An Ecolabel for Aircraft

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It can be observed that new passenger aircraft are advertised with many claims about their environmental advantages compared to the baseline model and compared to the competition. These advertisement claims are often not verifiable, not based on any reporting standards (due to a lack of such standards), and generally not backed up by reviewed scientific publications. There is a tendency to disguise the massive overall environmental impact of all in-service aircraft of one manufacturer or one airline by small ecologically friendly activities boosted by the company's public relations department. This behavior can be called green-washing and should be countered with objective, standardized information.

"Ecolabel" is a general term. There are ecolabels that simply endorse a product. Others assert compliance with a set of minimum requirements for sustainability or the reduction of harm. Yet other ecolabels give more details and quantify pollution or energy consumption by way of index scores or units of measurement. In any case, the goal of an ecolabel for aircraft is to encourage travelling passengers to choose a service (an airline with a specific transport option and seating arrangement) and a product (an aircraft type) such that this selection is the least damaging to the environment.

The proposed *Ecolabel for Aircraft* is defined in accordance with ISO 14025 (2006): Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures. A Type III environmental declaration can be described as "quantified environmental data for a product [or service] with pre-set categories of parameters based on the ISO 14040 (2006) series of standards [Environmental management – Life cycle assessment], but not excluding additional environmental information." This means, the ecolabel is based on the knowledge of a complete life cycle analyses for aircraft [1][2][3][4][5].

The information generated called *Ecolabel for Aircraft* is offered:
- for the experts as a detailed Environmental Declaration (ISO 14025, Type III) and
- for the travelling public in condensed form as an Environmental Label (ISO 14021, Type II), considering also the EU Ecolabel User Manual. Information given for energy labels is used: EU DIRECTIVE 2010/30 "Information of the consumption of energy". A good example is the REGULATION (EC) No 1222/2009 "Labelling of tyres with respect to fuel efficiency and other essential parameters". The EU Commission proposed a single energy efficiency label with a scale from A to G (http://ec.europa.eu/energy/en/news/new-electricity-market-consumers)

Ecolabel for Aircraft is voluntary, in the open public (can be calculated by anyone), life cycle based, open to interested parties, allows to quantitatively compare different offers, open for verification, flexible, and transparent. From the outset, clear Product Category Rules, PCR are defined (here for the service "flight" with a product "aircraft"). The *Ecolabel for Aircraft* should be administrated by a program operator which should be a scientific organization.

The *Ecolabel for Aircraft* includes resource depletion, climate impact, local air quality, and noise pollution. Some emission products (CO_2, H_2O, SO_x) are linked to fuel and hence their emission mass is solely dependent on fuel usage while others (NO_x, CO, HC, Smoke) are also dependent on the combustion process of the engine. All performance categories are then rated on a scale from A to G, indicating how good or poor they are compared to other aircraft. For this purpose, the fuel consumption and the emission data of various aircraft and engines was evaluated from publicly available databases such as the *Engine Emission Data Bank* or *Noise Data Bank*. Specific Air Range (SAR) is an appropriate metric for measuring fuel consumption. As a result, the overall aircraft rating is:

$$\text{Overall Rating} =$$
$$0.6 \cdot (\text{normalized fuel consumption rating}) + 0.2 \cdot (\text{normalized air quality rating}) + 0.2 \cdot (\text{normalized noise rating}).$$

Initially an aircraft related rating is calculated based on the standard cabin layout and its number of seats. If the airline uses a different cabin layout with a different number of seats, the overall rating changes. For each travel class – First Class (FC), Business Class (BC) and Economy Class (EC) – a separate weighting factor is calculated based on the cabin floor area (seat pitch times seat width) occupied by the respective seat. All input data for the calculations is taken from open sources on the Internet.

References

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