Aviation
Overview and calculation

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Scope

Possible type of projects

Innovative projects that can demonstrate GHG emission avoidance and that contributes to the reduction of effects of non-CO_2 gases within the defined scope, could be accountable. Examples of such projects could include:

Projects that reduce energy use per functional unit e.g., MJ per journey	Design changes (e.g., new airframes, optimised weight)
	Operational measures, (e.g., speed limitation approaches, software improvements, climate-optimized flight trajectories to avoid climate forcing arising from aircraft contrails)
	Engine efficiency (e.g., replacement of fleet with equivalent with more efficient motors)
	Integrated projects which include software type activities such as changes to flight paths or air traffic management
Projects that reduce GHG emissions per energy use, e.g., tCO_2e / MJ	Manufacturing of electric or hydrogen-fuelled aircraft or their components
	Fuel switch (e.g.,use of electricity, sustainable biofuels or renewable fuels of non-biological origin, instead of the conventional fossil fuel)
Projects that envisage a modal shift (e.g., new mode of transportation, or a combination or various modes)	
Other **projects that contribute to the reduction non-CO_2 effects**, e.g., contrails from aviation	

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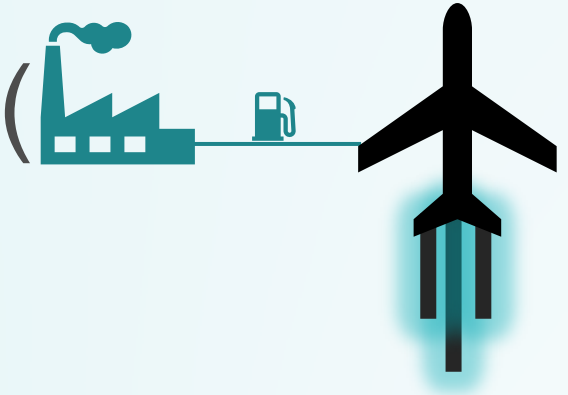
Boundaries

Scenario	Emission source	Large and medium scale projects	Small scale projects
Reference	GHG emissions due to the combustion of conventional aviation fuel that in the absence of the project activity would be consumed for the operation of the flights covered by the project	Yes	Yes
	Other climate impacts due to the non-CO_2 effects that would occur in the absence of the project activity	Yes	Yes
Project	GHG emissions due to the combustion of the fuels of fossil origin, including any residual quantities of jet A-1 kerosene and the fossil fuel share of SAFs, that will be consumed in air, water or land modes proposed in the project activity	Yes	Yes
	GHG emissions due to the (1) combustion of the biomass-based fuel, including the share of biogenic fuels in SAFs), (2) generation of renewable energy sources or (3) generation of electricity that will be either imported from the grid or produced on-site that will be consumed in air, water or land modes proposed in the project activity	Yes	No
	GHG emissions due to the use of H_2, including derived synthetic fuels, and any share used in the composition of SAFs that will be consumed in air, water or land modes proposed in the project activity	Yes	Yes
	Other climate impacts due to the non-CO_2 effects that will occur in the project activity	Yes	Yes

Absolute GHG emissions avoidance

Transportation of goods and passengers

$$\Delta GHG_{abs} = \sum_{y=1}^{10} (Ref_y - Proj_y) = \sum_{y=1}^{10} \left(\right.$$



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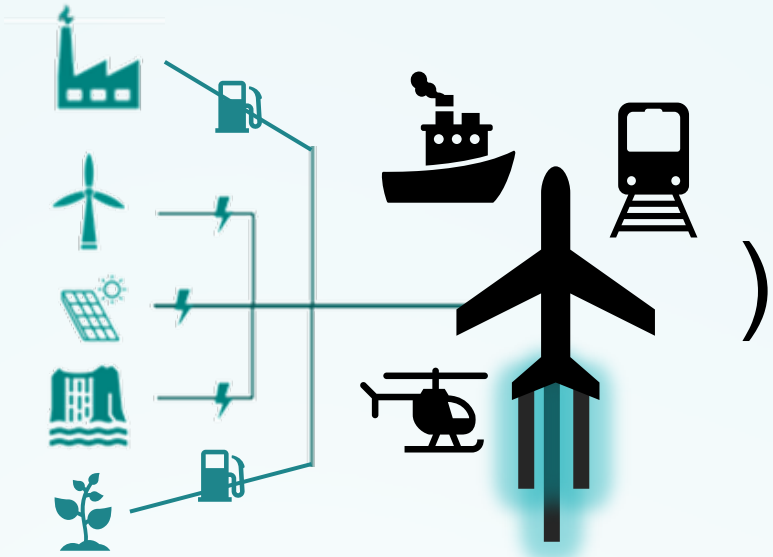

$$\left. \right)$$

$$= \sum_{y=1}^{10} \left(Ref_{jetA1} + Ref_{nonCO2} - (Proj_{FF} + Proj_{bio} + Proj_{elec} + Proj_{res} + Proj_{H2}) + Proj_{nonCO2} \right)$$

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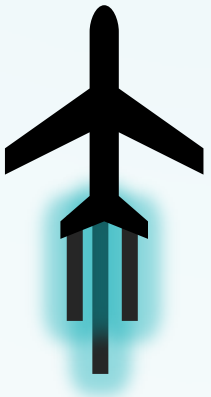
Absolute GHG emissions avoidance

Non-CO_2 effects

The non-CO_2 impacts derive mostly from the contrails as a result of water vapour and emissions from nitrogen oxides (NOx), soot particles and oxidised sulphur species. Their net impact is a warming effect on the climate, although there are a number of individual warming and cooling effects from the respective aviation non-CO_2 emissions, with trade-offs and uncertainties of different degrees, and with sensitivity to atmospheric conditions at the point of emission.

To ensure equal treatment for the **reference scenario, a fixed equivalence factor of three should be applied**. This is aligned with the range of overall radiative forcing from aviation identified by the IPCC in its special report on aviation (1999) ranging from 2 to 4 times the radiative forcing from CO2 alone.

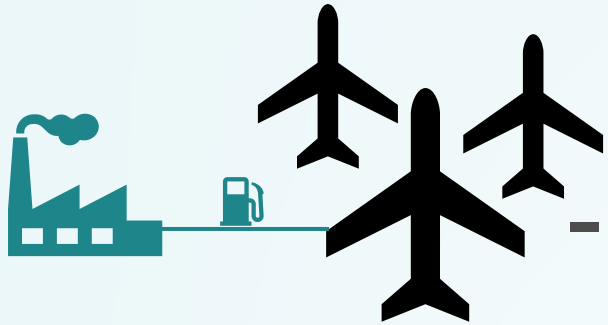
As projects have a rather unique nature, under the **project scenario, applicants will have to explain their own approach for calculating or modelling non-CO_2 effects**, using the corresponding CO_2 equivalency metric, demonstrated either by scientific literature or by modelling global near surface temperature change.



Absolute GHG emissions avoidance

Manufacturing of innovative aircraft or their components

$$\Delta GHG_{abs} = \sum_{y=1}^{10} (Ref_y - Proj_y) = \sum_{y=1}^{10} ($$



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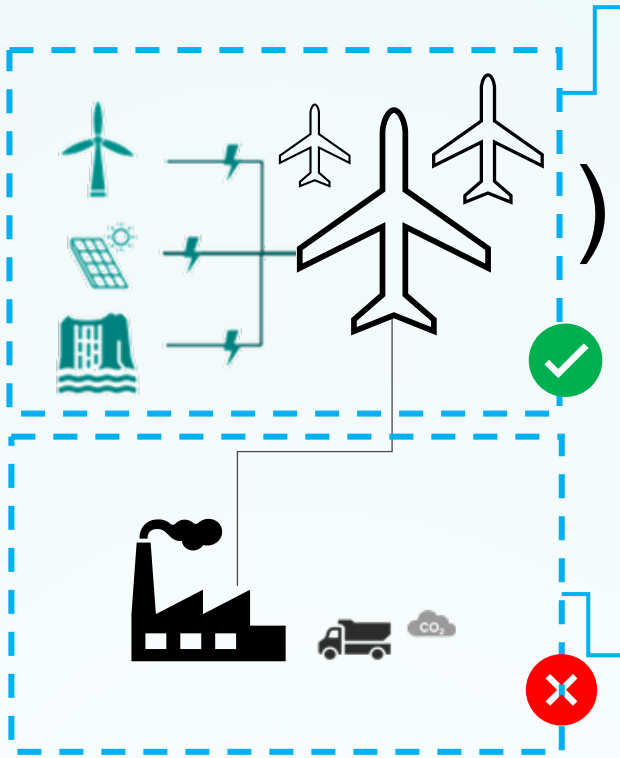

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Emissions due to the manufacturing of the innovative aircraft are <u>out of the scope of GHG avoidance calculations</u>.

GHG avoidance will be equal to the emissions saved by the innovative technology when operating

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Example AVI

Fuel switch and fuel efficiency

1. Description: Replacement of flights with flights using an innovative and more efficient aircraft fueled with SAF, that is composed by a blend of jet A1 kerosene and biofuel.
2. Classification: Mobility → Aviation → Transportation of goods/services / Methodology: AVI, Section 7
3. Reference: Convention aircraft is fuelled with conventional aviation fuel

$$\Delta GHG_{abs} = \sum_{y=1}^{10} (Ref_y - Proj_y) = \sum_{y=1}^{10} \left(Ref_{jetA1,y} + Ref_{nonCO2,y} - \left(Proj_{FF,t,y} + Proj_{bio,t,y} + Proj_{nonCO2,y} \right) \right)$$

$$= \sum_{y=1}^{10} Q_{jetA1,y} * EF_{jetA1} + 2 * Q_{jetA1} * EF_{CO2,jetA1}$$

$$- \left((Q_{FF,t,y} * EF_{FF}) + (Q_{bio,t,y} * EF_{bio}) + Proj_{nonCO2,y} \right)$$

Based on the share of fossil fuel in the SAF

Based on the share of biofuel fuel in the SAF

Values estimated or modeled by the applicant and duly evidenced

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