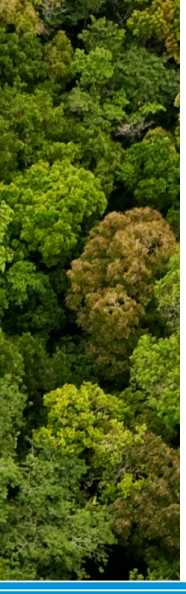
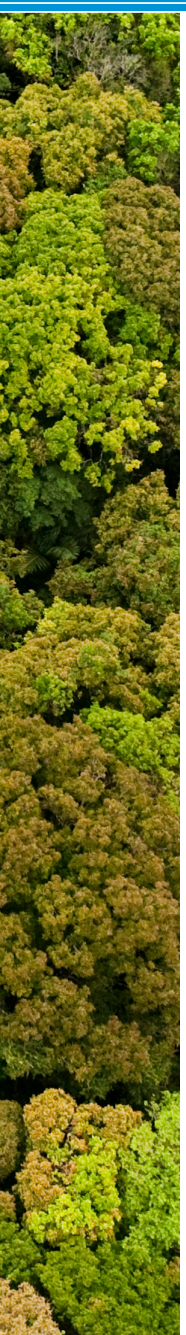


LINKING FLIGHT AND FORESTS:

THE ESSENTIAL ROLE OF FORESTS IN SUPPORTING GLOBAL AVIATION'S RESPONSE TO CLIMATE CHANGE

An overview for ICAO decision-makers

Harnessing the aviation sector's commitment to curb its emissions to help reduce global deforestation is one of the most compelling ways to slow climate change, maintain ecosystems upon which the whole world depends and improve the livelihoods of 1.6 billion people. ICAO and the world should seize this opportunity to meet its climate objectives and the Sustainable Development Goals.



EXECUTIVE SUMMARY

In October 2016, the International Civil Aviation Organization (ICAO) Assembly finalized and adopted a global market-based measure (MBM) to assist the international aviation industry in achieving its agreed climate change targets—capping aviation greenhouse gas emissions at 2020 levels, delivering "carbon neutral growth from 2020." As of November 2016, 66 countries, representing more than 86.5% of international aviation activity, committed to participate in the market-based measure from its start.

- Countries are continuing the development of the components of the MBM, including what types of offset activities should be eligible.
- Reducing emissions from deforestation and forest degradation, and sustainable management of forests, conservation of forest carbon stocks and enhancement of forest carbon stocks (collectively referred to as REDD+) is a framework developed under the United Nations Framework Convention on Climate Change (UNFCCC) and was included in Article 5 of the Paris Agreement[1] for addressing deforestation by helping society value forests for their carbon sequestration, storage and other services.
- REDD+ has many benefits in line with the goals and principles of the ICAO MBM, including:
  - An existing policy framework for reducing deforestation, sustainably managing forests, enhancing forest carbon stocks, and delivering both carbon and non-carbon benefits;
  - Incentives to protect, restore and sustainably manage forests and their natural capital with almost a decade of proven results;
  - Benefits beyond emissions reductions, as REDD+ can also protect biodiversity, support local communities and ensure that vital ecosystem functions remain intact; and
  - Robust and cost-effective REDD+ offsets which can play a key role in filling the emissions gap and supporting the aviation sector to meet its climate goals.

The ICAO MBM can depend on REDD+ to provide the volume of robust offsets it needs to meet its emission reduction targets as well as a multitude of additional benefits in developing countries—including sustainable development, biodiversity conservation and improved human well-being—and to do so with environmental integrity.

[1] United Nations Framework Convention on Climate Change (UNFCCC). 2015. Adoption of the Paris Agreement.

THE ROLE OF INTERNATIONAL AVIATION IN ADDRESSING CLIMATE CHANGE

If international aviation were its own country, it would be a top-ten emitter of carbon dioxide globally;[2] and because aviation's pollution is emitted at high altitudes, scientists think it may exert an even more powerful warming effect.[3] However, the sector is not covered by the global climate agreement under the UNFCCC and is not currently bound to emission reduction rules.

As the world's population continues to grow and becomes more globalized, so does the scale of international aviation. To keep up with projected increases in demand for international air travel, an estimated 56,000 new passenger aircraft will have to take to the sky over the next 25 years.[4] As a result, aviation's carbon emissions are forecast to skyrocket in coming years and could triple or quadruple by 2040.[5]

To address this risk, ICAO proposed the world's first aircraft carbon dioxide efficiency standard.[6] Improving the operational and technological efficiency of international aviation is vital for addressing the industry's carbon footprint. However, even with such improvements, **a large emissions gap remains to be addressed by the MBM**, as illustrated in Figure 1.

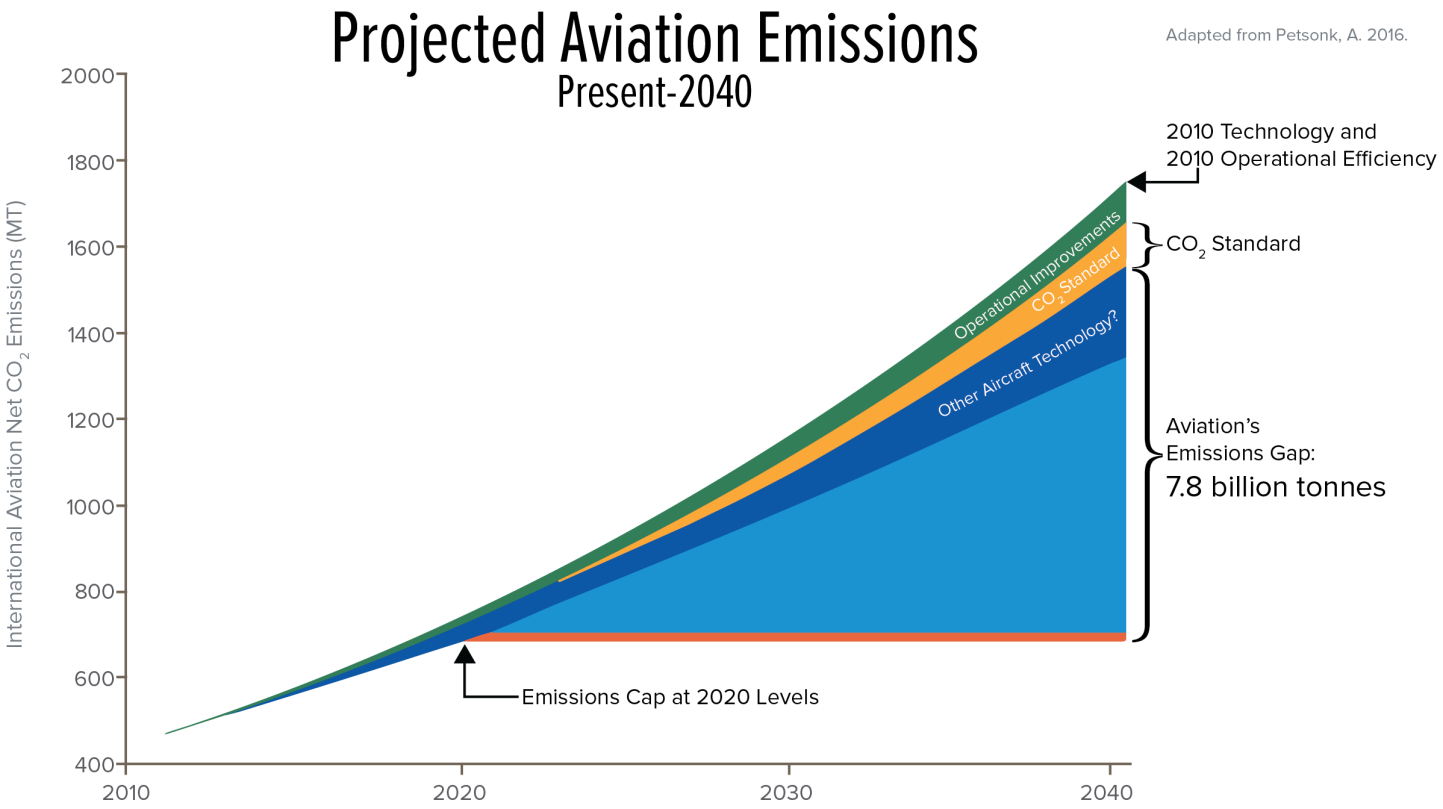


Figure 1: *The top of the upward sloping curve shows how international aviation's emissions are slated to grow in coming years. The horizontal red line toward the bottom, labeled "Emissions Cap at 2020 levels," shows the ICAO Assembly's agreed goal of "carbon-neutral growth from 2020." The area below the top of the curve and above the horizontal red line at 2020 is the total amount of emissions that international aviation must address to meet this goal. Reductions from operational improvements are shown in green and expected emissions reductions from ICAO's new CO_2 standard are shown in orange. The remaining "emissions gap" of 7.8 billion tonnes is shown in blue, between the orange wedge and the horizontal red "Emissions Cap at 2020 levels" line.*[7]

[2] IEA. 2015. CO_2 Emissions from Fuel Combustion Highlights, 2015. http://www.iea.org/publications/freepublications/publication/co2-emissions-from-fuel-combustion-highlights-2015.html.
[3] International aviation may be responsible for up to 5 percent of the world's total anthropogenic warming, according to Lee et al. 2009. *Aviation and global climate change in the 21st century*. Atmospheric Environment (43)22-23. http://www.sciencedirect.com/science/article/pii/S1352231009003574.
[4] ICAO Secretariat. 2013. Air Traffic and Fleet Forecasts. 20-21. ICAO Environmental Report 2013. http://cfapp.icao.int/Environmental-Report-2013/#20/z.
[5] Fleming and Ziegler, "Environmental Trends in Aviation to 2050." 24-25. In ICAO Environmental Report 2013, available at http://cfapp.icao.int/Environmental-Report-2013/#25/z.
[6] ICAO. 2016. *New ICAO Aircraft CO_2 Standard One Step Closer To Final Adoption*. http://www.icao.int/Newsroom/Pages/New-ICAO-Aircraft-CO2-Standard-One-Step-Closer-To-Final-Adoption.aspx.
[7] For the source of the "emissions gap" graph, see Petsonk, A. 2016. To understand airplanes' climate pollution, a picture is worth a thousand words. http://blogs.edf.org/climatetalks/2016/02/12/to-understand-airplanes-climate-pollution-a-picture-is-worth-a-thousand-words/?_ga=1.245391884.948298676.145408906. This graph has been adapted from ICAO. 2015. Overview of ICAO's Environmental Work. http://www.icao.int/Meetings/GLADs-2015/Documents/Presentations/Singapore/20150423_GLADs_P1_V36_SINGAPORE.pdf.

ICAO MBM: ADDRESSING CLIMATE CHANGE & SUPPORTING FOREST CONSERVATION

To address climate change, it is critically important to protect the world's forests, which currently store more carbon than is in the world's atmosphere.[8] Tropical forests alone absorb almost a fifth of all carbon dioxide released each year from the burning of fossil fuels, thus playing a significant role in slowing the rate of climate change.[9] Yet the destruction of these same tropical forests contributes 10 to 15 percent of global annual carbon emissions.[10] Scientists warn that the goal of limiting global warming to 1.5 °C or even 2 °C will be impossible to achieve if the world does not change how it uses its land-based resources, particularly tropical forests.

REDD+ is an important framework for reducing emissions from deforestation and forest degradation, sustainably managing forests, enhancing forest carbon stocks and delivering both carbon and non-carbon benefits. It was first established and defined as a mitigation option by the 197 Parties of the UNFCCC in Decision 1/CP.13 in 2007, and was further elaborated upon in subsequent decisions.[11]

The benefits of REDD+ reach well beyond its contributions to emission reduction efforts, providing additional environmental and social benefits not found in the mitigation activities of other sectors. For example, tropical forests provide food, water, fuel and medicine to 1.6 billion people.[12] These forests also house much of the world's biodiversity and help mitigate flooding, reduce soil erosion and conserve water resources critical to local communities. Existing safeguards and multiple-benefit standards specifically promote and enhance the provision of these additional social and environmental benefits.[13,14] Through the inclusion of REDD+ in ICAO's MBM, airlines can provide REDD+ with an important source of financing. This helps ensure REDD+ effectiveness, not only in terms of mitigating climate change, but also by adopting appropriate safeguards, thus providing additional benefits for local communities and ecosystems worldwide.

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[8] The atmosphere contains ~720 gigatonnes of carbon (Falkowski, P. et al. 2000. The Global Carbon Cycle: A Test of Our Knowledge of Earth as a System. Science 290:291- 296.); Forests contain 861 +/- 66 gigatonnes of carbon (Pan, Y. et al. 2011. A Large and Persistent Carbon Sink in the World's Forests. Science 333:988-993.).
[9] Lewis, S.L. et al. 2009. Increasing Carbon Storage in Intact African Tropical Forests. Nature, Vol 457.
[10] Busch, Jonah and Kalifi Ferretti-Gallon. 2014. Stopping Deforestation: What Works and What Doesn't. Center for Global Development, Washington, DC.
[11] UNFCCC Decisions 1/CP.16 paragraphs 70 and 71, 12/CP.17, 9/CP.19, and 10/CP.19 http://unfccc.int/documentation/decisions/items/3597.php.
[12] UNEP. 2014. Building Natural Capital: How REDD+ can Support a Green Economy, Report of the International Resource Panel, United Nations Environment Programme, Nairobi, Kenya.
[13] United Nations Framework Convention on Climate Change (UNFCCC). 2011. Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010. FCCC/ CP/2010/7/Add.1. http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf.
[14] REDD+ Social & Environmental Standards (REDD+ SES). 2014. http://www.redd-standards.org/.
[15] International Civil Aviation Organization. 2013. Assembly Resolutions in Force. Doc 10022. Resolution A38-18. http://www.icao.int/Meetings/GLADs-2015/Documents/A38-18.pdf. For the full list of guiding principles and additional details, see the Technical Overview associated with this briefing paper.

REDD+: A WELL-ESTABLISHED OPPORTUNITY TO FILL THE AVIATION EMISSIONS GAP

In 2013, the ICAO Assembly identified sixteen high-level principles[15] for designing the MBM, agreeing that these activities should, *inter alia*:

1. Support the mitigation of greenhouse gas emissions;
2. Be transparent;
3. Be cost-effective;
4. Ensure no double counting/double claiming of emissions reductions; and
5. Minimize leakage and market distortions.

Over the last decade, the REDD+ sector has matured considerably, demonstrating credible approaches to ensuring environmental integrity, and is therefore well-positioned to address all of the MBM's guiding principles. For example:

1. **Mitigation of greenhouse gas emissions**: As outlined in the previous section, REDD+ has established itself as a well-accepted approach to reduce emissions;
2. **Transparent**: Robust approaches for the accounting, monitoring, reporting and independent verification of REDD+ activities have been developed and implemented around the world;[16]
3. **Cost-effective**: Many governments at the national and subnational levels, international financial institutions and non-state actors have already undertaken the necessary groundwork to ensure the effective implementation of REDD+, making REDD+ a highly sought after offset type by both the public and private sectors;
4. **No double counting/double claiming of emissions reductions**: All REDD+ activities, which need to be tracked in transparent registries, would be subject to strict no double counting/double claiming requirements, such as requiring host countries to account for REDD+ tonnes in their national accounts. These requirements would need to be applied to all credits, REDD+ or otherwise, being used by the aviation sector; and
5. **Minimize leakage and market distortions**: Tools and methods have been created to account for and manage non-permanence and leakage to other areas, ensuring that credited forest emission reductions are real and permanent.[17] Well-established methods have also been developed to determine additionality and ensure credible baselines (or reference levels) for calculating reductions based on historical deforestation.

All of the provisions outlined above have been developed through transparent processes and are demonstrated in REDD+ activities throughout the world.

Over the past decade, several airlines have demonstrated climate leadership as early supporters for REDD+ and other forest conservation activities. For example, leading airlines such as Air Canada, Delta Air Lines, Kenya Airways, Qantas and United Airlines enable their passengers to voluntarily offset emissions from their flights via forest conservation and restoration activities.[18] REDD+ has also garnered support from over 70 countries around the world, including REDD+ donors and implementing countries.[19] Further, REDD+ was specifically recognized by all member states of the UNFCCC as a valuable mitigation strategy and financial incentive in the 2015 Paris Agreement, sending a strong global signal about the importance of REDD+ and its role in addressing climate change.[20]

CONCLUSION

REDD+ is a proven, efficient and effective way to achieve emission reductions at scale, as well as additional benefits for society and the environment. It is in line with the goals and principles of the ICAO MBM, and the supply of robust and cost-effective REDD+ offsets can play a key role in filling the emissions gap and supporting the aviation sector to meet its climate goals, while at the same time contributing to the Sustainable Development Goals.

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[16] These include approaches such as the Methodological Framework (MF) of the Forest Carbon Partnership Facility (FCPF) and the VCS Jurisdictional and Nested REDD+ (JNR) framework.

[17] Best-practice standards frameworks ensure the permanence of credited emission reductions from REDD+ activities through the use of a diversified buffer reserve, which covers any potential losses or reversals that may occur.

[18] Air Canada. 2016. Travel carbon neutral. http://www.aircanada.com/en/travelinfo/traveller/zfp.html; Delta Air Lines. 2016. Carbon Calculator. https://www.delta.com/content/www/en_US/about-delta/corporate-responsibility/carbon-emissions-calculator-https.html#calc; Kenya Airways. 2016. Carbon Offset Program. https://www.kenya-airways.com/global/Other_Services/Carbon_Offset_Project/; Qantas. 2016. Fly Carbon Neutral Program Overview. http://www.qantas.com/travel/airlines/fly-carbon-neutral/global/en; United Airlines. 2016. CarbonChoice carbon offset program. https://www.united.com/web/en-US/content/company/globalcitizenship/environment/carbon-offset-program.aspx.

[19] UN-REDD Programme. 2016. Regions and Countries Overview. http://www.unredd.net/index.php?option=com_unregions&view=overview&Itemid=495.

[20] United Nations Framework Convention on Climate Change (UNFCCC). 2015. Adoption of the Paris Agreement. FCCC/CP/2015/L.9. https://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf.