we'll continue to see the sector try to bat away ever increasing concerns about its climate change strategies.

One approach used to date is the role of lobbying of policymakers against proposals that might affect their economic prospects, while simultaneously marketing aviation's services relying on 'tropes' including adventure & discovery, privilege and urgency (albeit not climate urgency).

Another approach is to issue decarbonisation roadmaps. Numerous industry-led and other reports have been published since 2020. Few, if any, are independently peer-reviewed or published in scientific journals. None of them have reconciled the sector's full climate impact with the temperature goal of the Paris Agreement, and instead refer to CO_2 emissions alone. Most of the different decarbonisation roadmaps share the same common features and shortcomings:

- All delay action for another day – it's easy to say someone else will do something else, sometime in the future;
- Most point to a single hypothetical scenario of what could happen, rather than what will happen as a result of current plans;
- These scenarios often depend on the 'right' support in place from governments, with the sector avoiding responsibility for not making progress in their absence;
- They generally rely on techno-fixes, efficiencies and other solutions that have not yet been invented, or proven at scale;
- Sustainable fuel feedstocks and e-kerosene production capacity will be in high demand from multiple sectors, yet the aviation sector assumes it can secure all of the fuel it wants;
- Savings are represented as absolute CO_2 emission reductions, when in fact they are more likely to be avoided CO_2 emissions – which are not the same thing and don't help achieve net zero;
- Most ignore the GHG emissions budget linked to the Paris Agreement 1.5°C temperature goal, i.e., success isn't just reaching net zero by 2050 – cumulative emissions between now and 2050 matter more and reductions are necessary now (see figure below);
- All ignore the ethics of inaction; every industry is dealing with decarbonisation challenges and there are plenty of other special cases – including agriculture. Where is the conversation happening between industries about whether to prioritise a tonne of CO_2 for food production, for example, versus a round trip to the other side of the world?
- Neither is there any meaningful discussion on equity-based social change to guide aviation decarbonisation decision-making.



Net zero by 2050 doesn´t mean cumulative aviation CO_2 emissions will stay within a 1.5°C GHG emissions budget

The decarbonisation roadmaps rarely look back to compare progress on targets against previous forecasts. Perhaps this might raise concerns over credibility, given the sector's poor track record on delivering against its environmental targets. It's hard to escape the conclusion that these decarbonisation roadmaps are public relations exercises whose purpose is to deflect and defend. Or to put it more charitably, they are opportunities to inform policymakers on the support the sector needs to decarbonise, highlight the excellent progress the sector has made to date and to counter the negative press stoked by NGOs.

Annual reduction target

An alternative approach is possible, indeed necessary. One which better recognises the urgency of the climate crisis and clearly signals the importance of proactively engaging all stakeholders to deliver change in the short term. We propose that the sector adopts, as a minimum level of ambition, the same commitment that other sectors are adopting for 2050 net zero setting, i.e. a linear annual reduction target of 4.2% as set out by SBTi. We note however, that even this minimum approach is inconsistent with achieving the Paris Agreement goal because even greater annual emissions reductions are now required and this is before accounting for the sector's non-CO_2 warming. As a result, we also propose that the sector immediately start measuring and reporting its full climate impact, i.e. both CO_2 and non-CO_2 emissions. The

sector's CO_2 emissions can be used as a proxy for the net zero pathway, but the focus must shift to align with the Paris Agreement temperature goal in the near term, for example by COP29.

Focusing on timeframes within the tenures of current CEOs and industry leaders would help improve accountability. But it would also allow for fresh thinking on priorities and potential solutions in the short term to mitigate the sector's climate impacts. This could include, for example, avoidance of persistent warming contrails and targeted use of sustainable aviation fuel, which potentially offer some of the few reasonably effective and efficient mitigation options (aside from economic instruments) in the near term. These then allow time for scaled up R&D on airframe, engine, fuel and other potential technologies to take effect in the mid-term, in addition to airspace modernisation and other operational measures.

The sector would be free to use its basket of measures in whatever order it wishes, but it must meet the annual reduction target. In the short term it may have to rely on some economic instruments, potentially including demand management, but this will only incentivise the sector further to get into action. The default 'business as usual' scenario focusing on growth may otherwise lead to stranded assets of aircraft and airport infrastructure on a scale we are all too familiar with, again impacting aviation workers and investors.

Policymakers should also consider how best to drive this change forward. ICAO brings the 'common but differentiated responsibility' conundrum as well as distractions between domestic and international flights, while IATA does not represent the full sector. Perhaps realigning with the main UNFCCC process could help ensure consistency in climate change mitigation policy.

On the corporate side of the aviation sector, we note the increase in climate related shareholder action and litigation. A number of high-profile appeal cases are likely to have established precedent and will influence future case law. Some specific examples include:

- Heathrow Airport's third runway application was found not to have taken account of the Paris Agreement;
- A greenwashing lawsuit has been filed against KLM in the Netherlands, over misleading marketing that promotes the sustainability of flying;
- Shareholders at Delta and United Airlines voted for increased transparency on the company's climate change lobbying, while shareholders of Air France-KLM have pursued the Board on its environmental commitments;
- Shareholders are increasingly seeking airlines to be more transparent about their GHG

emissions performance by disclosing to CDP;

- An institutional investor has forced Spanish airport operator AENA to give shareholders an annual vote on its efforts to tackle climate change; and
- Institutional investors are also monitoring aviation climate related risk disclosures (known as Task force on Climate related Financial Disclosures – TCFD).

New sustainability disclosure requirements, in Europe in particular, are beginning to force the sector from its laggard position to be more transparent about the environmental and social risks it faces and how it plans to respond. The role of sustainable finance is important here too. Parts of the sector have already begun to respond to requests from investors, financial regulators and other stakeholders on climate risk disclosure, for example through CDP, SBTi and TCFD. The TCFD's transition risks are of special interest as they will likely impact aviation workers most.

The sector needs to be serious about its ESG due diligence, risk assessment and reporting of climate transition plans. We know there are risks facing the sector, and in particular for its workers. Any chance of delivering a just transition requires collaboration and dialogue between aviation industry leaders and employees.

After decades of inaction and missed targets, the aviation sector has a credibility gap and risks being perceived as the next Big-Tobacco / Big Oil, given the similar strategies used by each. The sector has known about and downplayed its climate problem, has sought to distract and delay mitigation at national, regional and international levels. It remains solely focused on near term economic growth with little appetite to consider its externalities, including the pollution and climate impact it is responsible for, or how its employees will fare in the transition to a low carbon economy. Industry leaders understand the challenges in attracting and retaining the best people to help them deliver the change necessary to reduce its climate impact and improve its climate resilience.

Ultimately, the sector's social licence could come into question, with movement caps at Amsterdam's Schiphol Airport and domestic flight bans in France just the beginning.

The authors represent Safe Landing, a group of aviation workers campaigning for long-term employment by challenging industry leaders to conform with climate science and reject dangerous growth.

About the authors

Finlay Asher co-founded Safe Landing in 2021. He spent seven years at Rolls-Royce designing future aircraft engine systems and working on various Airbus and Boeing airframe platforms. He worked in System Design on the Trent 7000 (Airbus A330neo), Trent XWB (Airbus A350), UltraFan geared turbofan, and within the Vision 20 future programmes team studying novel propulsion such as Variable Pitch Fan and integrated airframe/engines concepts.

Dr Jarlath Molloy has held roles in a number of organisations connected to the aviation sector and has worked on multiple initiatives and industry groups. He is also a Chartered Physicist.

Views expressed in Commentary op-ed articles do not necessarily represent those of GreenAir.

References

Steffen, W., Richardson, K., Rockström, J., Cornell, S.E., Fetzer, I, Bennett, E.M., Biggs, R., Carpenter, S.R., de Vries, W., de Wit, C.A., Folke, C., Gerten, D., Heinke, J., Mace, G.M., Persson, L.M., Ramanathan, V., Reyers, B. and Sörlin, S. (2015) Planetary boundaries: Guiding human development on a changing planet, Science, Vol. 347, Issue 6223, available at http://dx.doi.org/10.1126/science.1259855

Armstrong McKay, D.I., Staal, A., Abrams, J.F., Winkelmann, R., Sakschewski, B., Loriani, S., Fetzer, I., Cornell, S.E., Rockström, J., and Lenton, T.M. (2022) Exceeding 1.5°C global warming could trigger multiple climate tipping points, Science, Vol. 377, Issue 6611, available at http://dx.doi.org/10.1126/science.abn7950

EY (2022) Enough. A review of corporate sustainability, in a world running out of time, available at https://www.ey.com/en_au/climate-change-sustainability-services/enough-a-review-of-corporate-sustainability

Ritchie, H., Roser, M. and Rosado, P. (2022) Energy, available at https://ourworldindata.org/transport#what-share-of-global-co2-emissions-come-from-aviation

IATA (2022) Airlines cut losses in 2022; Return to profit in 2023, available at https://www.iata.org/en/pressroom/2022-releases/2022-12-06-01/

D.S. Lee, D.W. Fahey, A. Skowron, M.R. Allen, U. Burkhardt, Q. Chen, S.J. Doherty, S. Freeman, P.M. Forster, J. Fuglestvedt, A. Gettelman, R.R. De León, L.L. Lim, M.T. Lund, R.J. Millar, B. Owen, J.E. Penner, G. Pitari, M.J. Prather, R. Sausen, L.J. Wilcox (2021) The contribution of global aviation to anthropogenic climate forcing for 2000 to 2018,

Atmospheric Environment, Volume 244,2021, 117834, ISSN 1352-2310, available at https://doi.org/10.1016/j.atmosenv.2020.117834

Teoh, R., Schumann, U., Gryspeerdt, E., Shapiro, M., Molloy, J., Koudis, G., Voigt, C., and Stettler, M. E. J. (2022). Aviation contrail climate effects in the North Atlantic from 2016 to 2021, Atmos. Chem. Phys., 22, 10919–10935, available at https://doi.org/10.5194/acp-22-10919-2022

ICAO (2022) States adopt net-zero 2050 global aspirational goal for international flight operations, available at https://www.icao.int/Newsroom/Pages/States-adopts-netzero-2050-aspirational-goal-for-international-flight-operations.aspx

IPCC (2022) Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change . Cambridge University Press, Cambridge, UK and New York, NY, USA. https://www.ipcc.ch/report/ar6/wg3/downloads

IPCC (1999) – J.E.Penner, D.H.Lister, D.J.Griggs, D.J.Dokken, M.McFarland (Eds.), available at https://archive.ipcc.ch/ipccreports/sres/aviation/index.php?idp=0

ICAO (2022) Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), available at https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx

DW (2021) Plan to make flying green 'too broken to fix', available at https://www.dw.com/en/corsia-climate-flying-emissions-offsets/a-56309438

Brazzola, N., Patt, A. and Wohland, J. (2022) Definitions and implications of climate-neutral aviation. Nat. Clim. Chang. 12, 761–767, available at https://doi.org/10.1038/s41558-022-01404-7

UK Government (2021) UK enshrines new target in law to slash emissions by 78% by 2035, available at https://www.gov.uk/government/news/uk-enshrines-new-target-in-law-to-slash-emissions-by-78-by-2035

Stay Grounded (2021) Fact sheet 4 – Biofuels, available at https://stay-grounded.org/wp-content/uploads/2021/08/SG_factsheet_8-21_Biofuels_print_Lay02.pdf

T&E (2022) Europe's largest airlines claim net zero future whilst lobbying to weaken EU's climate laws, available at https://www.transportenvironment.org/discover/europes-largest-airlines-claim-net-zero-future-whilst-lobbying-to-weaken-eus-climate-laws/

Higham, J., Hanna, P., Hopkins, D., Cohen, S., Gössling, S. and Cocolas, N. (2021). Reconfiguring aviation for a climate-safe future: Are airlines sending the wrong message? Journal of Travel Research, available at http://doi.org/10.1177/00472875211033648

Gössling, S. and Humpe, A. (2020), The global scale, distribution and growth of aviation: Implications for climate change, Global Environmental Change, Volume 65, 102194, ISSN 0959-3780, https://doi.org/10.1016/j.gloenvcha.2020.102194

Stay Grounded (2022) Fact sheet 6 – Net zero & carbon neutrality, available at https://stay-grounded.org/wp-content/uploads/2021/11/SG_factsheet_9-22_Net-Zero_en_A4.pdf

We are possible (2022) Missed targets – A brief history of aviation climate targets, available at https://www.wearepossible.org/latest-news/for-20-years-the-aviation-has-missed-all-but-one-of-their-sustainability-targets

SBTi (2022) Net zero standard, available at https://sciencebasedtargets.org/resources/files/Net-Zero-Standard.pdf

Anderson, K. and Calverley, D. (2022) How alive is 1.5? Part one – A small budget, shrinking fast, available at https://climateuncensored.com/how-alive-is-1-5part-one-a-small-budget-shrinking-fast/

Molloy, J.; Teoh, R.; Harty, S.; Koudis, G.; Schumann, U.; Poll, I.; Stettler, M.E.J. (2022) Design Principles for a Contrail-Minimizing Trial in the North Atlantic. Aerospace 2022, 9, 375, https://doi.org/10.3390/aerospace9070375

Teoh, R., Schumann, U., Voigt, C., Schripp, T., Shapiro, M., Engberg, Z., Molloy, J., Koudis, G. and Stettler, M.E.J (2022) Targeted Use of Sustainable Aviation Fuel to Maximize Climate Benefits, Environmental Science & Technology 2022 56 (23), 17246-17255, http://dx.doi.org/10.1021/acs.est.2c05781

Client Earth (2022) Greenwashing lawsuit against KLM airline has been filed in court, available at https://www.clientearth.org/latest/latest-updates/news/we-re-joining-legal-action-against-dutch-airline-klm-for-greenwashing/