Abstract

Air transportation is essential in moving people and cargo across the globe, but there is increasing recognition in the industry about the negative impact of aviation on the environment. Studies show that commercial aviation is responsible for 2.4% of global carbon emissions (Wright, 2019). Aircraft manufacturers and airlines are taking actions to reduce their carbon footprint by investing in environmental projects including forest conservation, capturing and reusing methane gas emitted from landfills, and developing fuel-efficient engines, biofuels, and electric aircraft.

The United Nations created the first global carbon offsetting scheme named CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation), which will enable aviation to cut its CO₂ emissions by 2.5 billion tons between 2020 and 2035 through US$40 billion investment in regulated, carbon reduction projects in other sectors. The International Airline Trading Association (IATA) created the “Four Pillars” principle, namely technology, operations, infrastructure and economic measures for airlines to achieve carbon-neutral growth by 2020.

Keywords

Sustainability, Aviation, CORSIA, Emission Trading System (ETS), Carbon offsets, net zero carbon emissions, biofuels, IATA, flight shaming

Issue

Aviation contributes 2.4% to global CO₂ emissions (Wright, 2019).

CO₂ Emissions by Economic Sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>CO₂ Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity &amp; heat production</td>
<td>31%</td>
</tr>
<tr>
<td>Transport</td>
<td>24%</td>
</tr>
<tr>
<td>Manufacturing &amp; Construction</td>
<td>12%</td>
</tr>
<tr>
<td>Residential</td>
<td>12%</td>
</tr>
<tr>
<td>Other</td>
<td>22%</td>
</tr>
</tbody>
</table>

CO₂ Emissions by Transport Sector

<table>
<thead>
<tr>
<th>Mode</th>
<th>CO₂ Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automobiles</td>
<td>40%</td>
</tr>
<tr>
<td>Airline</td>
<td>23%</td>
</tr>
<tr>
<td>Railways</td>
<td>13%</td>
</tr>
<tr>
<td>Ships</td>
<td>12%</td>
</tr>
</tbody>
</table>

Some Airlines Becoming more Eco-Friendly

Flight Shame Revealed

Swiss Bank UBS 6,000 people survey: 27% reduced the flight numbers they took due to environment concern

Solutions

- New and more efficient technology
  - Sustainable alternative fuel and biofuels
  - New engines and airframes
  - Improved operations and infrastructures
  - Global offsets, such as planting trees, plastic free, recycling
  - Electric aircraft can reduce CO₂

CORSIA

Carbon Offsetting Reduction Scheme for International Aviation
- Mitigate CO₂ emissions
- Started on January 1, 2020
- All carriers are required to report their CO₂ emissions annually

Expected to Mitigate 2.5 billion tons of CO₂ between 2021 and 2035

Source: IATA, 2019

ETS

Emission Trading System in Europe
- Airlines pay to reduce carbon emissions
- Reduced emissions on European flights by more than 8 million tons, 40% per flight

Source: IATA, 2019

IATA “Four Pillars”

Technology
- Sustainable alternative fuels
- New airframe and engine
- Retrofits

Operations
- More efficient flight procedures
- Operation weight reduction

Infrastructure
- More efficient air traffic management systems
- More efficient equipment and airport infrastructure

Economic Measures
- Global offset mechanism
- Positive economic incentives

Flight Shaming and Issues to Solutions

Skeptics
- Doubt if emission reductions are:
  - Permanent
  - Overestimated
- Airline emissions occur immediately, but offsets take time
- New engines might create less CO₂ but create more trails
- Greta Thunberg effect

Optimists
- Positive on aviation initiatives
- Believe future technology, such as electric aircraft will solve CO₂ issue

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