



# Aviation and Climate Change

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### Airlines and Climate Change: The Aviation Emissions Problem



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Aviation has an emissions problem. As an industry, both in the scope of its operations and the nature of its emissions, aviation has a significant effect on the environment. Despite this, aviation emissions remain largely unregulated and are continuously increasing against a background of decreasing global emissions from many other industry sectors.

Based on Intergovernmental Panel on Climate Change (IPCC) calculations, aviation's contribution to worldwide annual emissions (estimated at 3%) could be as low as 2% or as high as 8%.<sup>1</sup> The United Nations aviation body, the International Civil Aviation Organization (ICAO), forecasts significant emissions growth in the aviation industry: against a 2006 baseline, an increase of 63% to 88% by 2020 and 290% to 667% by 2050 (without accounting for the impact of alternative fuels).<sup>2</sup>

Research published in 2013 by the Manchester Metropolitan University (MMU) found that total aviation emissions in 2006 were 630 Mtonnes of CO<sub>2</sub> and that, by 2050, those emissions are projected to be between 1,000 and 3,100 Mtonnes depending on growth and level of mitigation assumed.<sup>3</sup> Mitigation involves improved and advanced technology, more efficient operations, market-based mechanisms (MBM) and biofuels.

If global aviation was a country its emissions would be ranked about 7th between Germany and South Korea on CO<sub>2</sub> alone.<sup>4</sup> At the same time, air travel itself continues to show robust and sustained growth of 4 – 5% a year.<sup>5</sup>

At a constant emissions rate, the MMU research found that radiative forcing (the metric used by climate scientists to measure climate impact) continues to increase for a constant emissions rate since CO<sub>2</sub> is accumulating much faster in the atmosphere than it is being removed.<sup>6</sup> The longevity of CO<sub>2</sub> in the atmosphere (if a tonne of CO<sub>2</sub> is released, 30% is removed in a few decades, 50% over a few centuries, and the remaining 20% over millennia) means that the warming impact on the climate of aviation emissions will continue to grow relative to other sources.<sup>7</sup>

This article examines the aviation emissions problem and the political and legal solutions to it.

We first review the international framework for the regulation of aviation emissions. We then examine the European Union's (EU) attempt to include international aviation in its Emission Trading Scheme (ETS), which resulted in (a) a challenge in the European Court of Justice; (b) China preventing its airlines from participating in the European scheme; and (c) the U.S. Government passing legislation prohibiting U.S. aircraft operators from participating in the EU's ETS.

Primarily, our article assesses the outcome of the triennial Assembly of the UN's ICAO. The Assembly's main task during a two week meeting in Montreal, Canada in late 2013 was to find a solution to the aviation emissions problem.

In a microcosm, aviation represents many of the difficult issues associated with addressing climate change generally. Indeed, the ICAO aviation outcome – the ICAO solution – is strikingly similar to that which the international community has worked out to address climate change as a whole, albeit with some important differences.

## The International Framework for the Regulation of Aviation Emissions

The International climate change legal framework consists of the United Nations Framework Convention on Climate Change (UNFCCC)<sup>8</sup> and its later adopted Kyoto Protocol.<sup>9</sup>

### UNFCCC

The UNFCCC was adopted in 1992 and entered into force in 1994; it has almost universal State participation. It provides a framework for future action and cooperation by States on climate change. There are no legally binding limits on emissions for parties to the UNFCCC and there are no quantitative targets. Instead, parties commit to mitigate climate change “with the aim of returning individually or jointly to their 1990 [emissions] levels...”<sup>10</sup>



A crucial theme in the UNFCCC is that developed and developing State parties have “common but differentiated responsibilities and respective capabilities” in dealing with climate change, and therefore, developed countries “should take the lead in combating climate change” and its effects.<sup>11</sup>

### The Kyoto Protocol

The Kyoto Protocol to the UNFCCC was adopted in 1997, and entered into force in 2005.<sup>12</sup> It places quantifiable obligations upon States to decrease their levels of greenhouse gas emissions, and enjoys almost universal participation by States (Canada, Japan and Russia withdrew and the U.S. was never a party). The Kyoto Protocol is presently the world's primary climate change agreement.

Unlike the UNFCCC, the Kyoto Protocol sets legally binding limits on developed State parties' emissions of



greenhouse gases and did so for the first commitment period 2008 – 2012 and for the second period 2013 – 2020 (after which it may be replaced by one agreement applicable to both developed and developing States).<sup>13</sup> In terms of commitments, emission limitations or reduction commitments are set out for developed State parties expressed as a base year 1990 percentage. Australia’s target in the first commitment period, for example, was 108%.<sup>14</sup> Only Iceland’s target was more generous.

The Kyoto Protocol covers only about 15% of the world’s emissions.<sup>15</sup> Article 2(2) of the Kyoto Protocol provides that developed States “shall pursue limitation or reduction of emissions ... from aviation ... through the International Civil Aviation Organization.” Put another way, international aviation is excluded from the world’s primary climate change instrument. The problem is left to ICAO, a Canadian-based UN agency, for resolution.

It should also be noted that, in terms of aviation regulation generally, international aviation is regulated by a complex web of over 3,500 bilateral air services agreements. While in recent years, groups of countries have come together to negotiate multilateral “open skies” agreements, the majority of international air services are still traded bilaterally. But, none of these agreements address aviation emissions (although, in principle, there is no reason why they could not).

Aviation emissions, then, are excluded from the Kyoto Protocol. But, ICAO has been unable to reach any kind of consensus on a comprehensive approach to addressing the aviation emissions problem. As a result, individual States and coalitions of States have taken action. That action has resulted in legal challenges and the possibility of a trade war between States, both of which are examined below.



## The Inclusion of Aviation in the EU’s Emissions Trading Scheme (EU ETS)

The EU ETS has been operational since the beginning of 2005 and has paved the way for the development of trading schemes around the world. Under a 2008 EU Directive on the inclusion of aviation in the EU ETS,<sup>16</sup> all flights (EU and non-EU) landing at or taking off from any airport within an EU member State from 1 January 2012 must surrender emission allowances equal to the emissions created from an entire flight.

However, most of these allowances – 85% – were to be allocated to the airlines for free, and the remaining compliance costs would be passed on to passengers (many of whom with little choice as to how to get to the EU other than by air travel).

International airlines, led by those in the U.S. and China, vigorously opposed the inclusion of aviation in the EU ETS and challenged its legality in the European Court of Justice (the ECJ). The ECJ’s Advocate General, however, recommended that the ECJ find the scheme legal.<sup>17</sup> In a 21 December 2011 decision, the ECJ did just that.<sup>18</sup>

### The European Court of Justice Decision



The ECJ found that the EU had expressly provided for *uniform* application of the allowance trading scheme to all aircraft operators on routes which depart from or arrive at an airport situated in the territory of an EU Member State.<sup>19</sup> The EU had sought to comply strictly with the non-discrimination provisions of bilateral air service agreements with non-EU States.

Therefore, Directive 2008/101, to the extent that it provided for application of the allowance trading scheme in a non-discriminatory manner to aircraft



operators established both in the EU and in third States, was not invalid, and examination of that Directive disclosed no factor of such a kind as to affect its validity.

Just prior to the ECJ decision, ICAO, through its Council, endorsed a working paper approved by 26 States, including the U.S., China, Russia and India (none of which have emissions reduction targets under the Kyoto Protocol), calling on the EU to exclude non-EU carriers from the EU ETS.<sup>20</sup>

Subsequently, in early 2012, after the ECJ decision, China prohibited its airlines from participating in the scheme (the Chinese objection being, in part, that carbon cost is calculated over the length of the entire journey, not just within EU airspace). It also blocked its airlines from buying dozens of aircraft from the Airbus unit of European Aeronautic Defence and Space (EADS), and said that (or, rather, the China Air Transport Association said that) the EU ETS would cost its airlines USD 123 million in its first year.

In November 2012, the U.S. Government passed legislation that essentially prohibited a U.S. aircraft operator from participating in the EU ETS. Indeed, the U.S. law is unambiguously called the *European Union Emissions Trading Scheme Prohibition Act of 2012 (ETS Prohibition Act)*.<sup>21</sup>

Almost at the same time, largely because of such direct international opposition, the EU announced that it would freeze until late 2013 the inclusion of international aviation in its ETS. It would “stop the clock” on its ETS and look to ICAO to address the problem in that time, the same organization which, since 1997, has grappled unsuccessfully with the issue.<sup>22</sup>

The EU stated:

Based on the encouraging results of the ICAO Council meeting on 9 November – and the constructive engagement of our international partners in the relevant discussions – the EU is convinced that a global solution for addressing the fast growing aviation emissions from international aviation is within reach at the upcoming ICAO Assembly in 2013.

As a gesture of good faith the EU will “stop the clock” on the implementation of the international aspects of its ETS aviation by deferring the obligation to surrender emissions allowances from air traffic to and from the EU by one year.<sup>23</sup>

As a result, the EU “would not require allowances to be surrendered in April 2013 for emissions from such flights” in 2012. And while monitoring and reporting obligations would also be deferred in relation to such flights, the obligations with regard to all operators’ activities within the EU would remain intact; “compliance with the EU law will be enforced in this respect.”<sup>24</sup>

“Stopping the clock,” the EU said, would create space for political negotiations and demonstrate confidence that ICAO would be successful in obtaining agreement on meaningful international action:

This means the ICAO process is allowed time until the 2013 Assembly in September/October and that no compliance will be expected as regards air traffic outside the EU in the interim.<sup>25</sup>

The EU also said that “in the unlikely event of the ICAO Assembly failing to move forward the EU ETS legislation would be applied in full again from 2013 onwards.”<sup>26</sup> Despite this edict, on 3 April 2014, the EU Parliament voted to continue to “stop the clock” until 30 December 2016.<sup>27</sup>

## Aviation, Trade Rules and Climate Change

In some respects this is all slightly curious. Under the main piece of legislation on the inclusion of aviation in the EU’s ETS, all flights (EU and non-EU) landing at or taking off from any airport within an EU member State must surrender emission allowances equal to the emissions created from the entire flight. But, again, most of the allowances are allocated to the airlines for free, and the remaining costs can be passed on to passengers.

At the heart of the matter is an issue of some significance – “whether nations may adopt climate laws that have impacts on foreign companies offering goods or services in their territories.”<sup>28</sup> Put another way, can aviation and trade rules “seriously undermine efforts to



prevent the disastrous consequences of unmanageable [global] climate change?”<sup>29</sup>

It is a problem that has attracted the attention of Nobel Laureates. In early 2013, a group of leading economists, including eight Nobel Prize winners, wrote to President Obama urging him to support a price on aviation emissions. They said this:

Pricing carbon in the aviation sector will incentivize appropriate investments, [trade] and changes in operations that would reduce future greenhouse gas emissions. If climate change is to be slowed appreciably at tolerable cost, it is wise to use the market to provide incentives for individuals and firms to reduce greenhouse gas pollution ... While we recognize the barriers to a uniform global price on all carbon emissions, pricing emissions in the aviation sector via ICAO would be a good start ... The ICAO Assembly only meets every three years, the EU ETS is only suspended for one year, and the unpriced flow of carbon emissions into the atmosphere is increasing the risks to society every day.<sup>30</sup>



The Nobel laureates urged President Obama to advance immediately a “proposal for a global market based measure for aviation.”<sup>31</sup>

The next section of this newsletter examines the environmental outcomes of the ICAO Assembly and what it achieved – or, put another way, whether the faith of the Nobel laureates in ICAO to solve the aviation emissions problem through a global market-based mechanism was justified (it should be noted that the

Assembly deals with matters other than environmental ones and the emissions problem, including, for example, safety, security, air traffic management and competition (State subsidies) matters).

### “Blood in the room”: The 2013 ICAO Assembly



The ICAO Assembly on 4 October 2013 reached a consensus agreement to proceed with a roadmap towards a decision to be taken on a global MBM at the next Assembly in 2016 (the Assembly meets every three years) for implementation in 2020.<sup>32</sup> It is an agreement to agree, and it mirrors the approach taken by the UNFCCC and the Kyoto Protocol generally on climate change matters.

Specifically, the Assembly:

- Decided to develop a global MBM (an ETS, in other words) for international aviation, and to “finalize the work on the technical aspects, environmental and economic impacts and modalities of the possible options for a global MBM scheme, including on its feasibility and practicability, taking into account the need for development of international aviation ...”;
- requested the Council to “make a recommendation on a global MBM scheme” that appropriately addresses “key design elements, including a means to take into account special circumstances and respective capabilities” of States, and

the mechanisms for the implementation of the scheme from 2020 as part of a basket of measures which includes technologies, operational improvements and sustainable alternative fuels to achieve ICAO’s global aspirational goals;



- said that any MBM taking into account the “special circumstances and respective capabilities of [developing] States” could be accommodated through “exemptions from, or phased implementation for, the application of a MBM to particular routes or markets with low levels of international aviation activity, particularly those serving developing States”; and
- agreed to report the results of this work for decision by the 39th Session of the Assembly in 2016.<sup>33</sup>

The Assembly decisions defer a decision on a global MBM until the 2016 Assembly.

It is worth noting that, largely due to action by “developing” States (led by Russia, China and India) a paragraph was included in the agreement, the purpose of which, in effect, is to eliminate the inclusion of foreign aircraft operators in the EU ETS. The EU attempted the inclusion of a “reduced airspace coverage framework” in exchange for progress towards a decision on a global MBM in 2016 for implementation in 2020, but was not successful. It was reported that the EU was “outflanked and outnumbered.”<sup>34</sup>

Paragraph 16(a) of the agreement requires States (or regions), “when designing new and implementing existing MBMs for international aviation [to] ... engage in constructive bilateral and/or multilateral consultations and negotiations with other States to reach an agreement ...”<sup>35</sup> in the EU ETS. Europe will therefore have to limit the scope of its ETS to intra-EU flights only – and flights by foreign aircraft operators may even have to be excluded if without the consent of the operator’s country of registration.

One report on this issue – and on the overall result – immediately after the Assembly concluded:

It is a big blow to Europe’s prestige, [Europe] having already conceded ground in expectation of an agreement to adopt a global MBM in 2016 and accepted a reduced scope of the EU ETS to regulate

carbon emissions that were emitted in European airspace rather than for the whole of the departing or arriving flight, as set down in the original legislation. The EU has always maintained that if a “meaningful” agreement ... was not forthcoming it would “snap back” to full coverage once the present stop-the-clock derogation ends. Unless the EU wishes to embark on further confrontation with China, India and the United States, it would appear to have to accept the new limitation on its powers.<sup>36</sup>

The Resolution reflected demands from developing States as to their “special circumstances and respective capabilities” and the UNFCCC-enshrined principle of “common but differentiated responsibilities” in terms of designing and implementing a global MBM. The Resolution set forth goals to achieve a global annual average fuel efficiency improvement of 2% until 2020 and an aspirational global fuel efficiency improvement rate of 2% per annum from 2021 to 2050, calculated on the basis of volume of fuel used per revenue tonne kilometre performed. But the Resolution provided that these goals:

would not attribute specific obligations to individual States, and the different circumstances, respective capabilities and contribution of developing and developed States to the concentration of aviation GHG emissions in the atmosphere will determine how each State may voluntarily contribute to achieving the global aspirational goals ...<sup>37</sup>

Notwithstanding reference in the ICAO Resolution to an agreed aspirational global fuel efficiency improvement rate of 2% per annum from 2021 to 2050, the Resolution also makes clear at the outset (and it does this in the recitals) that the goal of 2% is:

unlikely to deliver the level of reduction necessary to stabilize and then reduce aviation’s absolute emissions contribution to climate change, and that goals of more ambition will need to be considered to deliver a sustainable path for aviation.<sup>38</sup>



Two percent is, however, the goal by 2050. Reference, then, to “goals of more ambition [being needed] ... to deliver a sustainable [aviation] path” for aviation can’t apply before 2021 – or before 2050.

### Post-Assembly: Inclusion of Emission From All Flights Within EU Airspace



Notwithstanding the ICAO Assembly’s Resolution, the European Commission later in October 2013 released a proposal on the inclusion in the EU ETS from 2014 of emissions within European airspace from all international flights (EU and non-EU) to and from EU airports.<sup>39</sup>

In response, IATA stated:

Following an historic agreement by ICAO States in October to develop a market-based measure (MBM) and a rejection of unilaterally-imposed national or regional schemes, it was with disbelief and shock that we received the news that Europe is returning to its misguided intentions ... It [the EU proposal] would take us back to the brink of a trade war, a situation the industry certainly would want to avoid.<sup>40</sup>

We know now, of course, that the EU backed down from their decision to let the clock run out.

### Airspace Regulation Proposed by the U.S.

Regulation of airspace had been proposed and supported by the U.S. at ICAO as a means by which, post-Assembly, the EU could take forward the inclusion of aviation in its ETS. Such support notwithstanding, members of both the U.S. House of Representatives Committee on Transportation and Infrastructure and the Subcommittee on Aviation wrote to the Secretary of the U.S. Department of Transportation in November 2013, stating that such regulation “violates the spirit and the letter of the ICAO

agreement, as it would unilaterally be applied to portions of U.S. flights to and from the EU ... the ETS amendment currently being considered in the EU flouts the agreed upon framework developed by the ICAO.”<sup>41</sup>

The Committee and Subcommittee members also stated that, if the proposed amendment was adopted by the European Parliament and Council, the Secretary should exercise his authority under the *ETS Prohibition Act* and prohibit U.S. aircraft operators from participating in the EU ETS.<sup>42</sup>

As of November 2014, the Secretary had not so exercised that authority.

### International Climate Change Agreements – and the ICAO Assembly Agreement

#### “Agreements to Agree”

The ICAO outcome represents an “agreement to agree” – an agreement to proceed with a roadmap towards a decision to be taken on a global MBM to address aviation emissions from international flights at the next ICAO Assembly in 2016, for implementation in 2020 (assuming agreement).

This approach is remarkably similar to the approach taken by the UNFCCC and the Kyoto Protocol in addressing climate change generally.

In terms of the UNFCCC and the Kyoto Protocol, a “Platform for Enhanced Action” on climate change, a non-binding agreement “to develop a protocol, another legal instrument or an agreed outcome with legal force” under the UNFCCC and applicable to *all parties* – both developed and developing (and, thus, a breach in the traditional “firewall” between developed and developing States, enshrined in the UNFCCC and the Kyoto Protocol) – was launched at the Durban climate change conference in 2011. The Protocol would come into effect in 2020.<sup>43</sup> At Doha the following year, it was agreed that “elements” of a draft negotiating text for such a document would be “considered” no later than the end of 2014, “with a



view” to a negotiating text before May 2015, for agreement later that year and then implementation in 2020.<sup>44</sup> In other words, both developed and developing States would have emission reduction targets. For practical purposes, these reduction targets abolish the principle of States having common but differentiated responsibilities and respective capabilities.

In 2007 the non-binding UNFCCC/Kyoto Protocol Bali “road map” was agreed with a view to a post-2012 agreement.<sup>45</sup> In 2011 (at Durban) there was agreement to reach agreement in 2015 on a text with commitments to commence in 2020. In 2012, at Doha, interim procedural steps were agreed, and climate change finance work programmes were extended, or put off. A second commitment period was also agreed which will cover just 15% of global emissions, which includes no major emitter, and with existing targets being reviewed by the end of next year.



It can be argued that this is the illusion of progress, an argument perhaps reinforced when one considers that no new pledge to reduce emissions from a major emitting State was made at either Doha in 2012 or Warsaw in 2013. (There is a conference currently ongoing in Lima, Peru).<sup>46</sup> Unsurprisingly, with every delay, the ambitions for a global climate change agreement increase.

There are clear parallels between the way the global emissions problem and the aviation emissions problem are being addressed. This is perhaps also unsurprising, particularly given that both problems are being addressed under the auspices of, and within a

framework created by, the UN. There are, then, challenges for international climate change cooperation and governance. And as Lawrence Summers, a former U.S. Treasury Secretary and Harvard President, has said,

considerable imagination will be required as to how [global] agreements can be made attractive to the major developing countries or made to be effective without their participation.<sup>47</sup>

### A “Patchwork Quilt”: Aviation and the International Climate Change Experience

It has been argued that if ICAO cannot implement an effective agreement amongst its members, the laws of a unified approach to emission regulation will not be fruitful.

Chris Lyle of Air Transport Economics says this:

There is a prospect of a complex, overlapping and possibly duplicative patchwork of emissions regimes applying to air transport ... However, such a patchwork, while by no means ideal, is not unworkable, as illustrated by industry’s administrative ability to deal with the increasing proliferation of taxes, charges and duties in the archaic bilateral economic regulatory framework – while continuing to avoid paying taxes on fuel for international flights. Various other economic sectors are already and increasingly covered by differing carbon pricing regimes in place around the world and which relate to each other without an overarching global accord.<sup>48</sup>

Indeed, the workability of such a “patchwork” approach draws some support from the international climate change experience generally. In terms of that experience, a survey of climate change law and policy at the national, sub-national and city levels reveals significant – and potentially significant – bottom up actions in both developed *and* developing States, and outside the top-down UNFCCC framework. This is in part because of the UN “agreement to agree” approach and because deadlines for agreement keep getting pushed out.







For example, China has emissions trading pilot programs in five cities (including Beijing and Shanghai) and two provinces, and aims to establish a national ETS in the period 2016 – 2020. It also aims to reduce CO<sub>2</sub> per unit of GDP by 40 – 45% relative to 2005. India has an ETS-like “Perform Achieve and Trade” initiative with intensity-based energy targets in a test phase, and a Renewable Energy Certificate System at the sub-national level.<sup>49</sup>

Kazakhstan started a pilot phase ETS program in 2013, and then in January 2014 launched a two-year phase.<sup>50</sup> South Korea’s ETS begins in 2015 with three phases out to 2026, and with caps for facilities covering 60% of its emissions.<sup>51</sup> The Brazilian Development Bank (BNDES) signed an agreement with the state of Rio de Janeiro to stimulate “the development of a market for environmental assets.”<sup>52</sup>

California, the world’s ninth-largest economy, has a cap-and-trade ETS which sets a limit on sources responsible for 85% of its emissions, with the aim of achieving an 80% reduction on 1990 levels by 2050.<sup>53</sup>

The U.S. Regional Greenhouse Gas Initiative (RGGI) comprises nine Northeastern and Mid-Atlantic State-level emissions trading schemes.<sup>54</sup>

In Canada, the province of Quebec has a cap-and-trade program,<sup>55</sup> and Alberta has an emissions-intensity based Specified Gas Emitters Regulation covering 45% of total emissions.<sup>56</sup> This regulation is significant, as Alberta emits the highest amount of greenhouse gas emissions of any Canadian province, and accounts for about one-third of Canada’s overall emissions.

None of the countries, states, provinces or cities mentioned above have – or ever will have – Kyoto targets.

And the U.S. – based Climate Policy Initiative (CPI), which charts the acceleration of national climate policy around the world, states that:

[W]ith global negotiations stalled, we focus on national and subnational policy, because that is where the action is ... the climate policy world of today is national and sub-national rather than global.<sup>57</sup>

These examples of subnational, national and international climate change regulations provide the prospect of hope that if ICAO fails to enact a unilateral agreement, the “patchwork” will provide workable coverage.<sup>58</sup>

### Design of any MBM

Almost 5 years out from the proposed start date for a global aviation emissions MBM, there are a plethora of design issues to be addressed with regard to such a mechanism. These include mode of implementation, and whether liable entities would be airline corporations, or States, or a curious combination of both.

Another issue, one which is central to international climate change agreements, is that of developed and developing parties having “common but differentiated responsibilities and respective capabilities” in dealing with climate change. Generally this question means developed countries “should take the lead in combating climate change” and its effects.

There are a number of Articles in the Chicago Convention – the 1944 Convention on International Civil Aviation, the primary instrument governing international aviation and to which virtually all States are party – which refer to its provisions having “uniform” application, and being applied “without distinction as to nationality” (Articles 11 and 15 of the Chicago Convention). International climate negotiations have recently dealt with this issue by essentially doing away with it.



The proposed 2020 global climate change treaty will apply equally to developed and developing States. That's not the case for ICAO which clearly stated in its Assembly Resolution 17/2, adopted by the 38th Assembly on 4 October 2013, that:

[T]he different circumstances, respective capabilities and contribution of developing and developed States to the concentration of aviation GHG emissions in the atmosphere will determine how each State contribute[s] to global goals ...<sup>59</sup>

In fact, excluding States on the basis of the “common but differentiated responsibilities” principle as set out in the Resolution excludes States with less than a 1% share of total civil international activities (again, a UNFCCC principle but not a Chicago Convention one), and so exempts all but about 20 of the world's nations from taking part in any aviation ETS.

It will, then, be interesting to see how that issue is resolved, given that each of the 2020 putative global climate change and aviation agreements propose to treat developing States very differently – the former by including such States, the latter by excluding them.

### The Issue Post-ICAO Assembly: Can Aviation's Emissions Really Be Reduced?

Recently published research shows that, no matter what the aviation industry does to reduce emissions, any such action will be outweighed by growth in air travel, even if significant (and contentious) mitigation measures come into force (and such measures are decades away at best).<sup>60</sup>

In other words, can the aviation industry in the long term really reduce emissions – given that little has been done to date? Indeed, ICAO

lacks the legal authority to force compliance [with mitigation measures] ... and therefore is heavily reliant on voluntary cooperation and piecemeal agreements.<sup>61</sup>

### Reduced Aviation Emissions Outweighed by Increasing Air Travel

Research in the journal *Atmospheric Research* shows that, while some mitigation measures for civil aircraft emissions can be left to market forces, other measures require a more involved oversight. “[T]he current global regulatory-framework does not provide the necessary strength of stewardship.”<sup>62</sup>

The study proposes a global regulator which has “teeth” – that is, not ICAO. The authors understand the difficulty with such a proposal, however, when they say that providing a global regulator with the requisite level of authority requires an international treaty which “history would suggest is going to be very difficult.”<sup>63</sup>

According to the research, if all mitigation action is implemented successfully, the rate of air traffic growth will still be greater than the rate of emissions reductions, necessitating a reduction in demand for air travel through human behavior change. Yet such reduction “will be strongly resisted by all stakeholders in the [aviation] industry,” and “the ticket price-increases necessary to induce the required reduction in traffic growth-rates place a monetary-value on CO2 emissions” at up to 100 times the amount of common valuations – thus a regulator which has teeth.<sup>64</sup>

Civil aviation will therefore become “an increasingly significant contributor” to greenhouse gas emissions and the aviation industry “will become more and more of a problem for the climate.”<sup>65</sup>



## A Lawsuit to Force Airline Emissions Reductions



Another problem for airlines is the prospect of a lawsuit against the U.S. Environmental Protection Agency (EPA) from the Center for Biological Diversity and Friends of the Earth.<sup>66</sup> These groups sent notice of intention to file suit under the U.S. Clean Air Act and have 180 days (from the date of their notice) to file suit. They do so based on the EPA's "unreasonable and unjustifiable delay" in acting on its duty

to determine whether global warming pollutants from aircraft emissions cause or contribute to air pollution that may reasonably be anticipated to endanger the public health or welfare, and if so, to regulate those emissions.

The Center for Biological Diversity and Friends of the Earth note that aviation is viewed as the fastest growing source of CO<sub>2</sub> emissions worldwide, increasing at a rate of almost 5% per year.<sup>67</sup>

### Airport Emissions

At about the same time as the *Atmospheric Environment* study, an EU study found that even the smallest of the 500 airports in the EU's 28 member States "consumes energy like there's no tomorrow."<sup>68</sup> At issue are the heating, ventilation and air-conditioning plants which consume 50% of the energy used at airports.<sup>69</sup> And, of course, airports and airport terminals continue to be built across the globe as air travel increases.

The study shows that EU airports together produce as much CO<sub>2</sub> as a city of 50 million people – the emissions of the larger airports alone equal those of a city of 100,000 people. The EU's CASCADE Programme [which ends March 2015] aimed to assist airports to reduce their emissions and energy needs by 20% of the life of the project.

## Limits to Growth

The aviation industry is representative of all the problems that attend any global climate change regime. Indeed, there's some irony here. In a report to the Club of Rome commemorating the 40<sup>th</sup> anniversary of the landmark report, *The Limits to Growth*, twenty recommendations are provided to individuals in the absence of any future global climate agreement.<sup>70</sup>

Taking heed of such advice involves air travel.

## Conclusion: At the Moment Even Nobel Prize Winners Cannot Solve the Aviation Emissions Problem



In its Fifth Assessment Report on the Physical Science for Climate Change, the IPCC concluded:

Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased ...

Human influence on the climate system is clear. This is evident from the increasing greenhouse gas concentrations in the atmosphere, positive radiative forcing, observed warming, and understanding of the climate system [and] ...

Continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system. Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions.<sup>71</sup>



As the University of Cincinnati's Adrian Parr notes, climate change poses several problems – scientific, economic, social (“[h]ow can human societies change their climate-altering behaviours and adapt to changes in climate?”), cultural and legal. Indeed, “[w]hat regulations can be introduced to inhibit environmental degradation, promote GHG reductions, and assist the people, species, and ecosystems most vulnerable to environmental change?”<sup>72</sup>

All of these problems are wrapped up in the aviation emissions problem. The difficulties in addressing that aviation problem reflect, in a microcosm, the difficulties in addressing a global climate change problem with which the world is not organised to deal. Climate change is a global problem. Yet, 190 sovereign States, developed and developing, “with common but differentiated responsibilities and respective capabilities,” attempt to address it.

The concerns of those disparate States are very different – as the aviation emissions problem demonstrates and as the UNFCCC and its Kyoto Protocol recognise. It's clear under the UNFCCC that developed countries “should take the lead in combating climate change” and its effects, and that under the Kyoto Protocol only developed States have emissions reduction targets.



There are other ongoing divides.

In October 2013, a World Wildlife Fund delegate to the ICAO Assembly said that the Assembly saw scenes:

I don't think ICAO has ever seen before ... There was just an incredible outpouring of dislike of the EU ETS, very aggressive interventions from a lot of States, and an almost overwhelming antipathy towards the [EU's] ETS. You could really smell blood in the room ...<sup>73</sup>

One alternative way to address the climate change problem would be to break the problem up into different pieces, which could involve sectoral agreements, agreements between industry sectors, for example, contemplating decentralised arrangements in which particular issues are discussed and negotiated. But even then, efforts to deal with the aviation sector by way of addressing the climate change problem are themselves problematic – “blood in the room,” as the ICAO delegate said.

In terms of aviation, the Deputy Director of the Center for Climate Change Law at Columbia University said:

Countries are retreating to protectionism when faced with the EU's attempt to seriously address one major emitting source [aviation] in an equitable manner ... [this] suggests little hope that these same countries might soon take bold stances in committing to the long-term, deep emissions reductions necessary to avoid the worst effects of climate change.<sup>74</sup>

The ICAO outcome does not represent such a “bold stance,” of course, “in committing to the long-term, deep emissions reductions necessary.” Carbon-neutral growth from 2020, even if it is possible, will not be enough (and carbon-neutral growth is a long way ahead of the ICAO position). As the chairperson of the Australian Initiative for Sustainable Aviation Fuels has said, “[aviation] will be dependent on the same liquid jet fuel for many decades” and that “while certification allows for up to a 50:50 mix of biofuel and conventional jet fuel, it is likely to be a considerable time before the industry has enough scale to meet even that mix.”<sup>75</sup>

Manchester Metropolitan University research puts the position even more clearly:

Aviation currently uses kerosene for powering aircraft engines, and is likely to do so into the foreseeable future.<sup>76</sup>

The developed/developing State divide is clearly breaking down in terms of international climate change negotiations generally, but not in terms of international aviation's attempts to address its climate change and emissions problem.



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