FLIGHTPATH 1.5°

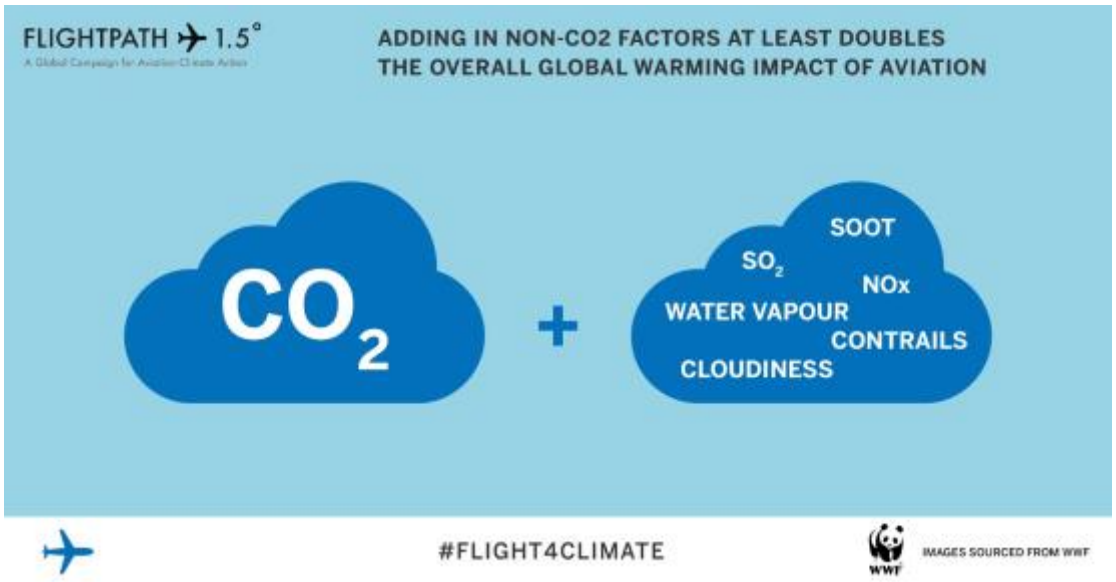
INTERNATIONAL AVIATION'S LINK TO CLIMATE CHANGE

International Coalition *for* **Sustainable** Aviation (ICSA) | September 27, 2016

Aviation Sector Contribution to Global Emissions

Current Profile:

Emissions from aviation number among the top 10 largest sources of global carbon emissions. The sector is now the 7th biggest emitter, producing more pollution than either Canada or South Korea but less than Germany. Aviation accounts for approximately 2% of world carbon emissions. However, aviation's impact on atmospheric warming and climate change is not only confined to its carbon emissions: aircraft emit non-carbon greenhouse gases (like NO_2) and heat water vapor to the atmosphere, generating significant warming feedbacks or radiative forcing particularly over shorter timescales. Taking these CO2 and non-CO2 impacts into account, aviation accounts for an estimated 4.9% of global greenhouse gases.



Together with the volume of CO_2 emissions produced by the international shipping sector (between 2-2.5%), these two sources of transportation account for nearly all the outstanding world emissions not covered by country climate plans.

International aviation remains exempt from fuel taxation, a subsidy which amounts to an estimated $60bn per annum. Such a subsidy, coupled with other, national subsidies to the aviation sector, help artificially inflate demand and reduce efficiency incentives.

A Fast Growing Sector:

Already a significant percentage of global emissions, international aviation is growing quickly. If nothing is done to address pollution from the industry, total emissions are projected to balloon by 300% above 2005 levels by mid-century.

If allowed to quadruple, airline emissions will counteract the goals set at the 21st Conference of Parties (COP21) of the United Nations Framework Convention on Climate

Change (UNFCCC). The Paris Agreement set a goal of limiting global average temperature rise to 1.5°C or well below 2˚C above preindustrial levels. As the Paris Agreement establishes a framework for the international community to curtail other sources of emissions, if no simultaneous efforts are taken to curb aviation emissions, the share of carbon emissions coming from aviation could grow to 22% (nearly a quarter of all CO2 emissions) by 2050. By one set of calculations a rise that steep would exhaust nearly 27% of the remaining carbon budget for keeping global temperatures below 1.5˚C by mid-century. Therefore, for the Paris temperature goals to be met, international aviation will need to contribute to the global effort to reduce emissions.

International Governance:

Left out of COP21:

While the Paris Agreement does not directly reference emissions from international aviation and shipping, it does seek to reduce all sources of anthropogenic (man-made) emissions which includes international aviation. However, the Agreement is silent on how these emissions are to be addressed - unlike domestic emissions, which are addressed through Nationally Determined Contributions (NDCs). This creates uncertainty as to how the necessary emission reductions are to be achieved.

However in 2010, the UN's International Civil Aviation Organization (ICAO) set an **aspirational goal of carbon-neutral growth from 2020 levels** (known as the CNG 2020 target). That goal was reinforced three years later when ICAO passed Resolution A38-18 which set two primary objectives:

- Achieve global fuel efficiency improvements rates of 2% per annum starting in 2013 and continuing until 2050.

- Keep global net carbon emissions from international aviation from 2020 at the same level (Carbon Neutral Growth from 2020).

Founded in 1947 through the Chicago Convention, ICAO was established to "foster the planning and development of international air transport so as to ensure the safe and orderly growth of international civil aviation throughout the world." In 1983, ICAO set up a Committee on Aviation Environmental Protection (CAEP) to develop policy on the environmental impact of aviation including noise pollution and emissions. In 1997 the Kyoto Protocol, the world's first international climate treaty, directed so called Annex B developed countries to work through ICAO to limit emissions from international aviation. Discussions in ICAO over the past 20 years have, however, not stopped emissions from growing by 50% over that same time and has not yet curbed emissions away from a trajectory of a four-fold further increase by mid-century if no action is taken.

One contributing factor to the unchecked emissions growth has been ICAO's opposition to regional measures, for example the inclusion of international aviation in Europe's Emissions Trading Scheme (ETS) or campaigning by the EU against fuel taxation.

However, in 2013 the organization set a goal for itself to arrive at an agreement on the design and coverage of a binding carbon offsetting system to compensate for aviation emissions growth at its 2016 assembly meeting. The market-based system being negotiated is called the Global Market-Based Measure (GMBM) for international aviation which is being developed under the name **the Carbon Offsetting Scheme for International Aviation (COSIA)**.

ICAO's assembly only meets once every three years. Therefore, if ICAO does not adopt an agreement at its 2016 session it will not have another opportunity to take strong meaningful action on addressing aviation emissions until 2019.

The Structure of ICAO:

Of the 191 nations in the ICAO Assembly, 42 nations have been involved in designing a global agreement on aviation emissions in ICAO.

Within ICAO several subsidiary bodies have contributed to developing the policy options and delivery mechanisms for limiting emissions, including the Environmental Advisory Group (EAG), CAEP, the ICAO High Level Group (HLG), the ICAO Council, and a subgroup of CAEP called the Technical Task Force for the Global Market Based Measure (GMTF). That Task Force, in turn, has two subgroups charged with developing suggested guidance on the monitoring, reporting and verification (MRV) and another for the emissions unit criteria (EUC) central to the market solution that ICAO is designing as a principal part of its strategy to curb emissions.

In 2012, ICAO formed a special 17 country body called the High Level Group (HLG) tasked with providing near-term recommendations on the development and implementation of a GMBM mentioned above. This body has met at intervals since its formation to negotiate the design and burden-sharing of the market system.

The negotiated text produced by the HLG is then reviewed by the ICAO leadership body the ICAO Council. Thirty-six Member States make up the ICAO Council States at any one time. They are elected to the council by the assembly body for three year terms. Currently, the President of the ICAO Council is Dr. Olumuyiwa Benard Aliu from Nigeria.

The ICAO Council will have final sign off on the draft of the Agreement text that gets presented to the full ICAO assembly for a vote at the fall 2016 meeting, ICAO's 39th Assembly session.

Each of ICAO's 191 member countries is allotted a single equally-weighted vote and decisions in the assembly body are made through majority agreement.

Only delegations of countries can vote in ICAO. However, while industry and civil society stakeholders are prohibited from voting in ICAO decisions they are granted permission to observe ICAO proceedings and submit policy recommendations and reactions. Global airline carriers are represented by the International Air Transport Association (IATA). IATA is the umbrella association for the world's various regional trade associations such as Association of American Airlines (A4A) or Association of European Airlines (AEA).

Civil society and non-governmental organizations are also represented in ICAO proceedings by the International Coalition for Sustainable Aviation (ICSA). ICSA is the only association of NGOs licensed to observe, access discussions and participate in ICAO.

ICAO assembly and high-level meetings opening ceremonies are open to members of the press but proceedings are usually closed to media.

Transparency Deficit:

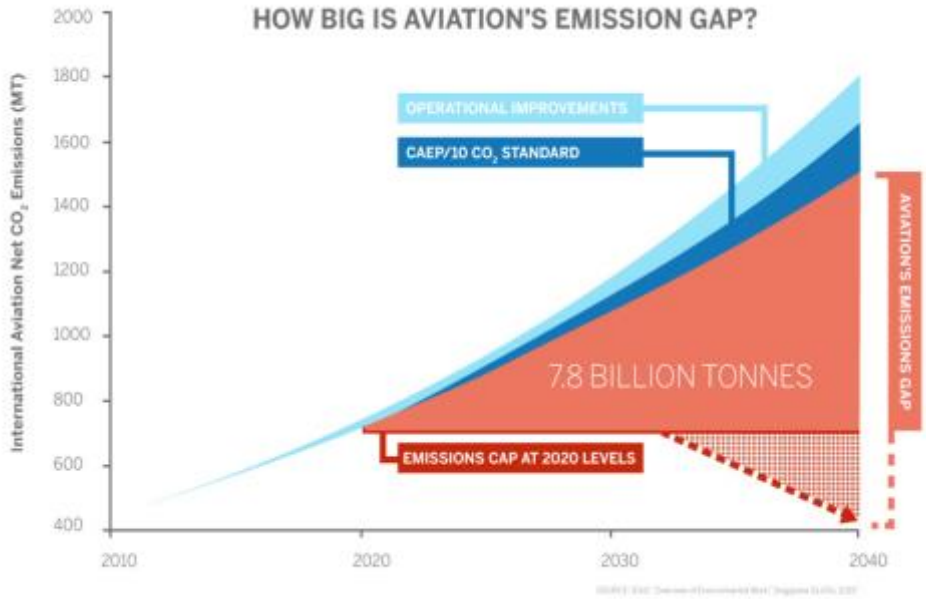
However, the access to ICAO processes is often restricted. Even when granted, access can sometimes be caveated with legal constraints on how information learned from that access can be disclosed or used. While ICSA access is usually more limited than that granted to country delegations or industry stakeholders, some constraints on transparency are applied to all parties to ICAO.

For instance, access to CAEP documents and its online portal is only granted after parties agree to sign an 'unlimited liability clause' that prohibits them under penalty of law from sharing or publicly commenting on any of the information they learn from restricted documents. Even country delegations are required to consent to be held liable to gain access to the documents.

ICAO's low transparency environment has been a feature of the forum since its inception and a continuing obstacle to civil society and media efforts to ensure accountability in ICAO.

Options for reducing emissions – the Basket of Measures

Aviation has a huge "emissions gap" – shown in red – about 7.8 billion tonnes of carbon pollution that international aviation will have to deal with to meet its own climate goals (such as the CNG 2020 target), let alone the kinds of reductions that will be needed if the sector is to bring emissions down to the dashed red arrow, along the lines of the Paris Climate Agreement.



To close the emissions gap ICAO has a number of options that it can deploy. This basket of measures includes efficiency improvements and operational improvements. However, as can be seen in the diagram these improvements have limited power to make a dent in the emissions gap (the dark and light blue wedges respectively). Therefore, the bulk of the emissions gap will need to be closed by the development of alternative fuels, and market solutions like the already mentioned global market-based measure (combined effort needed to address the dark red portion of the graph).

In Sector Reductions:

Efficiency Improvements: Beginning in 2009, ICAO started work to establish the world's first CO2 efficiency standard for new aircraft. The stated purpose was to adopt a standard that would reduce emissions beyond what would have occurred without such a standard. In 2013, ICAO finalized a new CO2 certification procedure to evaluate and compare the cruise fuel efficiency of aircraft, and in February 2016, ICAO's environmental protection committee (CAEP) finalized the first binding CO2 standard for the sector. However, the CO2 standard adopted by ICAO is not strong enough to meaningfully reduce emissions. This standard won't come fully into effect until 2028, and the stringency of the standard is so low that most aircraft currently in production already meet it.

There is still time to strengthen the standard and ICAO has already agreed to update its 2010 technology review study that informed the current target. However, the sector will need to take other effective actions in the meantime to keep from locking in millions of tonnes of avoidable emissions at a time when the planet is facing a rapidly diminishing global carbon budget.

Operational Improvements: In addition to changing how efficiently jet engines process and use fuel, changes can also be made to how efficiently planes are flown, the distance of the routes and speeds they use in takeoff and landing and while airborne. However, both ICAO and IATA are researching ways to further increase the operational efficiency of air carriers. While these changes can lead to measurable reductions in the emissions required to operate aircraft they have limited range and by themselves are insufficient to deliver the needed reductions in the sector to eliminate the emissions gap diagramed above.

Alternative Fuels: Reducing greenhouse gas emissions from aviation is technologically challenging. There is scope for some future improvement in technical and operational efficiency, but this is limited. The aviation industry sees sustainable biofuels as the key long-term technology for decarbonizing aviation. Sustainable biofuels could have a role to play, but with serious challenges to developing enough supply to fuel the aviation industry other policy and technological solutions must play a role to address soaring demand and provide powerful incentives for in-sector reduction measures such as operational and design efficiencies.

Outside Sector Reductions - Market Measures and Offset Credit systems: Global Market-Based Measure

While the aviation sector is putting some resources into developing improvements that can deliver in sector reductions (such as the operational improvements and sustainable, alternative fuels described above), more immediate solutions are needed to curb and reduce the rapid growth in pollution from aviation. The bulk of the emissions growth will be addressed by the above-mentioned **global market-based measure (GMBM).** In 2013, the 38th session of the ICAO Assembly established a task force to develop a Global

market-based measure (GMBM) to cap international aviation's net carbon dioxide emissions at 2020 levels. The task force and the ICAO Council's Environmental Advisory Group (EAG) have worked to develop the GMBM over the last three years to meet a deadline of finalizing the design and presenting the GMBM for adoption at ICAO's next General Assembly in September-October 2016. Expected to be voted in at the fall 2016 session the GMBM would then come into force on January 1, 2021.

What is a market-based measure: Market-based measures apply market principles to create incentives to reduce emissions. The GMBM is based on the **principle of offsetting emissions**. An offset credit is an emissions unit representing an emissions reduction or removal below a baseline in a sector or location that does not have an emissions cap.

A GMBM would give each airline the flexibility to reduce its own emissions or purchase emissions units from other carbon market programs to meet an agreed compliance obligation as set by ICAO. Also important to note, the **aviation industry wants a global measure** to in order to avoid a patchwork of regional measures and the friction that causes in operations and markets. However, a second reason the aviation is industry prefers a global measure to several regional standards is that some of the regional standards under consideration would potentially be more ambitious than a single world standard arrived at by global consensus.

The design of the GMBM will need to safeguard the environment. ICSA (the International Coalition of Sustainable Aviation) have agreed on a set of standards that the GMBM will need to meet to achieve essential environmental integrity called the ICSA checklist. ICSA have also compared how the current draft of the GMBM agreement matches with the checklist and have produced a scorecard identifying which portions of the agreement text need to be strengthened to result in an environmentally-sound Agreement. The ICSA scorecard will be updated as new iterations of the draft Agreement text become available between now and the 2016 fall assembly. These materials are linked to here and listed in the additional resources section at the end of the document.

Three of the Central Contested Issues in the Design of the GMBM:

The main issues at stake are the design options of the GMBM, particularly how the offset obligation can be distributed among airlines, how special circumstances and respective capabilities (SCRC) of states can be reflected, how the target of carbon neutral growth from 2020 onwards can be achieved and how environmental integrity can be ensured through environmentally reliable offset units.

The Emerging Opt-in Nature of the First Two Phases of the System: Member States are beginning to coalesce around a proposal to run two voluntary phases before the scheme becomes mandatory in 2027. The agreement, as currently proposed, establishes (1) a first voluntary "pilot phase" from 2021 through 2023, (2) a voluntary "first phase" from 2024 through 2026, and (3) a "second phase" based on mandatory criteria from 2027 through 2035.

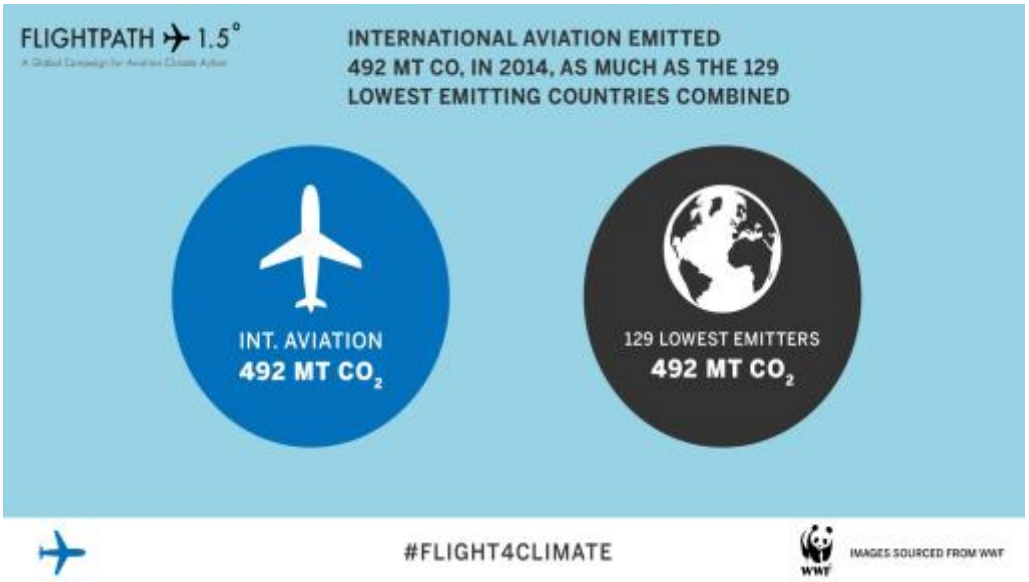
A voluntary system marks a departure from ICAO's previously committed approach and presents a new challenge to reaching ICAO's goal of achieving carbon-neutral growth at 2020 levels. The newly proposed voluntary approach leads to uncertainty about the MBM's emission coverage. If the current voluntary opt-in design is to stabilize emissions at 2020 levels then ICAO will need to secure maximum participation in the scheme. This means securing the widest possible participation from countries in both the voluntary opt-in phases as well as making sure the mandatory portion of the scheme has sufficient participation. This becomes particularly necessary for the proper functioning of the scheme because the latest text also stipulates that the scheme will only offset the post-2020 emissions growth of those countries that opt in (potentially leaving a large proportion of emissions growth unregulated).

Countries, particularly industrialized and major aviation countries, will need to publicly commit to join the first two voluntary phases by the end of the ICAO Assembly if the GMBM is to reach the levels of coverage that ICSA has determined are necessary to deliver the CNG 2020 target (namely between 80-90% coverage or higher). The issue of coverage and exemptions will be explored more fully in the next section but an official list of exempted countries means that ~10% of emissions will already not be covered, and every additional country that opts out of the scheme will add to that percentage.

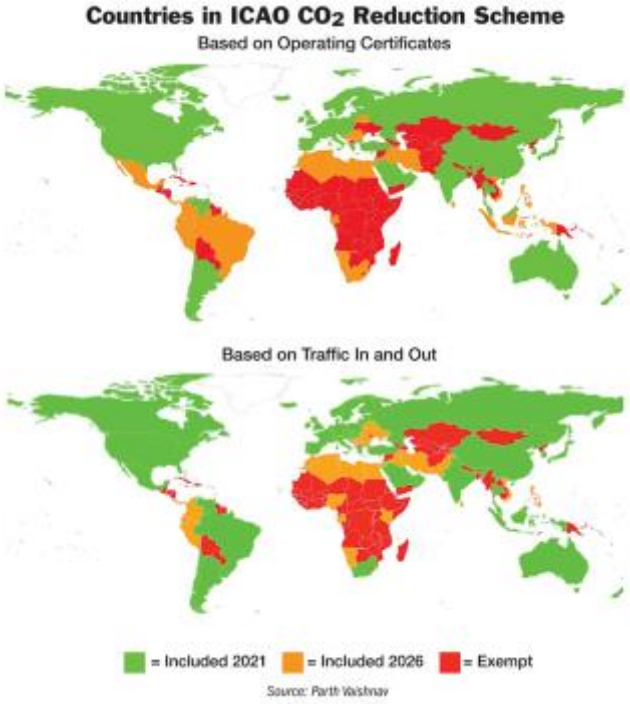
Beyond initial coverage an additional concern with the current text is maintaining the durability of that coverage. The latest proposed text would allow nations participating in the global market-based measure (GMBM) to opt out with only six months' notice. Environmental measures, including market-based measures depend on consistent participation for their effectiveness. The cost- and environmental effectiveness of MBMs depend on predictable demand for and supplies of quality emission reductions; investment in these, in turn, depends on consistent participation by governments. ICSA is urging ICAO to remove the option to opt-out or, at the least, to revise the language to parallel the longer four-year notice period required by a state wishing to withdraw from the Paris Agreement.

However, while there are concerns about formulating the first phases of the GMBM as a voluntary opt-in program there are also several promising recent developments that have created momentum behind the latest proposal of the GMBM and the viability of its voluntary design for its first two phases. The US, China and EU have all indicated their intention to join the voluntary opt-in phases of the scheme from 2021 if there is sufficiently wide participation. The Marshall Islands has also made a recent announcement that it will join as an early participant in the scene setting an example for climate vulnerable countries and small emitters to possibly do the same. If other countries can be held to account and opt in too, there is a chance that approaching ~90% of emissions could be covered by the scheme.

Coverage and Exemptions: The GMBM is being designed to occur in phases. The biggest distinction is between the first two phases (which are likely to be opt-in phases - see above) and the third phase (which is currently designed to be mandatory). Not all countries will be expected to participate in the pilot and first phase of the market scheme, which will start in 2021-2023 and 2024-2026 respectively.



Many countries are responsible for only a small percentage of emissions. However, since not all countries will take part in the opt-in phases not all country carrier emissions from the aviation sector will be covered in the first six years of the program. The strength of the GMBM will be importantly impacted by, the proportion of emissions that will be covered in the first two phases of the market scheme.



While the proportion of emissions that will be covered in the opt-in phases is not yet settled, to adopt a GMBM in line with the ICAO's 2020 carbon neutral target the offsetting requirement exemptions granted must be reduced to 10% or fewer for the pilot and first phase.

The criteria for inclusion and which countries can qualify for exemption in the first two phases is still being decided. While ICAO has set a rule that the "same requirements and rules shall apply to all aircraft operators on the same routes between states," there are two principal methods for defining a nation's contribution to air traffic under consideration. The current ICAO methodology is to calculate traffic carried by airlines that have been issued air operator certificates (AOC) by the country.

However, if a nation's contributions are calculated based on the total traffic in and out of a country, the first phases of the GMBM would cover a greater percentage of emissions. By one estimate the proportion of international traffic that would be covered could be as a high as 88% in 2021-25, rising to 95% in 2026-35.

According to either methodology, those nations that are expected to participate in the pilot and first phase include the world's developed countries and some of the world's larger developing countries (like China). However, as the below diagram will make clear, a subset of large developing countries (two of the biggest including Brazil and Nigeria) would be protected if national contributions are defined according to the AOC criteria but would be eligible for inclusion in the first phase of the program if contributions are defined by total traffic flows in and out of a country.

An additional change to the current Assembly resolution text that would help close the emissions gap would be a provision that would ensure that exempted emissions are redistributed to non-exempt countries. Currently that provision is omitted from the resolution text effectively undermining ICAO's own 2020 target.

Burden-sharing between developed and developing country air carriers: A central challenge in the ICAO MBM talks is how to ensure that responsibilities for reducing and offsetting emissions are shared fairly.

Developing countries and their airlines point out that richer nations and their legacy airlines are responsible for the lion's share of aviation emissions, both currently and historically. They also argue that the latter should therefore shoulder more of the emissions reduction responsibility. At the same time, developed countries do not want to put their airlines at a disadvantage vis-à-vis some of the more competitive fast-growing airlines.

How to maintain environmental integrity while taking into account the Paris Agreement principle of common but differentiated responsibilities and respective capabilities in the light of different national circumstances, and the Chicago Convention on Civil Aviation requirements of nondiscrimination and fair opportunities, presents a challenge.

Two logics that create a continuum for determining how to distribute responsibility for offset credits exist: 100% sectoral vs. 100% individual. According to the former logic the amount of offset credits that need to be distributed is calculated based on the annual percentage growth of emissions in the entire international aviation sector and airlines would all be responsible for the same portion of offsets. Whereas under the 100% individual formulation each airline would be responsible for a percentage of its own

annual growth. A 100% individual rationale is favored by the more mature and slower growing airlines of developed countries (like A4A and E4A) and would place a disproportionate burden on the fast-growing carriers of developing countries.

Some argue that the "100% individual" approach would create a stronger price signal than "100% sectoral" — but a shift to 100% individual could simply give a lighter pass to slow-growing carriers with already large carbon footprints, undercutting their incentive to reduce emissions.

The landing zone on this question is likely to fall somewhere in the middle, closer to 100% sectoral. However, this is one of the most challenging issue to address in the negotiations, and countries are engaging bilaterally to reach consensus in the final months and weeks leading up to the assembly meeting.

Limits of the GMBM: Offsetting does not reduce emissions, but only compensates for them elsewhere. However, because ICAO adopted a negligible CO_2 standard, the GMBM is even more essential and is the aviation sector's main climate change tool in the short term. **Its effective design is therefore critical to compensate for emission growth in the sector**. The GMBM can only be considered a first step. ICAO parties must quickly move to strengthen the ambition of the GMBM and adopt measures that reduce aviation emissions in the sector itself.

As a first step, the ICAO agreement in October 2016 must initially cap net total carbon emissions of international civil aviation at 2020 levels. At the same time, ICAO must launch a process to regularly review the 2020 cap. Over time, international aviation can be pressed to ratchet its emissions down in line with the Paris Agreement's goal of pursuing efforts to limit the increase in global temperatures to 1.5°C.

Essential Information for the Fall 2016 ICAO Assembly Meetings:

Starting on September 27th and concluding on October 7th the 39th session of the ICAO full assembly will convene in Montreal. The 191 countries of the assembly are expected to spend the first few days of the nearly two-week session discussing the global market based measure, working through the remaining log jams. It is then anticipated that they will put the agreement text aside and come back to it towards the end of the meeting when it is expected to be brought to a vote and adopted.

The Flightpath 1.5 campaign members have been watching developments in the talks closely and will have both an on the ground and remote presence closely monitoring the negotiations and ready to share their observations and analysis.

Additional Resources:

- International Coalition for Sustainable Aviation (ICSA) website
- FlightPath 1.5 website
- ICAO's latest release of a Draft Resolution on a Market-Based Measure
- ICSA Checklist
- ICSA Progress Report on the ICAO MBM
- ICAO Environmental Report 2016
- Analysis: Aviation could consume a quarter of the 1.5C carbon budget by 2050