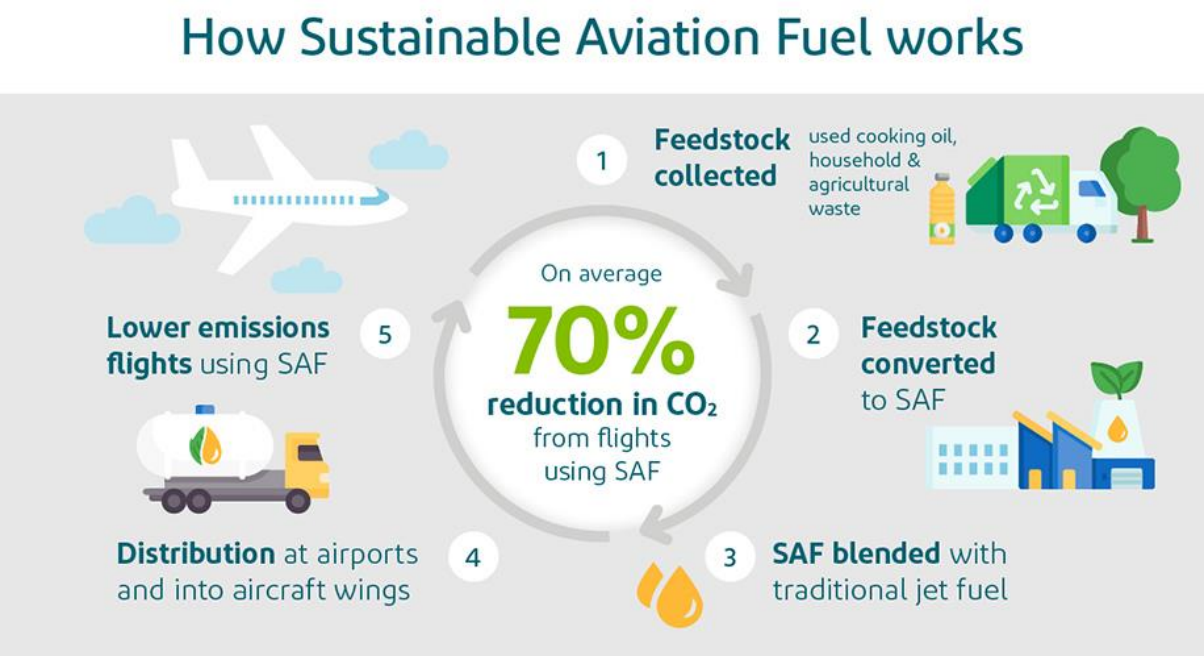
SUSTAINABLE AVIATION FUELS – SCIENCE & TECHNOLOGY

News: Recently, India and Brazil have decided to collaborate on production and use of Sustainable Aviation Fuels (SAF).

Emissions from the Aviation Industry

- Aviation accounts **for 2.5% of global CO2 emissions: data from the Global Carbon Project.**
- Aviation has contributed around 4% to global warming to date. Airplanes emit gases (carbon dioxide, water vapor, nitrogen oxides or carbon monoxide − bonding with oxygen to become CO 2 upon release) and atmospheric particulates (incompletely burned hydrocarbons, sulfur oxides, black carbon), interacting among themselves and with the atmosphere.
- SAF, also known as **biojet fuel**, is a **renewable alternative to conventional fossil-based jet fuels**. It is derived from sustainable sources like waste oils, fats, and biomass, and is designed to reduce carbon emissions from aviation while being compatible with current jet engines and infrastructure.



Feedstocks and Production

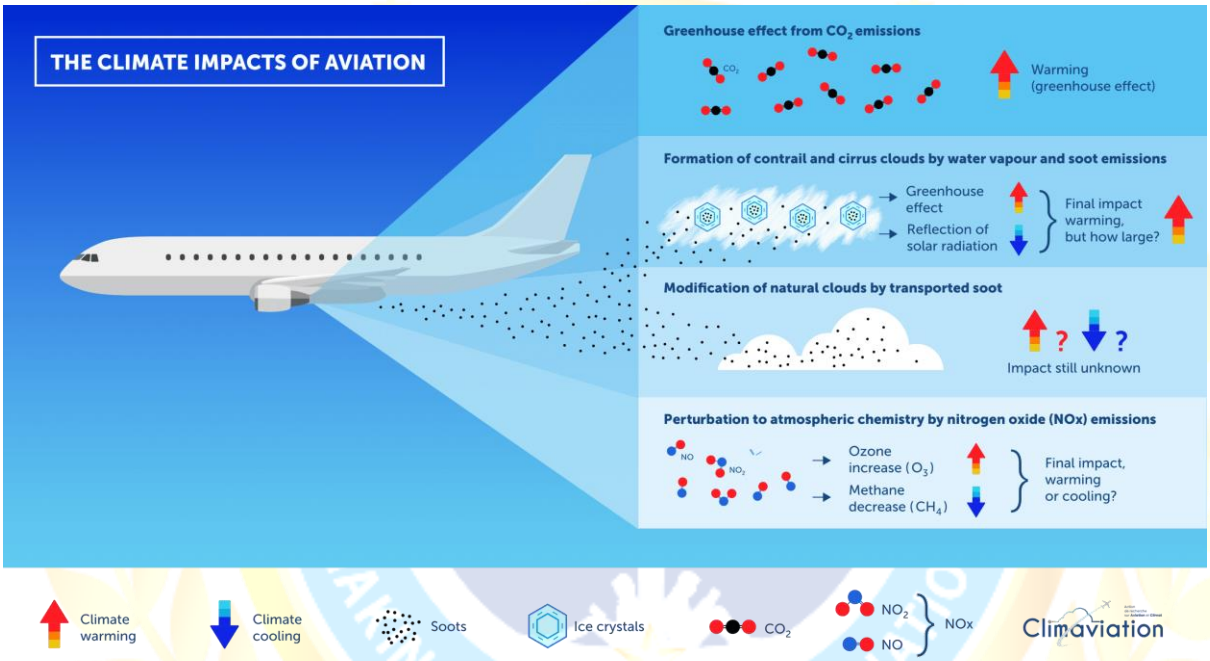
SAF can be produced from a variety of **biomass-derived feedstocks**, such as used cooking oils, agricultural residues, and other non-fossil organic materials. These are converted into fuel using processes like **Hydroprocessed Esters and Fatty Acids (HEFA)**, which use oils and fats, and **Power-to-Liquid (PtL)** technology, which synthesizes fuels from captured CO_2 and renewable electricity.

Environmental Benefits

As a biojet fuel, SAF offers significant **reductions in lifecycle greenhouse gas emissions—up to 70% compared to traditional fossil-based jet fuels**. Additionally, it **reduces harmful pollutants** like sulfur oxides and particulate matter, contributing to cleaner air and a reduced environmental footprint.

SAF Adoption in Aviation

SAF can be **blended with conventional jet fuel without any modifications to current aircraft**, making it a viable and scalable solution for the aviation sector.



Challenges

The **scaling of biojet fuel faces challenges** such as limited availability of feedstocks, higher production costs, and competition with other sectors for renewable resources.

Closing Remark

As production scales up and costs decrease, SAFs are likely to play an increasingly pivotal role in **reducing aviation's carbon footprint** and creating a more sustainable future for air travel.

Source: https://www.thehindubusinessline.com/economy/policy/india-and-brazil-to-collaborate-on-saf-leverage-biofuel-expertise-to-decarbonise-aviation/article68667055.ece