Fact Sheet 4: Strategic Direction

THE WEDGE CHART

In 2009, IATA along with the global aviation industry set ambitious de-carbonization goals including carbon neutral growth from 2020, and halving net CO_2 by 2050, relative to 2005 levels. Meeting these targets will involve a suite of measures. IATA believes that sustainable aviation fuel (SAF) will need to play a substantial role in achieving the longer-term ambition. This fact sheet looks at the potential options, or a combination of options, that would be necessary to meet the ambitious environmental goals in the sector. The primary focus of this fact sheets is on SAF, in particular what the ultimate achievement levels could be. Policy is likely to be the main determining factor for whether adequate feedstock is made available for the hard to decarbonize sectors such as aviation and shipping. Should policy initiatives direct biomass towards other sectors, like ground transport, it will be a misallocation of feedstock to a sector that has better alternatives such as batteries and electricity. As explained in more detail below, adequate feedstock does exist under appropriate sustainability constraints to satisfy all of aviation's fuel requirement in 2050.

This chart is a schematic representation of the three global **aviation industry goals to address its climate impacts:**

1. An average annual improvement in fuel efficiency of 1.5% from 2009 to 2020;
2. A cap on net aviation CO_2 emissions at 2020 levels through carbon-neutral growth;
3. Halving net CO_2 emissions by 2050, compared to 2005 levels.

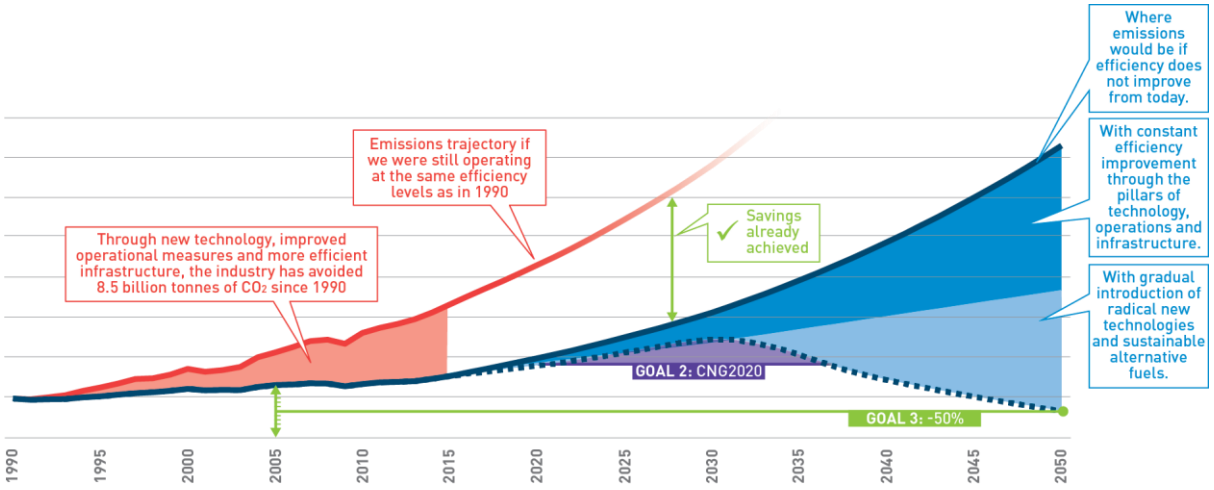


Figure 1: Wedge Chart

In calendar year 2019, the aviation industry carried more than 4.5 billion passengers, producing roughly 2% of global manmade carbon emissions (equivalent to 900 million tonnes of carbon dioxide). While COVID-19 may impact passenger growth trajectories in the medium term, aviation's annual passenger numbers are still expected to grow towards 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
(i.e. fleet moderisation and the potential future electrification of smaller aircraft

Efficient Operations
(i.e. lighter onboard materials, fuel saving improvements such as winglets)

Improved Infrastructure
(i.e. improved air traffic management, reduced queues on the runway)

A Global Market-Based Measure
(CORSIA)

Sustainable Aviation Fuels

IATA believes that the more substantive reductions in net CO_2 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.

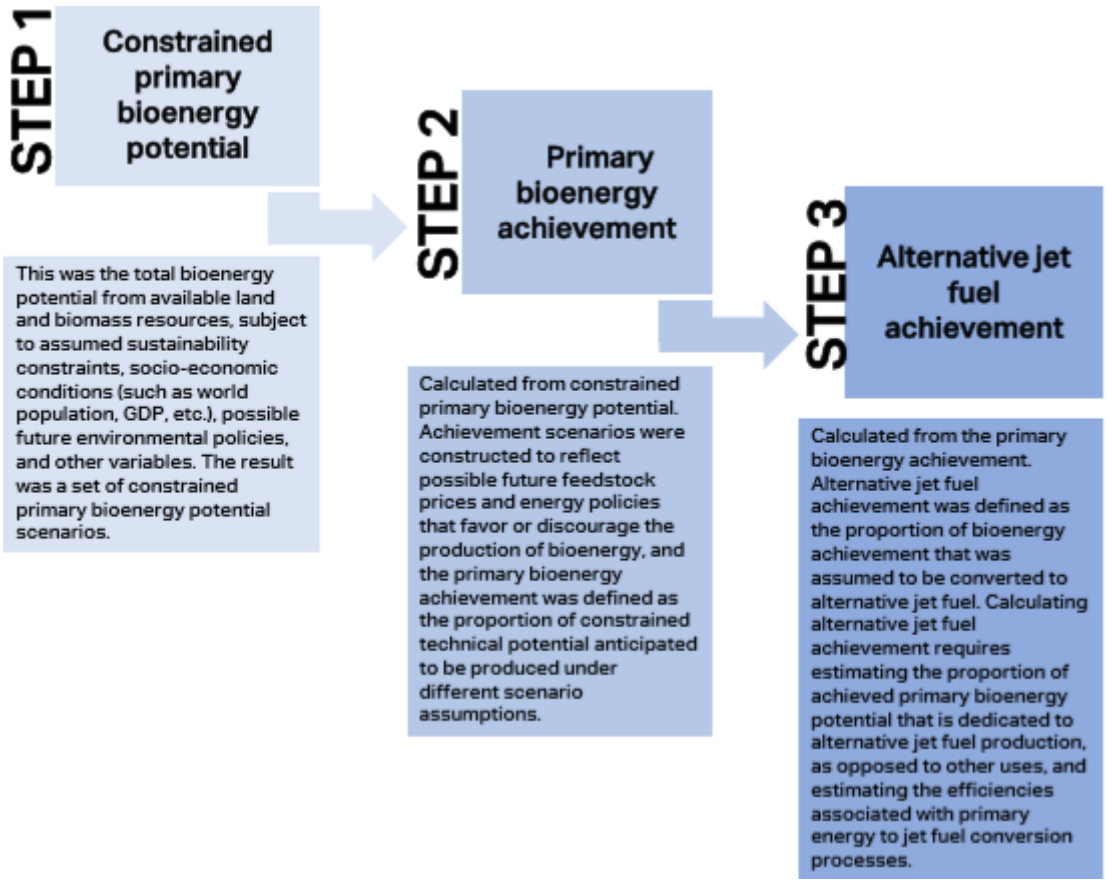
Calculation Methodology

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).[i]

The long-term assessment covered the global production potential of alternative jet fuels with no consideration as to whether it would be used for 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 favour or discourage the production of bioenergy, and the primary bioenergy achievement was defined as the proportion of constrained technical potential anticipated to 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.



Source: IATA, ICAO, MIT

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 in the year 2050 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 aviation fuel)
2. A scenario in which bioenergy resources are dedicated to the production of sustainable aviation fuel in proportion to two times aviation's share of final energy demand in 2050, in order to reflect a particular policy emphasis on sustainable aviation fuel production.
3. A scenario in which bioenergy resources are dedicated to the production of sustainable aviation fuel in proportion to aviation's share of final energy demand in 2050.
4. A scenario in which other priorities are first satisfied before sustainable aviation fuel is produced

In a world where there is significant policy emphasis towards meeting aviation's energy needs, it is possible 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 CO_2 reduction achievement will come from sustainable aviation fuel.

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

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[i] In 2015 ICAO used the terminology of Alternative Jet Fuel (implying sustainable aviation fuel)