

Preparing for the High-level Meeting on a Global MBM Scheme (HLM-GMBM)

Frequently Asked Questions (FAQs)

Note: The information included in the responses to the selected “Frequently Asked Questions” makes reference to the “Draft Assembly Resolution text on a Global Market-based Measure (GMBM) Scheme”, included in the Appendix to Working Paper HLM-GMBM-WP/2 for consideration by the ICAO High-level Meeting on a Global Market-Based Measure (MBM) Scheme. In particular, references to paragraphs 17 and 18 of the said draft Assembly Resolution text are made taking into account that the content of both paragraphs is related to work in progress under the Committee on Aviation Environmental Protection (CAEP).

1. Why has ICAO decided to develop a global MBM scheme (GMBM) for international aviation?

Environmental Protection is one of the Strategic Objectives of ICAO. Work in this area has been undertaken by ICAO since the late 1960s, first focusing on the establishment of international policies and standards related to aircraft noise, but gradually expanding to other subject areas such as local air quality and subsequently climate change.

According to most recent figures from the Intergovernmental Panel on Climate Change (IPCC), aviation (domestic and international) remains approximately 2% of global CO₂ emissions produced by human activity; international aviation is responsible for approximately 1.3% of global CO₂ emissions.

Under ICAO’s mandate, aviation has consistently invested in better aircraft technology and the improvement in efficiency of air transport operations. Significant technological progress has been made in the aviation sector, with aircraft produced today being about 80 per cent more fuel efficient per passenger kilometre than in the 1960s.

Total aviation emissions, however, are forecasted to grow in the coming decades. Projected total annual improvements in aircraft fuel efficiency of the order of 1–2% are expected to be largely surpassed by traffic growth of around 5% each year. The most recent estimates, based on analysis conducted by the Council’s Committee on Aviation Environmental Protection (CAEP), anticipate international aviation fuel consumption growing somewhere between 2.8 to 3.9 times by 2040 compared to the 2010 levels. For further details on the analysis conducted by CAEP, please refer to document A38-WP/26 presented by the Council at the 38th Session of the ICAO Assembly.

In October 2013, the 38th Session of the ICAO Assembly adopted Resolution A38-18, which constitutes the consolidated statement of continuing ICAO policies and practices related to climate change. Under this Resolution, the Assembly resolved that ICAO and its Member States, with relevant organizations, would work together to strive to achieve a collective medium term global aspirational goal of keeping the global net CO₂ emissions from international aviation from 2020 at the same level (so-called “carbon neutral growth from 2020”). The Assembly also defined a basket of measures designed to help achieve the ICAO’s global aspirational goal. This basket includes non-market-based measures such as lighter airframes, higher engine performance and new certification standards, operational improvements (e.g. improved ground operations and air traffic management) and sustainable alternative fuels; as well as market-based measures (MBMs).

The aggregate environmental benefit achieved by non-MBMs will be insufficient for the sector to reach its aspirational goal of carbon-neutral growth from 2020. A global MBM scheme is a cost-effective and complementary way for international aviation to meet its aspirational goal as part of the basket of measures on a temporary basis. This was preferable to having a patchwork of regional and local measures that are not harmonized and could create inefficiencies in the system without any certainty of delivering environmental benefits.

Secondary questions

1.1. *What is a “market-based measure (MBM)”?*

A market-based measure (MBM) is a policy tool that is designed to achieve environmental goals at a lower cost and in a more flexible manner than traditional regulatory measures. Examples of MBMs include levies, emissions trading systems, and carbon offsetting.

1.2. *What was the request from the 2013 ICAO Assembly on a global MBM scheme?*

Under Resolution A38-18, paragraph 19, the ICAO Assembly requested the Council (a governing body responsible to the ICAO Assembly), with the support of ICAO Member States, to conduct work and report its results for decision at the next 39th session of the ICAO Assembly, which is scheduled to be held from 27 September to 7 October 2016. Within this mandate, the Council is requested to:

- a) 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, the proposal of the aviation industry and other international developments, as appropriate, and without prejudice to the negotiations under the UNFCCC;

- b) organize seminars, workshops on a global scheme for international aviation participated by officials and experts of Member States as well as relevant organizations;
- c) identify the major issues and problems, including for Member States, and make a recommendation on a global MBM scheme that appropriately addresses them and key design elements, including a means to take into account special circumstances and respective capabilities, and the mechanisms for the implementation of the scheme from 2020 as part of a basket of measures which also include technologies, operational improvements and sustainable alternative fuels to achieve ICAO's global aspirational goals.

1.3. *What has been achieved since the 2013 ICAO Assembly on a global MBM scheme?*

Since the 2013 Assembly, the ICAO Council has established the Environment Advisory Group (EAG), which was composed of 17 Council Representatives and representatives from IATA. The EAG, under the direction of the Council, was mandated to oversee all the work related to the development of a global MBM scheme and make recommendations to the Council. The EAG pursued progress, starting with a "Strawman" approach, in which a basic proposal for a global offsetting scheme was tabled with a view to generating discussion and analyses for improvements.

The EAG met 15 times in total and it was supported in its technical and analytical work by the Council's Committee on Aviation Environmental Protection (CAEP). A series of analyses requested by the EAG and the Council were undertaken by CAEP, including:

- Volumes of future CO₂ emissions from international aviation and overall cost impacts to achieve the carbon neutral growth from 2020;
- Cost impacts of using different combinations for individual operator's growth factor and the international aviation sector's growth factor;
- Various approaches for distribution of offsetting requirements to individual aircraft operators (e.g., route-based approach, accumulative approach, and comparison of these approaches); and
- Adjustments of offsetting requirements, technical exemptions and exemptions of routes to/from low emitting States.

In addition, work on technical aspects of the global MBM scheme (e.g. monitoring, reporting and verification (MRV); emissions units criteria (EUC) and registries) was also undertaken by CAEP, in support of the discussion by the EAG and Council.

The EAG/15 meeting in January 2015 considered a draft Assembly Resolution text on a global MBM scheme, which was developed by taking into account the progress achieved and views expressed during previous EAG deliberations.

The EAG/15 meeting recommended, and the Council endorsed, that a High-level Group on a Global MBM Scheme (HLG-GMBM) be established to facilitate the convergence of views in order to finalize draft Assembly Resolution text on a global MBM scheme, for consideration by the Council. The HLG-GMBM was composed of 18 high-level aviation and/or transport representatives. The HLG-GMBM met twice (24 to 25 February and 13 to 15 April 2016) and made progress in improving and clarifying a number of provisions in the draft Assembly Resolution text.

Based on the results of the HLG-GMBM, the Council in April 2016 decided on the draft Assembly Resolution text on a global MBM scheme, to be presented for consideration of the High-level Meeting from 11 to 13 May 2016.

1.4. *What was the role of the two rounds of Global Aviation Dialogues (GLADs) on MBMs?*

The Global Aviation Dialogues (GLADs) are the response to the ICAO Assembly's request in Resolution A38-18, paragraph 19 b), for the Council to organize seminars and workshops on a global scheme for international aviation. The GLADs aim to allow for well-informed deliberations on a global MBM scheme in the ICAO process toward the 39th session of the ICAO Assembly from 27 September to 7 October 2016.

The first round of five GLADs was organized throughout April 2015 across the ICAO regions in Peru, Kenya, Egypt, Singapore and Spain, with 362 participants in total from 79 different States and 22 different International Organizations. The second round of GLADs was organized in March/April 2016 in Egypt, Senegal, Indonesia, the Netherlands and Mexico, with 390 participants in total from 60 different States and 20 different International Organizations.

The GLADs was a forum for information sharing and exchange of ideas, rather than a forum for decision-making. The main objective of the GLADs is to reach out to those States that are not directly engaged in the Council or CAEP. To facilitate the engagement of participants, the GLADs used a unique small-group format to organize thematic dialogue sessions on design elements and implementation aspects of a global MBM scheme. Each dialogue session was held in a small-group format: a facilitator was assigned to each group, group members discussed specific common questions, and each group nominated a speaker to report back its summary of discussion to the plenary.

All documentation including presentations, dialogue questions, reference material, as well as the compiled summaries of small group dialogues are available on the 2015 GLADs website (<http://www.icao.int/meetings/GLADs-2015/Pages/default.aspx>) and the 2016 GLADs website (<http://www.icao.int/Meetings/GLADs-2016/Pages/default.aspx>) respectively.

1.5. *What is the objective of the High-level Meeting, and what would be the next steps?*

The High-level Meeting on a Global Market-Based Measure Scheme (HLM-GMBM) will be held at ICAO Headquarters in Montréal, Canada from 11 to 13 May 2016. The High-level Meeting will focus on deliberations on draft Assembly Resolution text on a global MBM scheme and make recommendations to the 208th Session of the Council, in preparation for the 39th Session of the ICAO Assembly, to be held from 27 September to 7 October 2016.

Prior to the High-level meeting, a briefing will be conducted to familiarize participants with the basic elements of the global MBM scheme proposal, as contained in the draft Assembly Resolution text. An onsite Helpdesk will also be available for State delegations to conduct one-on-one consultations.

ICAO's 191 Member States are expected to make a decision on the design of an international aviation global MBM scheme at the 39th ICAO Assembly in September and October 2016. If agreed, the global MBM scheme for international aviation would then be implemented from 2020.

1.6. *Why were international aviation emissions not included in the Paris Agreement at COP 21?*

The Convention on International Civil Aviation (so-called "Chicago Convention") and the United Nations Framework Convention on Climate Change (UNFCCC) are two international treaties signed in 1944 and 1992 respectively. The Chicago Convention's 191 Member States and the UNFCCC's 197 Parties to the Convention are basically the same countries, as both treaties have nearly universal membership.

The ICAO Assembly, comprised of all Member States, requested its Council to ensure that ICAO exercises continuous leadership on all environmental issues relating to international civil aviation, including GHG emissions. This is reflected in paragraph 2. a) of Assembly Resolution A38-18, which constitutes the consolidated statement of continuing ICAO policies and practices related to environmental protection – climate change.

Emissions from domestic aviation, addressed under the UNFCCC, are calculated as part of the national GHG inventories and are included in national totals, while emissions from the so-called "bunker fuels" (i.e. fuel used in international aviation and maritime transport) are reported separately. Also following a decision of the ICAO Assembly, ICAO provides information to the UNFCCC process on a regular basis, on international aviation emissions and on the activities undertaken to address these emissions.

The Paris Agreement is an international agreement linked to the UNFCCC; the legal relationship between the Paris Agreement and the UNFCCC is established by means of the former being an instrument to enhance the implementation of the Convention (i.e.

UNFCCC). This legal relationship is similar to the one existing between the Kyoto Protocol and the Convention.

The fact that international aviation emissions are not part of the Paris Agreement reinforces the confidence in the progress that States have been achieving through ICAO in the fight against climate change caused by international aviation.

2. How would a global MBM scheme for international aviation work? What are the main features of the current proposal for a global MBM scheme?

According to Assembly Resolution A38-18, paragraph 19 c), the Assembly requested that ICAO develops a global MBM scheme, as part of a basket of measures, to achieve the global aspirational goals (of carbon-neutral growth from 2020 onwards).

In the current proposal as per the draft Assembly Resolution text, the level of CO₂ emissions from international aviation covered by the scheme in 2020 represents the basis for carbon neutral growth from 2020, against which emissions in future years are compared. In any year after 2020 when international aviation CO₂ emissions covered by the scheme exceed this baseline, this difference represents the sector's offsetting requirements for that year.

In the draft Assembly Resolution text, the global MBM scheme is implemented in two phases, with increasing participation of States based on two criteria: their level of activity in international aviation, expressed in Revenue Tonnes Kilometers (RTKs); and their level of wealth expressed in gross national income (GNI) per capita, both of them calculated based on year 2018 data. The draft Assembly Resolution text determines participation the global MBM scheme as follows:

- First phase (from 2021) would apply to States that meet at least one of the following criteria:
 - They are classified as high income States in terms of GNI per capita in year 2018; or
 - Their individual RTKs in year 2018 are above 1.0 per cent of total RTKs, or their cumulative share in the list of States from the highest to the lowest amount of RTKs reaches 80 per cent of total RTKs.
- Second phase (from 2026) would apply to additional States that meet at least one of the following criteria:
 - They are classified as upper middle income States in terms of GNI per capita in year 2018; or

- Their individual RTKs in year 2018 are above 0.5 per cent of total RTKs, or their cumulative share in the list of States from the highest to the lowest amount of RTKs reaches 95 per cent of total RTKs.

The global MBM scheme also provides exemptions of those States classified as the Least Developed Countries (LDCs), Small Island Developing States (SIDS) and Landlocked Developing Countries (LLDCs), unless these States met both the GNI per capita and the RTKs criteria for inclusion in either first or second phase above.

In addition to the provisions on inclusion of States in the global MBM scheme, the draft Assembly Resolution text also defines coverage of the scheme at route level: a route will be covered by the scheme in a given phase if both States related to the route are participating in the scheme in that phase; similarly, a route will not be included in the scheme in a given phase if one or both of States related to the routes are not participating in the scheme in that phase.

Once participation in the global MBM scheme is defined for each phase and offsetting requirements are set for a given year, these requirements are distributed among aircraft operators participating in the scheme, and each operator will be responsible for addressing its determined share of offsetting requirements.

It is important to note that regardless of the coverage of the global MBM scheme, all States with aircraft operators undertaking international flights are requested to compile and transmit aggregated emissions information of their operators to ICAO, as part of the activities included in the States' implementation of a monitoring, reporting and verification (MRV) system.

The global MBM scheme calls for international aviation to address and offset its emissions through the reduction of emissions elsewhere (outside of the international aviation sector), involving the concept of "emissions units". One emissions unit thereby represents one tonne of CO₂. Two main types of emissions units exist: "Offset credits" from crediting mechanisms and "Allowances" from emissions trading schemes.

Aircraft operators compensate their international aviation emissions through the acquisition and redemption of emissions units, arising from different sources of emissions reductions achieved through mechanisms (e.g. UNFCCC's Clean Development Mechanism), programmes (e.g. REDD+) or projects (e.g. substituting coal-fired stoves with solar cookers). The buying and selling of eligible emissions units happens through a carbon market. The carbon market is a commodity market with the underlying commodity being emissions units. Like any commodity market, it is driven by the law of supply (eligible emissions units offered from different sources) and demand (eligible emissions units purchased by aircraft operators to offset their international aviation emissions under the ICAO global MBM scheme).

Emissions units are purchased directly between buyers and sellers, with brokers facilitating operations when needed.

Secondary questions

2.1. *What are the design elements in the proposed global MBM scheme to address “administrative simplicity”, “environmental integrity” and “cost-effectiveness”?*

Participants in the 2015 Global Aviation Dialogues (GLADs) identified “administrative simplicity”, “environmental integrity” and “cost effectiveness” as three most important considerations for the design of a global MBM scheme. Participants in the 2016 GLADs highlighted that paragraphs 7 (phased implementation), 9 (distribution of offsetting requirements) and 11 (technical exemptions) of the draft Assembly Resolution text were closely linked to such major considerations. A majority of GLADs participants considered that the 100% sectoral approach in paragraph 9 addressed the simplicity of the scheme.

2.2. *What are the design elements in the proposed global MBM scheme to address “differentiation” in a practical way without impacting non-discrimination?*

Participants in the 2016 GLADs highlighted paragraphs 7 (phased implementation), 8 (route-based exemptions) and 9 (distribution of offsetting requirements) of the draft Assembly Resolution text as the design elements to address differentiation in a practical way without impacting the non-discrimination principle.

2.3. *What is the rationale for the proposed phased implementation of the global MBM scheme?*

Paragraph 7 of the draft Assembly Resolution text addresses the issue of coverage of the global MBM scheme at State level; such coverage should be determined in line with the design principle of addressing “special circumstances and respective capabilities of States, in particular developing States, in terms of vulnerability to the impacts of climate change, economic development levels, and contributions to international aviation emissions” (paragraph 6 of the draft Assembly Resolution text).

In order to do so, the design approach of the global MBM scheme is proposed as a phased implementation, which determines that States subject to participation in the scheme will enter it at either a first phase starting in 2021 or a second phase starting in 2026. In order for a given State to determine whether the global MBM scheme applies to a State and if so, at which phase it does, the State will apply the criteria and exemptions outlined in paragraph 7.

Paragraph 7 d) of the draft Assembly Resolution text encourages States which are not supposed to participate in the scheme as per the provisions in this paragraph to voluntarily participate in it. There have been suggestions to strengthen the call to voluntary inclusion reflected in this paragraph in various ways.

2.3.1. Why are the two criteria of RTKs and GNI per capita being used for the purpose of phased implementation? Are there any other alternative proposals being discussed?

Paragraph 7 of the draft Assembly Resolution text outlines the criteria for the decision on the phase at which a State should join the global MBM scheme; these criteria have to be selected in a way that they allow for a clear recognition of “special circumstances and respective capabilities of States, in particular developing States, in terms of vulnerability to the impacts of climate change, economic development levels, and contributions to international aviation emissions” as per paragraph 6.

RTKs and GNI per capita have been proposed as two possible criteria for this purpose; RTK represents an international aviation related criteria, whereas GNI/capita represents an economic (wealth and development of State) related criteria. Also, the exemptions of those States classified as the Least Developed Countries (LDCs), Small Island Developing States (SIDS) and Landlocked Developing Countries (LLDCs) give consideration to the climate change vulnerability.

Note: During discussions prior to the High-Level Meeting, RTK has gained broad support, either as a stand-alone criterion or in combination with others. On the other hand, concerns have been raised regarding the use of GNI per capita as a phasing criterion. Alternative criteria suggested by States include inter alia: the ICAO Scales of Assessment (SOA); the UN Index; and the differentiation between developing and developed countries. An additional suggestion refers to a possible approach of including all States initially, with criteria to allowing for opting-out of the scheme.

2.4. What is the rationale for the proposed route-based exemptions?

Paragraph 8 of the draft Assembly Resolution text addresses the issue of coverage of the global MBM scheme at route level; such coverage should be determined in line with the design principle of minimizing market distortions between aircraft operators on the same routes. For this purpose, the design approach is that of providing equal treatment of all aircraft operators on a given route, so that a route is included in the scheme if both of the related States are participating in it, and a route is not included in the scheme if one or both of the related States are not participating in it.

By following this approach, when an aircraft operator calculates the portion of its CO₂ emissions in a given year for the purpose of determining the amount of offsets to be purchased, the operator will take into consideration emissions from routes included in the scheme as per the criteria outlined in this paragraph.

2.4.1. According to the proposed route-based exemptions, can the characterization of a route as “exempted” or “non-exempted” change over time?

The provisions in paragraph 8 of the draft Assembly Resolution text allow for the definition of a route as “exempted” or “non-exempted” on the basis of whether the States related to the route are participating or not in the global MBM scheme.

In line with paragraph 7 of the draft Assembly Resolution text, a State could be exempted from participating in the scheme in its first phase but participate in its second phase. Therefore, routes related to that State could potentially change their status, also depending on the status of the other States related to these routes.

2.5. What is the proposed distribution of offsetting requirements using the 100% sectoral growth factor?

Paragraph 9 of the draft Assembly Resolution text addresses the calculation of the total amount of CO₂ emissions to be offset in a given year under the global MBM scheme, as well as the distribution of the total amount of CO₂ emissions to be offset in a given year among aircraft operators participating in the scheme.

The “100% sectoral” approach implies the definition of a sector-wide baseline as well as of offsetting requirements based on a sector-wide growth factor. In line with this approach, when an aircraft operator included in the scheme calculates the amount of offsets to be purchased in a given year under the scheme, the operator will take into consideration its emissions covered under the scheme (as per the provisions in paragraph 8) multiplied by a sector-wide growth factor determined for all participants in the scheme on a yearly basis, as per the following formula:

$$\text{amount of offsets} = \frac{\text{an operator's emissions covered by COSIA in a given year}}{\times \text{sector's growth factor in the given year}}$$

Where:

- The sector's growth factor = (total emissions covered by COSIA in the given year – total emissions covered by COSIA at the 2020 levels) / total emissions covered by COSIA in the given year; and
- The total emission covered by COSIA in the given year do not include emissions exempted from the scheme in that year

2.5.1. *What are the pros and cons of the proposed “100% sectoral” distribution of offsetting requirements?*

A majority of participants to the 2016 Global Aviation Dialogues (GLADs) considered that the “100% sectoral” approach in paragraph 9 addressed the simplicity of the global MBM scheme (which was one of the three most important considerations for the design of a global MBM scheme identified by the participants to the 2015 GLADs), as they considered that multiplying an operator’s emissions by a given growth factor is a straightforward calculation.

The “100% sectoral” approach distributes the “burden” of sectoral emissions growth equally among all participants in the global MBM scheme. While this approach provides operators growing above the global average with less offsetting requirements than their individual growth of emissions, it provides other non-fast growing operators with higher offsetting requirements than the ones they would have otherwise if they were to offset just their individual growth of emissions.

In addition, this approach could provide operators with fewer incentives to take environmentally-friendly measures, compared to other approaches which take into consideration individual behaviours as through individual baselines and/or individual emissions growth factors. For this reason, there have been proposals to somehow take the individual share more into account, for example applying a “dynamic” approach whereby the distribution of offsetting requirements at the beginning of the scheme is done following a “100% sectoral” approach, and the use of individual factors are progressively introduced overtime.

2.5.2. *What is the baseline for the calculation of the total amount of CO₂ emissions to be offset in a given year under the global MBM scheme?*

Paragraph 9 of the draft Assembly Resolution text defines a sector-wide baseline whose coverage is the total emissions covered by the global MBM scheme in the reference year of 2020, as per the criteria defined in paragraphs 7 and 8 of the draft Assembly Resolution text.

Discussions have taken place on the possibility of calculating the baseline based on an average of data obtained for three years “around 2020”, provided that this approach does not delay implementation. In that case, it would be necessary to determine which 3-year period would be considered for the purpose of defining the baseline.

2.6. *How will the global MBM scheme apply to aircraft operators that will initiate activities after the entry into force of the scheme?*

Paragraph 10 of the draft Assembly Resolution text refers to “new entrants” as aircraft operators that commence an aviation activity falling within the scope of the global MBM scheme on or after its entry into force. This paragraph outlines criteria to determine when “new entrants” should start participating in the scheme, with the entry date being the earliest out of the following two:

- After three years from the year when the operator commences an aviation activity falling within the scope of the scheme;
- The year in which its annual emissions exceed 0.1 per cent of total emissions in 2020.

2.7. *Will the global MBM scheme include provisions for international aviation activities undertaken in exceptional circumstances, such as humanitarian aid operations?*

Paragraph 11 of the draft Assembly Resolution text defines the criteria for technical exemptions, which include reference to operations undertaken in exceptional circumstances, such as humanitarian, medical and firefighting operations. Aircraft operators which devote any of their aircrafts for such operations will not take into considerations emissions from fuel used in these operations for the purpose of the scheme.

This paragraph also defines exemptions for operators with a low level of annual emissions from their international aviation operations (10,000 metric tonnes of CO₂ emissions per year), as well as for aircrafts with less than 5,700 kg of Maximum Take Off Mass (MTOM).

2.8. *Will the global MBM scheme include provisions to review its implementation and make adjustments if needed?*

Paragraph 16 of the draft Assembly Resolution text includes a provision to conduct a periodic review of the global MBM scheme every three years from 2022. The objective of the review will be to make adjustments to the operationalization of the scheme; for example, in the event of the cost impact of the scheme being such that it may affect the sustainable development of the aviation industry, the review would consider the application of safeguarding provisions outlined in paragraph 15 of the draft Assembly Resolution text. This periodic review could also make a decision on the suspension of the scheme, provided that ICAO’s global aspirational goals were achieved through non-MBM measures.

3. What would be the impact of a global MBM scheme for international aviation?

Total aviation emissions are forecasted to grow in the coming decades; projected total annual improvements in aircraft fuel efficiency of the order of 1–2% are expected to be largely surpassed by traffic growth of around 5% each year. The most recent estimates anticipate international aviation fuel consumption growing somewhere between 2.8 to 3.9 times by 2040 compared to the 2010 levels.

A global MBM scheme is a cost-effective and complementary way for international aviation to meet its aspirational goal of keeping the global net CO₂ emissions from international aviation from 2020 at the same level (so-called “carbon neutral growth from 2020”), as part of a basket of measures. Some States have requested an assessment of the impact of the global MBM scheme on international aviation, and more specifically on those States participating in the scheme.

CAEP provided a significant amount of technical analyses on the impacts of different approaches for a global MBM scheme design, as requested by the Council and the Environment Advisory Group (EAG). This analysis was originally based on the Strawman proposal, and supported the development of the draft Assembly Resolution text. Analysis included quantification of the total quantities of CO₂ emissions from international aviation based on ICAO forecasts, and estimating the total expected quantities to offset. Based on the analysis, the estimated quantity to be offset by the whole sector would be of the order of 142 to 174 million tons of CO₂ in 2025; and 443 to 596 million tons of CO₂ in 2035, with these ranges being determined by the definitions of a total of nine scenarios going from the most optimistic scenario to the less optimistic one.

Final quantity to offset (in million tonnes of CO ₂ emissions)	2020	2025	2030	2035
Less optimistic scenario	-	174	376	596
Optimistic scenario	-	142	288	443

(Source: CAEP analysis presented at EAG/15)

CAEP also analysed possible costs of the proposed global MBM scheme by multiplying the estimated quantities of offsets with the assumed various emissions unit prices. It should be noted that the emissions unit prices drive significant uncertainty in total cost impacts of offsetting CO₂ emissions from international aviation.

In this analysis, total cost estimates vary, depending on the emissions unit price scenarios. Considering carbon prices ranging from 6 - 10 \$/ton CO₂-eq to 20 - 33 \$/ton CO₂-eq (based on

2020 and 2030 estimates), costs vary from 1.5 to 6.2 billion US\$ in 2025; with carbon prices ranging from 12 \$/ton CO₂-eq to 40 \$/ton CO₂-eq, costs vary from 5.3 to 23.9 billion US\$ in 2035. Putting in perspective with the reality of the business, the analysis also shows that the cost of carbon offsetting for operators would range from 0.2 to 0.6 % of total revenues from international aviation in 2025; and 0.5 to 1.4 % of total revenues from international aviation in 2035.

Carbon price assumptions (\$/ton CO₂-eq)	2020	2030	2035
IEA High	20	33	40
IEA Low	8	15	20
Additional Low	6	10	12

Offsetting cost (in 2012 Billion \$)	2025	2030	2035
Less optimistic scenario (with IEA High carbon price)	6.2	12.4	23.9
Optimistic scenario (with Additional low carbon price)	1.5	2.9	5.3

(Source: CAEP analysis presented at EAG/15)

According to a related cost analysis conducted by IATA, the offsetting costs related to the implementation of a global MBM scheme are expected to have a much lesser impact on international aviation than that caused by fuel price volatility. The estimated offsetting cost in 2030 is equivalent to that of a 2.6 US\$ rise in jet fuel price (per barrel); an extra 10 US\$ per barrel on the price of jet fuel would cost the industry about four times the estimated cost of offsets in 2030. To give a reference on magnitude, over the past decade the standard deviation of the jet fuel price annually has been almost 40 US\$ per barrel, meaning that airlines have managed to cope with oil price volatility (mostly upwards) of more than 15 times the size of the estimated offsetting cost in 2030.

When it comes to the cost impacts of a global MBM scheme for individual States or individual aircraft operators, we need to take into account the specific design features of a global MBM

scheme, such as phased implementation and exemptions (coverage of total emissions by the scheme), as well as the way to distribute the total offsetting requirements to individual operators participating in the scheme. Please refer to Question 2.3. for details on the proposed phased implementation of the global MBM scheme, and to Question 2.5. for details on the proposed distribution of offsetting requirements.

4. *What will States have to do in a global MBM scheme for international aviation?*

According to the draft Assembly Resolution text (paragraph 17), States are requested to undertake a series of actions in order to prepare for the implementation of the global MBM scheme from 2020.

All Member States whose aircraft operator undertakes international flights would be required to develop the necessary arrangements for the implementation of the MRV system from 1 January 2018, as per paragraph 17 b) of the draft Assembly Resolution text. According to paragraph 17 a), the Council will develop, with the technical contribution of CAEP, the SARPs and related guidance material to support the implementation of the MRV system, for adoption by the Council by June 2017.

In addition, the establishment of registries is also required to those States participating in the scheme for its implementation, as per paragraphs 17 g) and 17 h) of the draft Assembly Resolution text: Member States included in the scheme at the first implementation phase shall develop necessary arrangements for the establishment of their own registries or group registries established by groups of States, for operationalization no later than 1 January 2021; and Member States newly included in the scheme at the second implementation phase shall develop necessary arrangements for the establishment of their own registries or group registries established by groups of States, for operationalization no later than 1 January 2026. According to paragraph 17 e), the Council will develop, with the technical contribution of CAEP, necessary guidance material to support the establishment of registries under the scheme. This guidance material will be adopted by the Council by 2018.

A third feature for the implementation of the global MBM scheme is the development of Emissions Unit Criteria (EUC); States will need to ensure that the criteria currently being elaborated by CAEP for the eligibility of emissions units be followed once adopted by ICAO.

Secondary questions

4.1. *What is MRV (Monitoring, Reporting and Verification)?*

The components of the MRV of emissions include: the monitoring of fuel use and calculation of CO₂ emissions; the reporting of emissions data as a basis for establishing the annual offsetting requirements; and the verification of emissions data to ensure completeness and avoid inaccuracies. CAEP is currently elaborating MRV procedures for

the global MBM scheme; it is important to note that the way the global MBM scheme is designed has a direct influence on the complexity of the MRV system: a simpler global MBM scheme will result in simpler MRV requirements.

4.1.1. *Why is the MRV so important?*

MRV system is a key component of any system developed to address CO₂ emissions, and the basis for demonstrating that goals and objectives are being met by the participants in the system. MRV also supports transparency and accountability of the participants in the scheme.

4.1.2. *Who will be responsible for the various tasks to be undertaken within the MRV system?*

Each year, an aircraft operator reports emissions information to a State in which the operator is registered, using a standard tool/template. Sustainable alternative fuels are accounted for by aircraft operators as generating CO₂ emissions reduction pursuant to a formula, with relevant emissions factors, to be provided by ICAO.

Each year, States compile and transmit aggregated emissions information of their operators to ICAO, which calculates the total emissions from the international aviation sector based on the submissions.

To ensure accuracy, completeness and avoid mistakes, emissions data needs to be verified before it can be reported. Verification of a report is carried out by an internal pre-verification by the aircraft operator; a third-party verification before reporting from the operator to a State; and finally a post-reporting review by the State.

4.2. *What is a registry?*

“Registry” refers to the institutional, legal and operating infrastructure designed specifically to ensure efficient and transparent recording of emissions units, reportable emissions, compliance actions and to ensure accountability and environmental integrity. A co-ordinated registry structure design where different systems can “talk” with each other and have common technology, rules, and operational processes is being discussed for the global MBM scheme. This option builds on the registries that already exist in a number of States. CAEP is currently working on design elements of a co-ordinated registry structure.

4.2.1. *Why are registries so important?*

A registry provides a record of who holds each emission unit; monitors the transfer of emissions units from one account to another; and provides information when emission units are cancelled to prevent future use. All this

information is needed to assess operators' compliance with the offsetting requirements.

4.2.2. *Who will be responsible for the various tasks to be undertaken within the registry system?*

State registries will track and record compliance data of aircraft operators, and communicate such data to a consolidated central registry. States can establish their own registries, or groups of States can cooperate to establish joint registries. According to paragraph 17 f) of the draft Assembly Resolution text, ICAO will establish a Consolidated Central Registry, which ensures efficient and transparent recording of compliance data and actions under the scheme.

4.3. *What are EUC (Emissions Units Criteria)?*

The global MBM scheme calls for international aviation to address its emissions through the purchase and redemption of emissions units that represent emission reductions achieved outside of international aviation. It is therefore essential that these emissions units correspond to emission reductions with high environmental integrity (e.g., they are real, permanent, additional and verified) and are not being used for any other purpose, by setting up the criteria for eligible emissions units to be purchased by aircraft operators, which are called "Emissions Unit Criteria (EUC).

4.3.1. *Why are the EUC so important?*

The decision on what emission units could be used in a global MBM scheme is key to ensure that only those emissions units that meet high environmental integrity criteria could be used in a global MBM scheme.

4.3.2. *How will ICAO ensure that emissions reduction programmes/projects meet the EUC?*

According to the paragraph 17 d) of the draft Assembly Resolution text, the Council will establish, with the technical contribution of CAEP, a standing technical advisory body on the EUC to support the application of the EUC by Member States.

Subject to the 39th Assembly conclusion and further decision by the Council, such a technical advisory group will be established to assess various emissions reduction programmes/projects that meet the EUC, to enable aircraft operators to purchase eligible emissions units. In the meantime, CAEP has been working to establish an interim group to initiate the assessment of various emissions reduction programmes/projects in light of the EUC to facilitate early decision on this matter, until the said advisory group is formally established after the 39th Assembly.

4.3.3. *What have ICAO and its Member States done on the definition of the EUC?*

CAEP is recommending that offsetting programmes that generate offset credits, for purchase by aircraft operators, should meet a range of elements covering the need for: (i) clear, publicly disclosed, methodologies and protocols; (ii) considerations of the scope of activities; (iii) credit issuance and retirement procedures; (iv) identification and tracking of units; (v) the legal nature and transfer of units; (vi) validation and verification procedures; (vii) governance; (viii) transparency and public participation provisions; (ix) safeguarding systems to address environmental and social risks; (x) sustainable development criteria, and (xi) the avoidance of double counting, issuance and claiming.

In addition, offset programmes should deliver such credits that: (i) are additional; (ii) are based on a realistic and credible baseline; (iii) are quantified, monitored, reported, and verified; (iv) have a clear and transparent chain of custody; (v) represent permanent emissions reductions; (vi) safeguard against a potential increase in emissions elsewhere; (vii) are only counted once towards a mitigation obligation, and (viii) do no net harm.

According to the Paragraph 17 c) of the draft Assembly Resolution text, the Council will develop, with the technical contribution of CAEP, necessary guidance material for EUC to support the purchase of appropriate emissions units by aircraft operators under the scheme.

4.3.4. *What is the relationship between the EUC for a global MBM scheme and the emissions reduction programmes/projects under future UNFCCC mechanisms of the COP21 Paris Agreement?*

The Preamble of the draft Assembly Resolution text makes specific reference to the fact that the UNFCCC COP21 Paris Agreement provides for a new market mechanism to contribute to the mitigation of GHG emission to support sustainable development.

Paragraph 19 of the draft Assembly Resolution text requests the Council to promote the use of emissions units generated from programmes that meet the EUC and would benefit projects involving developing States, including emissions units generated from the CDM, new market mechanisms or other programmes under the UNFCCC.

According to the Paragraph 17 c) of the draft Assembly Resolution text, the Council will develop, with the technical contribution of CAEP, necessary guidance material for EUC to support the purchase of appropriate emissions units by aircraft operators under the scheme.

4.3.5. *Is there an interest from some States in developing credits within the aviation sector?*

Paragraph 20 of the draft Assembly Resolution text requests the Council to explore further development of aviation-related methodologies for use in offsetting programmes, and encourages States to use aviation-related methodologies in taking actions to reduce aviation CO₂ emissions. Consequently, credits generated from the implementation of projects and programmes designed in line with these methodologies could be used for offsetting purposes, without double-counting of emissions reduction.

The first aviation-related Clean Development Mechanism (CDM) methodology under the UNFCCC was adopted in November 2015. The methodology will quantify CO₂ reductions from the use of electric aircraft taxiing systems. ICAO and the UNFCCC Secretariat are also cooperating in the development of a methodology covering the supply and use of solar power for aircraft operations at airport arrival and departure gates.

Once approved, these methodologies can be used to implement emissions reduction projects from domestic aviation. Emissions units resulting from the projects can then be sold and purchased via carbon markets and used for compliance purposes.

5. *How does ICAO support States in the implementation of a global MBM scheme?*

There are major areas where support to States might be needed, such as the establishment of systems for the monitoring, reporting and verification (MRV) of emissions, or the development of national and regional registries.

With regard to the support for the implementation of a MRV system, the following provisions are included in the draft Assembly Resolution text:

- According to paragraph 18 a), the Council shall also take necessary action to expand the provision of capacity building and assistance for the preparation and implementation on Member States' action plans, in order to accommodate capacity building and assistance for implementation of the MRV system by Member States from 1 January 2018, including organization of seminars and training in all regions from 2017, and facilitation of financial support where needed.
- According to paragraph 18 b), Member States are encouraged to build partnerships among themselves to cooperate on the implementation of the MRV system.

In this context, it is worth noting that as part of ICAO-EU partnership project to assist the development of State Action Plans in 14 African and Caribbean States, the Aviation Environmental System (AES) has been developed and operationalized in each of those States, which provides a tool to allow States to monitor CO₂ emissions from international aviation at the State level. The AES could be adapted to support the preparation and implementation of the MRV system within the global MBM scheme.

With regard to the support for the implementation of registries, the following provisions are included in the draft Assembly Resolution text:

- According to paragraph 18 c), the Council shall also take necessary action to expand the provision of capacity building and assistance for the preparation and implementation on Member States' action plans, in order to accommodate capacity building and assistance for establishment of registries by States, including organization of seminars and training in all regions from 2017, and facilitation of financial support where needed.
- According to paragraph 18 d), Member States are encouraged to build partnerships among themselves to cooperate on the establishment of their own registries or group registries established by groups of States, and possible pilot implementation.

Secondary questions

5.1. *What was the outcome of the 2016 Global Aviation Dialogues (GLADs) with regards to the implementation of a global MBM scheme (MRV, registries)?*

One of the dialogue sessions in the 2016 GLADs addressed the implementation of a global MBM scheme. Dialogue groups showed a clear convergence in identifying the roles and responsibilities for different stakeholders (e.g., States, aircraft operators, ICAO) for the Monitoring, Reporting and Verification (MRV) of emissions data as well as for registries. As a result of the dialogues, most States expressed that further assistance would be needed to implement a MRV system and a registry for the purpose of a global MBM scheme, including the need for ICAO to provide capacity building and training by expanding the ICAO State's Action Plans initiative, as well as the need for Standards, guidance and tools.