Mitigation of international aviation emissions: The flightpath from Paris to Montreal

Tue 12 Jan 2016 – The COP21 climate summit last month produced a remarkable global consensus on the mitigation of anthropogenic greenhouse gas emissions and adaptation to their residual impact. Specific text addressing international aviation and shipping emissions was cut from the Paris Agreement during the meeting – seemingly with cursory consultation at most – and proved too difficult to reintroduce in the pressures of the final hours. But the Agreement embodies several features, notably increased ambition, which will serve to guide continuing work on mitigation of aviation emissions through ICAO. Of particular relevance is the development by ICAO of a global market-based measure (MBM) for consideration by the 39th Session of its Assembly later this year and intended implementation from 2020. *Chris Lyle* reviews some implications of the Paris Agreement for ICAO's undertaking.

In its biannual report to the UNFCCC's Subsidiary Body on Scientific and Technical Advice (SBSTA), which convened during COP21, ICAO noted it had formulated a 'basket of measures' to reduce emissions from international aviation, including air traffic management modernisation, acceleration of the use of fuel-efficient aircraft technologies, and the development and deployment of sustainable alternative fuels for aviation. Significant efforts were ongoing to fulfil the request of the 38th Assembly in 2013 for the Organization to develop a global MBM scheme for international aviation. The coming Assembly Session will consider a recommendation on the scheme that addresses key design elements and the implementation mechanisms from 2020.

Technological and operational improvements have produced significant achievements in aviation fuel efficiency over the past decades. A global CO2 certification standard is due to be adopted this year – although this will very likely be based on existing technology, apply only to new aircraft and exclude new versions of existing aircraft. Substantial progress has also been made on the use of sustainable alternative fuels, but their availability and price, along with full life-cycle assessment of biofuels, limits the prospect of their extensive contribution to aviation emissions mitigation at least until the long term. Overall, air traffic growth continues to outstrip appreciably the per unit reductions in emissions. The ICAO MBM scheme will therefore be crucial if international aviation is to play a requisite part in global emissions mitigation.

COP21 implications

There were four key aspects of COP21 that are of direct relevance for the ICAO process of mitigation of international aviation emissions: ambition, differentiation, financing and the constitutional arrangements.

Ambition: The negotiations in Paris markedly demonstrated increased emissions mitigation ambition by countries worldwide, notably to hold global warming *well* below 2°C *and* to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. This will require ratcheting up the Intended Nationally Determined Contributions (INDCs) submitted to the UNFCCC for COP21 by 187 countries, which the UNFCCC estimates would, if fully implemented, limit the temperature increase to 2.7°C. The first global review of this ratcheting up will be undertaken by the UNFCCC in 2018.

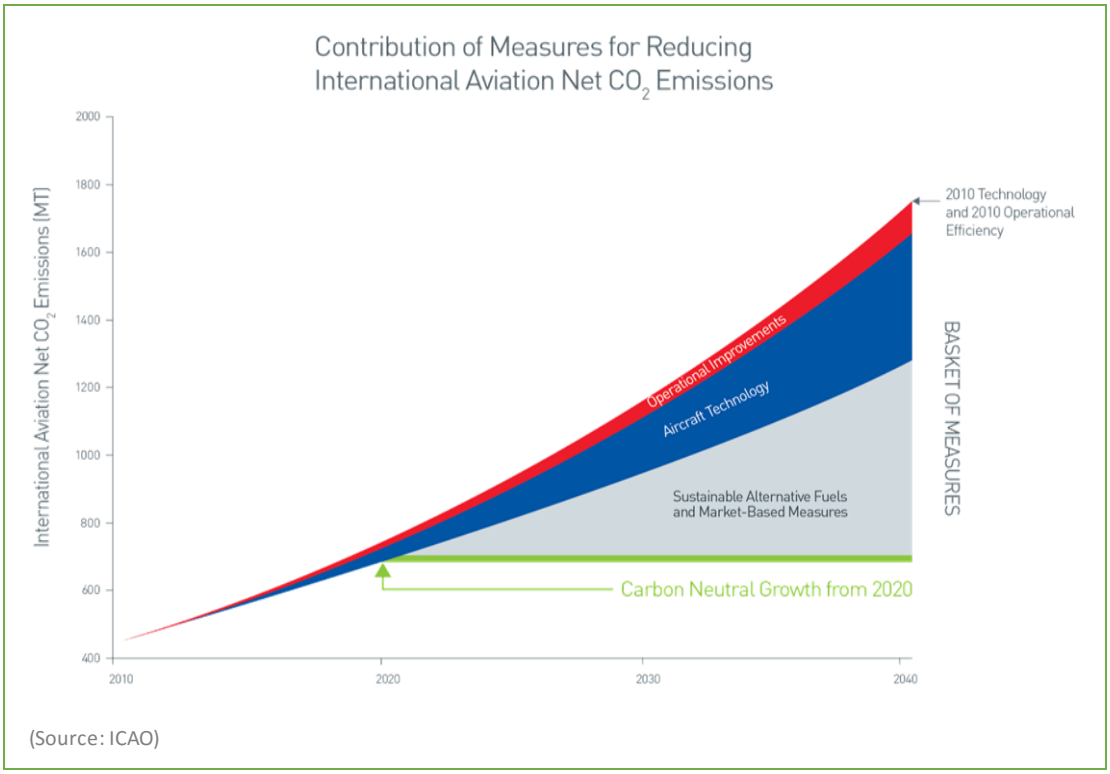
International aviation emissions are not part of INDCs but, unlike the vast majority of the INDCs, are predicted to show significantly continued growth to, and even beyond, 2030 rather than any peaking or reduction. The UNFCCC, using ICAO data, forecasts that by 2020, international aviation will emit 750 MT of CO2 emissions alone, that is 79% above the 419 MT in the 2005 base year and 21% above the current ICAO aspirational goal of 620 MT for 2020 (derived from ICAO forecast traffic growth and annual average fuel efficiency improvement of 2% from 2010).

For 2020 onwards, ICAO decided at its Assembly in 2010 to adopt an aspirational goal – taken from an earlier aviation industry target – of Carbon Neutral Growth (CNG2020). This was to be based on actual 2020 emissions

rather than those predicted at the time. Absolute international aviation emissions are expected to increase by some 40% from 2020 through 2030 – and to continue to grow beyond that. Carbon neutrality would be achieved through an MBM, most likely some form of carbon offsetting.

On offsetting, it should be noted, UNFCCC Executive Secretary Christiana Figueres has pointed out that it "is not a silver bullet, nor an alternative to the deep and decisive emission reductions that economies and communities have to make now and into the future."

When the concept of an MBM was initially proposed for international aviation, it was anticipated as being only a short to medium term measure, until technology and sustainable alternative fuels kicked in, not only to achieve CNG but indeed to move progressively below it. There is now realisation that the 'wedge gap' to be filled merely to achieve CNG will get larger and larger for the foreseeable future (*see graph below*). The possible contribution of alternative fuels to fill the wedge gap is presently uncertain but optimistic estimates are for the MBM contribution in 2030 to be reduced by about 25%.



(Source: ICAO)

As highlighted in a recent study carried out for the European Parliament (*see article*) international aviation's emissions of global CO2 are likely to rise substantially both absolutely and in terms of global share if the sector does not step up its commitment. Clearly, given the high ambition of the Paris Agreement, the goal of CNG2020 and associated offsetting needs to be revisited.

International aviation is sometimes considered a "special case" because of its catalytic effect. On two of the three pillars of sustainable development – economic and social – its contribution is on balance positive, which should weigh against its patently negative contribution to the third pillar, environmental. Thus reductions in international aviation emissions to the extent of the INDCs, especially when they are ratcheted up to reflect higher ambition, while desirable, may not be practicable.

But, as spelled out in the European Parliament study, international aviation and shipping "are industrial sectors similar to sectors such as electricity generation, steel or cement production. They are equally important to the

global economy and to economic development as other economic sectors but not more or less important than, for example, electricity, chemicals or retail. Since all other sectors are likely to be extensively covered by the post-Paris global mitigation targets, international aviation and shipping need to be covered by similar requirements. Otherwise production abroad would be implicitly subsidised via local production through inappropriate low transport prices and thus again induce higher GHG emissions."

That said, tourism is an economically important sector which is particularly effective in the transfer of wealth from rich to poor countries and more than half of international tourists arrive by air. In this respect, international aviation may be linked to several of the UN's Sustainable Development Goals.

Financing: International aviation remains exempt from fuel taxes and earlier draft negotiating texts for COP21 had seen a levy on international aviation as a source of financing for the UNFCCC Adaptation Fund. Lobbying by ICAO and the aviation industry had the relevant text removed. But offsetting can be considered as a form of financing and, despite her reservations, Christiana Figueres has noted that "offsetting has a part to play and in doing so can generate some of the funding needed for clean energy and adaptation projects in developing countries."

Differentiation: The Paris Agreement clearly reaffirms the principle of common but differentiated responsibilities and respective capabilities (CBDR&RC), in the light of different national circumstances. This is critical for the ICAO process, which has been struggling with the issue for many years. COP21 faced considerable difficulties in achieving an acceptable balance between relative national economic strengths and national GHG emissions, past and present. Dealing with aviation in isolation adds a third dimension: the standing of countries according to the level of international air transport traffic generated by their carriers, as well as the additional constituent of dealing with differing national circumstances at either end of a route.

Constitutional arrangements: Consequent upon the 1997 Kyoto Protocol, governments have been addressing international aviation emissions working through ICAO. The Paris Agreement renders large parts of the Protocol moot, at least after 2020. The UNFCCC is still well short of necessary ratifications regarding the second commitment period (2012-2020) and some additional countries are already considering withdrawal from the Protocol. So while the Protocol may continue *de jure*, in practice it has been relegated to history.

ICAO's involvement with climate change issues actually predates the Kyoto Protocol. In 1996, at ICAO's request, the Intergovernmental Panel on Climate Change agreed to undertake a special report on *Aviation and the Global Atmosphere*, which was published in 1999 and formed a basis for the Organization's work on the subject. The report, incidentally, is currently being considered for updating. Therefore ICAO expects – and is expected – to proceed under its own mandate, with continuing reports to SBSTA, although this does not preclude modification as well as clarification of the process for dealing with international aviation emissions when the UNFCCC develops mechanisms for implementation of the Paris Agreement.

There are two fundamental governance differences between the Paris Agreement and ICAO. First, a major change between the failed climate negotiations in Copenhagen in 2009 and the success in Paris was that the process moved from 'top down' globally to 'bottom up' by individual States. ICAO, a global standard-setting body, has no precedent for a bottom-up process. Second, the actual commitments (INDCs) under the Paris Agreement are voluntary, a concept which is difficult to conceive for an air route with different Parties at either end – indeed ICAO's initial consideration of offsetting has been that it should be mandatory.

One elemental weakness of the continuing treatment of international aviation emissions through ICAO is that there is no directly identifiable national commitment – only a global 'sector determined' contribution – and so the contribution of international aviation emissions does not have a high profile nationally. Not only is potential action diluted, international aviation is treated in a silo and not in the context of differing national circumstances and the relative contribution of aviation to the economy – notably for cases where tourism is critical. And, while membership of the UNFCCC and ICAO is essentially the same, the UNFCCC's mandate is to reduce greenhouse gas concentrations in the atmosphere, while the primary focus of ICAO is to protect and promote international aviation.

ICAO's MBM programme

Carbon pricing is widely recognised as a market-based measure which is both simple and effective, moving industry and consumers to greener fuel sources. But in the case of aviation there is no effective alternative to the widespread use of fossil-based fuel for the foreseeable future and carbon pricing has been shown to have a minimal effect on traffic and hence emissions. Thus the ICAO Council initially considered three other MBMs: emissions trading, carbon offsets with revenue generation and carbon offsets without revenue generation, but it has focused only on the latter. Emissions trading can be more effective than offsetting and there is already experience of it for air travel within Europe but it is more complex. Both emissions trading and offsetting incur significant management costs and inefficiencies.

Since 2014, an Environment Advisory Group (EAG), comprising 17 of ICAO's 36 Council Representatives, has been discussing a global MBM on the basis of a 'Strawman' prepared by the ICAO Secretariat and covering CO2 emissions only. This distributes offsetting obligations to operators based on a mix of collective and individual share of emissions growth. Credits would be generated outside the international aviation sector to avoid double counting of emissions. Widely differing national and regional positions have led to the introduction of possible amendments, for example:

- Adjustments to give preferential treatment to 'early movers' (prior to 2020), 'new entrants', and 'fast growers' – the latter two seem to be in direct contradiction of emissions mitigation.
- Exemptions for routes to and from States that fall below a *de minimis* threshold of emissions generated by all international flights to and from the State.
- Differentiation of offset obligations by route.
- Phase-in of routes, i.e. temporary exemptions.

While the reports of the EAG are not public, some insight as to current alternatives proposed in pursuance of broader application of CBDR&RC may be seen in submissions to SBSTA last month (*see article*) and related releases during COP21:

- 'Accumulative' historical emissions – operators offsetting obligations to be based on historical emissions (going back to 1992).
- States, rather than operators, to be the 'accountable entities' of the scheme.
- A fixed levy on international flights.

This author has long propounded the route differentiation concept to bridge CBDR&RC and the equal application provisions of the Chicago Convention, but has based this on generic national circumstances rather than international aviation traffic. Exemptions or reductions for routes to and from least developed, small island and landlocked developing States is a concept which catches the tourism concern mentioned previously, is rational in terms of the importance of aviation to the economies concerned, and has pre-existing classification in the UN, with the latter two categories of States specifically identified in the Paris Agreement.

If the MBM scheme includes significant exemptions/phase-ins/reductions for certain routes or carriers then this could of course affect the worldwide goal of CNG2020. The EAG defines CNG as applying to emissions from international aviation "that are not otherwise exempted", which could diminish the goal. The only logical alternative would be that the MBM contribution be higher for non-exempted routes and carriers to compensate for the exemptions but this would probably be politically unacceptable.

The ICAO Council has tasked its Committee on Aviation Environmental Protection (CAEP) with analytical work and technical support on such issues as assessing the emissions from various alternative fuels, Monitoring, Reporting and Verification (on which the UNFCCC has itself yet to develop a generic mechanism), and Emissions Unit Criteria (deciding which offsets should be eligible in the global MBM).

Clearly there are many questions outstanding. One particular concern remains how effective the offsetting would be. The UNFCCC, which originally established specific carbon market mechanisms pursuant to the Kyoto

Protocol, is now actively promoting them, notably through the Clean Development Mechanism. There are also a number of national and subnational schemes, and many non-governmental, voluntary mechanisms. But some developing States are known to oppose the concept of offsetting. Also, in the current voluntary market, there are offsets of widely differing quality and prices. Some do meet a Gold Standard, and a recent analysis by Germany's Oeko-Institut indicates that there would be a sufficient supply of quality carbon offsets to meet demand under a global MBM for international aviation (*see article*).

The MBM schedule

All these concerns have to addressed in the context of an extremely tight schedule. ICAO's EAG is due to meet again briefly in January and February, with the major triennial CAEP meeting in between. These meetings will be followed by a second series of regional Global Aviation Dialogues (GLADs) in March/April and a High-level Meeting in May at which a draft Assembly Resolution is expected to be available for comment. A further draft is to be agreed by the Council in its session ending on 17 June, with the Assembly itself scheduled for 27 September to 7 October.

On the UNFCCC front, ICAO will present its biannual reports to SBSTA in June and during COP22 in Marrakech, 7-18 November.

One outcome of COP21 is that international aviation and shipping emissions are no longer under the radar but have become a mainstream concern. Should ICAO fail to reach a substantive agreement in October, the UNFCCC may consider more direct action on international aviation emissions. In addition, the EU may lift the suspension of application of its Emissions Trading System to intercontinental flights and there could develop a patchwork of regional and bilateral emissions regimes applying to international air transport.

The stakes are therefore high, but the difficulties of ICAO reaching a meaningful and robust agreement on a global MBM should not be underestimated. And, like the Paris Agreement itself, an ICAO Assembly Resolution (which is non-binding, but needs consensus) will remain a paper tiger until implementation elements are defined, acted upon and verified.

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