Sustainable Aviation Fuels
Fact Sheet 6

THE WEDGE CHART

The aviation industry has set three global goals to address its climate impacts:

- an average annual improvement in fuel efficiency of 1.5% from 2009 to 2020;
- a cap on net aviation CO2 emissions at 2020 levels through carbon-neutral growth;
- halving net CO2 emissions by 2050, compared to 2005 levels.

At the current traffic rate (there were 41.9 million scheduled commercial flights carrying 4.4 billion passengers in 2018), the aviation industry produces roughly 2% of global manmade carbon emissions (equivalent to 781 million tonnes of carbon dioxide). Aviation’s annual passenger numbers are expected to grow up to 7.5 billion by 2035, meaning that effective action on reducing carbon emissions is essential to ensure the sustainable development of the industry. Companies across this sector are collaborating to reduce emissions through a matrix of measures.

These include:

- New technology
- Efficient operations
- Improved infrastructure
- A global market-based measure (CORSIA)
- Sustainable Aviation Fuels

IATA believes that the more substantive reductions in net CO2 from aviation will have to come from sustainable aviation fuels. Understanding what quantities might be available is an important element for evaluating aviation’s sustainability trajectory towards 2050.
During the ICAO Committee on Aviation Environment Protection (cycle 10) the Alternative Fuels Task Force formed a task group called the Fuel Production Assessment Task Group which was charged with estimating the potential production of Alternative Jet fuel in the short-term (2020) and the long-term (2050).

The long term assessment covered the global production potential of alternative jet fuels with no consideration as to whether it is used in domestic or international aviation. A 3 step process was used to assess ultimate achievement levels.

1. **Constrained primary bioenergy potential** was calculated. This was the total bioenergy potential from available land and biomass resources, subject to assumed sustainability constraints, socio-economic conditions (such as world population, GDP, etc.), possible future environmental policies, and other variables. The result was a set of constrained primary bioenergy potential scenarios.

2. In the second step, **primary bioenergy achievement** was calculated from constrained primary bioenergy potential. Achievement scenarios were constructed to reflect possible future feedstock prices and energy policies that favor or discourage the production of bioenergy, and the primary bioenergy achievement was defined as the proportion of constrained technical potential anticipated to actually be produced under different scenario assumptions.

3. In the third step, **alternative jet fuel achievement** was calculated from primary bioenergy achievement. Alternative jet fuel achievement was defined as the proportion of bioenergy achievement that was assumed to be converted to alternative jet fuel. Calculating alternative jet fuel achievement requires estimating the proportion of achieved primary bioenergy potential that is dedicated to alternative jet fuel production, as opposed to other uses, and estimating the efficiencies associated with primary energy to jet fuel conversion processes.

The combination of scenarios and underlying assumptions dictates the final achievement estimate. The results produced a wide range of scenarios from more than 100% of forecast energy demand for aviation to very low results, close to zero percent.

The greatest influence on the final achievement estimate were the policy scenarios. The 4 scenarios applied were:

1. A maximum alternative jet fuel production scenario (e.g. a world where it is all about producing sustainable jet)

2. A scenario in which bioenergy resources are dedicated to the production of alternative jet fuel in proportion to two times aviation’s share of final energy demand in 2050, in order to reflect a particular policy emphasis on alternative jet fuel production.

3. A scenario in which bioenergy resources are dedicated to the production of alternative jet fuel in proportion to aviation’s share of final energy demand in 2050.

4. A scenario in which other priorities are first satisfied before alternative jet fuel is produced

In a world where there is significant policy emphasis towards meeting aviation energy needs, it is feasible for much of the wedge chart schematic to be satisfied with sustainable aviation fuel. Should policy focus on ground transport or even an allocation of biomass proportionate to aviation’s share of final energy demand, then relatively low CO2 reduction achievement will come from sustainable aviation fuel.

Given ground transport has additional decarbonisation options relative to aviation (such as electrification) IATA believes policy that incentivizes the allocation of biomass towards difficult to decarbonize sectors such as aviation is effective policy.

For further information or additional clarification please visit website: [https://www.iata.org/whatwedo/environment/Pages/sustainable-alternative-jet-fuels.aspx](https://www.iata.org/whatwedo/environment/Pages/sustainable-alternative-jet-fuels.aspx)

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