

Sustainable Aviation

Why in news?

With the recent boom in the global aviation sector and rising air travel demand in India, concern for global carbon emissions due aviation is at the forefront.

What is Aviation?

- **Aviation sector** - It is concerned with the development and operation of *heavier-than-air aircraft*, such as airplanes, helicopters, gliders, and drones.
- **Importance** - It provides a rapid worldwide *transportation* network that generates *economic growth*, *creates jobs*, and facilitates international trade and *tourism*.
- **Economic growth**- Air travel is essential for trade, business, and tourism, and every day, 128,000 flights carry 12.5 million passengers and \$18 billion of world trade.
- It *enables \$3.5 trillion in global GDP* and supports 87.7 million jobs worldwide.
- **Connectivity**- They link major cities and small communities *24 hours a day* and flying is considered one of the safest and quickest ways to get around.
- Air cargo *transports goods* like electronics and fresh produce, ensuring timely deliveries and global trade growth.
- **India** - According to the International Air Transport Association (IATA), India poised to become the world's third-largest air passenger market by 2030.

Why there is a need to switch for sustainable aviation fuel?

- **Aviation is carbon-intensive activity** - Though this mode of travel contributes just 2.5% of the world's carbon emissions, it might increase with more population opting for air travel.
- **Increased demand for air travel** - A rising aspirational middle-class, especially in developing countries including India has spurred the growth of the aviation sector.
 - The Indian Brand Equity Foundation predicts the country will need over 2,800 new commercial aircraft in the next 20 years.
- **Increased Jet fuel demand** - It ran at 8 Mbpd (million barrels per day) in 2019, could rise to 18 Mbpd by 2050, as the global population rises 25%.
- **Pollution by aviation fuels** - Today's aviation fuels (mostly the widely-used Aviation Turbine Fuel - ATF) consist primarily of *hydrocarbon compounds and contain additives* that are determined by the specific uses of the fuel.
- They *emit CO₂* from burning fuel.

Aviation turbine fuel (ATF), also known as jet fuel, is a petroleum-based fuel that powers aircraft with gas-turbine engines. It consists of hydrocarbons like paraffins, cycloparaffins or naphthenes, aromatics, and olefins.

- **Alter the concentration of atmospheric gases** - They generate a *short-term increase*, but a *long-term decrease in ozone and methane*.
- It has also *heightened emissions* of water vapour, soot, sulphur aerosols, and water contrails.
- **Net global warming** - While some of these impacts result in global warming, others induce a cooling effect.
- But *overall, the warming effect is stronger*, pegged at 4% by most estimates.

What is Sustainable Aviation Fuel (SAF)?

- **SAF** - It is an *alternative fuel* made from *non-petroleum feedstocks* that reduces emissions from air transportation.
- **Criteria for to be a SAF** - They must be derived from a *low-carbon raw material* that can be continually and repeatedly sourced.
- They must *not deplete natural resources* or compete with other requirements such as food production, land and water use
- They must be an *alternative to traditional aviation energy* sources and be processed to create jet fuel in an alternative manner
- They must meet the *same rigorous technical requirements* and share the *same properties as conventional jet fuel*, so that they
 - Can be blended with other fuel
 - Can be used in commercial aircraft without requiring changes to existing technology and fuel systems, all in a safe way

The international aviation industry has set an aspirational goal to reach net zero carbon by 2050. Airlines and manufacturers are investing heavily in SAF, with giants Boeing and Airbus keen on tapping this disruptive trend.

- **Source** - They are *derived from renewable resources* such as plant oils, waste oils, and agricultural residues.
- **Flexible production** - SAF is a replacement *for conventional jet fuel, allowing for multiple products* from various feedstocks and production technologies.
- **Compatible fuel** - It can be blended with conventional Jet that can be used in existing aircraft and infrastructure.
- It can be blended at different levels with limits between 10% and 50%, depending on the feedstock and how the fuel is produced.
- **Fewer emissions** - Compared with conventional jet fuel, *100% SAF has the potential to reduce greenhouse gas* emissions by up to 94% depending on feedstock and technology pathway.



What lies ahead?

- The governments and international organizations need to implement regulations and standards aimed at reducing aviation's environmental impact.
- Investing in sustainable technologies can lead to long-term cost savings, create new job opportunities, and drive innovation within the aviation industry.

References

1. [The New Indian Express| Need for Sustainable Aviation Fuel](#)
2. [ICAO |Future of Aviation](#)