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ASSEMBLY — 38TH SESSION

EXECUTIVE COMMITTEE

Agenda Item 17: Environmental Protection

ICAO'S CO_2 STANDARD AS PART OF A BASKET OF MEASURES TO MEET EMISSION REDUCTION GOALS

(Presented by the International Coalition for Sustainable Aviation (ICSA))

EXECUTIVE SUMMARY

A38-WP/34 on environmental protection – climate change, notes that to promote sustainable growth of aviation a comprehensive approach consisting of work on technology and standards, and on operational and market-based measures to reduce emissions is necessary.

CAEP has agreed that the purpose of ICAO's CO_2 standard for new aircraft types is to produce emissions reductions beyond what would be achieved without the standard. However, if the eventual stringency of the standard to be introduced in 2020 or later is based on a restricted analysis of available technologies in 2016, the eventual stringency is unlikely to have any impact on new aircraft types introduced at the time the standard takes effect, and certainly not a decade later when the first revision might be expected.

The CO_2 standard is an integral element in ICAO's basket of measures to meet the sector's environmental goals. If the standard is not going to have an incremental effect then other measures in the basket must compensate and this only heightens the importance of the 38th Assembly agreeing to implement a global MBM that will be effective in reducing emissions.

Action: The Assembly is invited to confirm that the CO_2 standard is an essential element of the basket of measures and request Council to ensure that CAEP adheres to its commitment to agree a standard that produces incremental emission reductions beyond business as usual for new aircraft types.

Strategic Objectives:	This working paper relates to Strategic Objectives C, This working paper relates to *Environmental Protection and Sustainable Development of Air Transport.*
Financial implications:	No financial implications.
References:	Doc 9952, *Annual Report of the Council – 2010* CAEP8-WG3-IP6-03, *IE fuel burn reduction technology goals report, 13 September 2010 draft*

1. DEVELOPING A CO_2 STANDARD

1.1 The ICAO CO_2 standard differs quite fundamentally from ICAO's noise and NOx standards. A fuel standard is different because fuel efficiency has always been a major aircraft design parameter whereas noise and (to a large extent) engine emissions abatement measures are not in themselves inherent to building aircraft – at least until regulation was introduced. Noise and emissions alleviating technologies just add costs, while every fuel efficiency improving technology has both costs and savings. Fuel efficiency has always been a central concern of both manufacturers and indeed airlines as the well documented historical fuel efficiency trend demonstrates. Aircraft fuel efficiency at entry into service dates has improved 65% since the 1960s and every new aircraft generation shows at least a 10% better fuel efficiency as well as lower direct operating costs. The annual fuel efficiency improvement is currently at least 0.5-0.6% per year. Clearly aircraft efficiency has been improving even in the absence of an ICAO CO_2 standard.

1.2 ICAO acknowledged this natural improving trend in efficiency with additional and specific guidance on its implications for a baseline for the CO_2 standard. At its 2011 meeting in Beijing, Steering Group affirmed that the purpose of the CO_2 standard is to achieve emission reductions beyond what would be achieved in the absence of a standard, analyzed using ICAO criteria of technical feasibility, environmental benefit, cost effectiveness, and impacts of interdependencies (SG2011/Flimsy1). This interpretation is also consistent with ICAO's goal 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.

1.3 But aircraft manufacturers don't simply build aircraft with lowest operating costs or indeed best fuel efficiency in mind. Market forces i.e. the design requirements of size, range, speed and payload demanded by airlines obviously play a critical factor. And in this respect the decision by CAEP members under the strongest of pressure from manufacturers and airlines to apply the principle of transport capability neutrality in determining the fuel burn metric dealt the first major blow to the potential effectiveness of the standard (design range, speed, airfield performance and payload are all key determinants of overall aircraft fuel efficiency). We recognize, as does industry, that fuel burn and emissions could be further minimized if aircraft were specifically designed for a very precise mission but it is not realistic to expect airlines to own or operate fleets composed of a wide range of aircraft versions each being exclusively optimized and suitable for a specific payload-range combination. At the same time, the fact is that a metric system could have been selected to better credit optimisation of aircraft to the majority of missions flown (which is significantly shorter than the current design range of aircraft). While ICSA participated in the development of this metric system, and supported its adoption in 2012 given the pressing need to develop a standard, it must be recognized that ICSA also noted that this was a major missed opportunity.

1.4 A related missed opportunity was CAEP's failure to ensure that the metric specifically credited measures to reduce aircraft weight. This failure stemmed fundamentally from manufacturer's refusal to accept that aircraft empty weight should be included as a factor.

1.5 More recent discussions within CAEP over stringency further endanger the utility of any final standard. In particular, a recent decision taken by CAEP members to limit the technology levels to be considered in setting stringency to greater than or equal to TRL (technology readiness level) 8 in 2016 will severely constrain the likelihood that the standard can have any practical effect on meeting CAEP's requirement mentioned above of achieving emission reductions beyond what would have been achieved without the standard.

1.6 The standard is expected to take effect in 2020 or 2023, with an additional four to five year delay before affecting new entry-into-service aircraft. But the effect of the CAEP members' decision is essentially to limit the need for manufacturers when complying with the standard to have to incorporate any technologies available on aircraft after 2016. Yet there is a widely acknowledged natural trend of improving fuel efficiency of at least 0.55% per annum. Out of over a hundred scenarios that experts have studied, not one assumes that fuel efficiency will go backwards over the next decades.

1.7 This essentially means that the stringency requirement of a standard taking effect in 2020 or 2023, and, like the ICAO NOx and noise standards, set at a constant level for around 10 years, will have been rendered meaningless (by technology improvements driven by the business-as-usual market forces incorporated in new aircraft types) if not at the standard's inception, then fairly soon afterwards. While past CAEP decisions have regrettably determined that the NOx and noise standards should be technology following not forcing, it is clear that Steering Group Beijing's requirement for the standard to drive emission reductions beyond those that would be achieved without the standard – ie the natural historical fuel efficiency progression - cannot be reconciled with the later CAEP member decision on TRL8. The industry view is that to go beyond 2016 technology requirements in the stringency risks safety but it is clear that the undisputed yearly efficiency improvement now tracking at 0.5-0.6% a year has not endangered safety in the past. A 2016 technology level requirement can realistically have no significance whatsoever for new aircraft being introduced a decade later. The decision also seems to fly in the face of the view of ICAO's independent fuel burn experts who found in 2010 that under moderate to extreme regulatory pressure the fuel burn of new aircraft could in fact be reduced by 1.48% to 1.74% annually. Conservatively this would translate to emissions reductions as large as 400m metric tonnes (MMT) of CO_2 in 2050 or 14% of the total inventory under the industry business as usual scenario.

1.8 There is a further very important issue that has more recently become apparent. If ICAO is to meet and strengthen its long term emission reduction goals, all available and feasible technical measures will be required particularly if member state reluctance to deploy needed market based measures persists. Given the predicted high and sustained industry growth rates that are expected to 2050 and the increasing congestion in the air and slot constraints on the ground, scale and deploying ever larger aircraft may well need to be pursued by airlines. We have already seen an impressive growth in aircraft scale over recent decades. But it is clear that infrastructure considerations at airports, specifically the 80 meter box (wing span) limit, are already constraining the full scale benefits that very large aircraft can bring to emission reductions (by at least 11% in the case of current aircraft larger than 500t take-off mass). There is no reason in principle why the 80m constraint cannot be raised; it has been done twice before. There is a cost to be incurred at large aircraft hubs, but this limitation will eventually give rise to 1.3Mtonnes of CO_2 per annum (after delivery of all aircraft on order larger than 500t take-off mass) due to fuel burn that could have been avoided. ICSA feels strongly that any stringency line for very large aircraft should take account of the possible need for the 80m box limit to be reviewed so as not to provide a disincentive for scale emissions reductions to be pursued in the future.

2. CONCLUSIONS

2.1 Recognising that as the standard is a central element of ICAO's technology approach to reducing emissions, if the above decisions limiting the effectiveness of the standard are not rectified, then member states must recognise that this will (i) weaken considerably the effectiveness of the basket of technical and operational measures outlined in this Resolution and (ii) render even more urgent the need to adopt a decision at this Assembly to implement a global market-based measure by 2016 that will be effective in reducing emissions and to encourage the implementation of effective regional and national MBMs in the interim. ICSA reiterates that an effective CO_2 standard can make a difference and, properly constructed, will contribute significantly to urgently needed in-sector reductions at an acceptable cost and

according to an agreed and realistic timeline. ICAO states and industry have invested very considerable resources to this intensive process – as has ICSA out of a conviction that standards are an essential element to achieving improvements in transportation fuel efficiency. This is an opportunity that ICAO should not pass up. The outcome must be a meaningful one.

3. ACTION BY THE ASSEMBLY

3.1 The Assembly is invited to confirm that the CO_2 standard is an essential element of the basket of measures and request Council to ensure that CAEP adheres to its commitment to agree a standard that produces incremental emission reductions beyond business as usual for new aircraft types.

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