

AGD BRIEFING PAPER

SEED FUNDING FOR SUSTAINABLE BIOFUEL FEEDSTOCK CULTIVATION AND BIOJET REFINING CAPABILITY IN DEVELOPING COUNTRIES

The Aviation Global Deal Group’s discussion note recommends that a proportion of the revenues raised through the auctioning of a percentage of aviation carbon allowances could be ring-fenced for investment in cultivating and developing refinery capacity for sustainable, lower carbon biofuels.

Sustainably produced, lower life-cycle carbon biofuels could offer a “drop in” replacement to existing fossil-fuel based kerosene jet fuel. Processing technologies currently being developed can convert second generation feedstocks into fuels which exactly replicate (or surpass) the stringent performance criteria of conventional jet fuel. Although biofuels are not yet used for commercial aviation, their technical certification is proceeding rapidly, and it is expected that “drop in” biofuel/kerosene blends will enter the normal jet fuel supply chain within the next few years.

Start-up funding for biofuel production

A proportion of revenues generated through the auctioning of allowances under the Aviation Global Deal scheme could be used to provide start-up funding for biofuel feedstock cultivation in developing countries, and establishing local refining capacity. Many developing countries do not have natural reserves of crude oil or coal, and are therefore dependent on importing their essential fuel and energy from third countries. By developing a biofuel capability that is suited to the local climate and growing conditions this provides energy independence to these regions at a lower environmental cost.

As second generation biofuels (particularly commercial scale algal biomass production) are at an early stage of development and will take several years to reach maturity, it can sometime be challenging to attract financing for projects in the developing world. Biofuel feedstock farms and refineries established by revenues generated through the Aviation Global Deal scheme could act as a model for attracting additional private investment and scaling up production in a region.

Second generation biofuel feedstocks for the developing world

Many countries in the developing world offer ideal growing conditions for second generation biofuel feedstocks – areas of marginal, arid land or coastal areas that are currently unsuitable for food cultivation. *Jatropha curcas* is already widely grown in developing countries as a hedging shrub, to prevent livestock eating food crops. It can be grown in arid areas with very poor growing conditions – areas that have been previously deforested or overgrazed – and requires little or no irrigation or fertilizers. Salt water tolerant halophytes can be grown in shallow sea water, not conflicting with food cultivation. Algae, although at a very early stage of commercialisation, offers significant potential as a sustainable energy source. It is suited to salt or brackish water, could be grown in onshore or offshore ponds, and would be ideal for tropical regions. Significant research is currently underway to identify how optimum yields could be produced from algal biomass, making it more cost effective as a fuel

feedstock. It is estimated that the life-cycle carbon dioxide savings of bio-derived jet fuel could range from 50-80% when compared with conventional kerosene.

Energy security and economic development

The output of a biofuel refinery could be flexible, providing both ground transportation and aviation fuel. As one of the barriers to economic development is the availability of affordable energy, rather than shipping in crude oil based fuels, at high financial and environmental costs, biofuel produced locally could provide affordable and renewable energy security for the region and stimulate wider economic development. As well as faster industrialisation, farmers could switch to mechanisation (improving the yields from their land), and access to better and cheaper transport would allow both farmers and industry to ship goods to markets more easily, improving revenues and incentivising inward investment.

Sustainability criteria

The AGD Group recognises that concerns have been raised about the negative unintended consequences of first generation biofuels, ranging from deforestation/land clearing for the cultivation of biofuel feedstocks to potentially impacting on the availability/affordability of staple food crops such as corn. The AGD Group is committed to supporting only the development of fuels which meet a strict sustainability criteria, i.e.

1. Jet fuel plant sources should be developed in a manner which is non-competitive with food and where biodiversity impacts are minimized; in addition, their cultivation should not jeopardize drinking water supplies.
2. Total lifecycle greenhouse gas emissions from plant growth, harvesting, processing, and end-use should be significantly reduced compared to those associated with jet fuels from fossil sources.
3. In developing economies, development projects should include provisions or outcomes that improve socio-economic conditions for small-scale farmers who rely on agriculture to feed them and their families, and that do not require the involuntary displacement of local populations.
4. High conservation value areas and native eco-systems should not be cleared and converted for jet fuel plant source development.

Incentivising the use of sustainable biofuels by aviation

In order to encourage maximum usage of sustainable, lower carbon biofuels by the aviation sector, international mechanisms will need to be developed to account for their usage and to allow for flexibility within the aviation biofuel supply chain.

Transporting biofuels long distances to major aviation hubs would counteract a significant proportion of the carbon savings enabled with their cultivation. Instead, they should be used at local aviation hubs wherever possible. We would assume a system being established very similar to renewable electricity tariffs available in many countries, whereby airlines could agree to purchase a certain volume of fuel from sustainable sources as part of their contract with fuel suppliers. A volume of biofuel, equivalent to the contracted amount, would be guaranteed to enter the aviation fuel supply chain somewhere in

the world but would not necessarily be used by the contracting carrier. The carrier would, however, receive the benefit of any carbon savings associated with the cultivation of the fuels (e.g. a 50% saving compared with conventional jet fuel) and could include this in their carbon reporting at the end of a trading period.

Until such time as international models are agreed on how to calculate (significant efforts are underway on this issue, and may well be ready by the time the AGD scheme is introduced) a carbon output of zero should be assumed for all fuels derived from biomass; i.e. if biofuels represented 10% of an airline's total fuel consumption in the course of a year, then they would require 10% fewer carbon allowances at the end of a trading period. This will help incentivise the use of bio-derived fuels in the early stages, as they would be more commercially attractive to operators.