

# The Freshwater Connection

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Winter 2025  
Biomass



## Biomass

### There is a Need for Broad Public Discussion on Biomass Sustainable and Equitable

#### Questions

Considering all the demands that are going to be put on **biomass** going forward is it going to be **competing with food for agricultural land?**

There is going to be the need for **intensification of agricultural production** - will it be sustainable given the demands?

**What happens to the environment** when we start using biomass on **the scale of the oil and gas industry?**

The scientific consensus is that **climate change is occurring** as a direct result of burning fossils fuels.

What caught my attention is the **“Sustainable” Aviation Fuels (SAF)** proposals and the **massive claim** it has proposed for **biomass fuels**.

<https://www.nfu.ca/sustainable-aviation-fuel-national-farmers-union-addresses-major-north-american-conference/>

## What is Biomass

Agricultural biomass includes crops / crop residues such as corn, soybean, canola, wheat, and sugar, as well as animal manure, fruit and vegetable waste; and used cooking oil.

Forest biomass includes woody biomass from trees, such as branches, treetops, and stumps, as well as wood waste from the construction industry and wood processing residues, such as sawdust.

Biomass includes algae.

## Agriculture in Central Algoma

If you have been in Central Algoma recently you will have noticed disappearing dairy farms, disappearing fence rows, bigger fields, conversion of forests to agricultural lands, bare fields in winter, larger farms, corn, and soybeans. Agricultural land in southern Ontario is expensive, and farmers are responding to market demands. Farm financial margins on gross sales are low and farms need to be financially stable. Seed crops can be a cash crop.



Explore local. Buy local food and support local farmers.

## Advice to Farmers Through Time

(from Wendell Berry - *The Art of Learning* - *The Presence of Nature in the Natural World*)

**F.H. King (1911)** - *Farmers for Forty Centuries* - (Farming in China, Korea and Japan)

**J. Russell Smith (1920)** - *Tree Crops* - (Forest-field-plow-desert)

**Sir Albert Howard (1940) - An Agricultural Testament -** Mother earth never attempts to farm without livestock: she always raises mixed crops; great pains are taken to preserve the soil and to prevent erosion; the mixed vegetable and animal wastes are converted into humus; there is no waste; the processes of growth and the processes of decay balance one another; ample provision is made to maintain large reserves of fertility; the greatest care is taken to store the rainfall; both plants and animals are left to protect them-selves against disease.

### **The Green Revolution of the 1970s**

**Norman Borlaug, (1970) the "Father of the Green Revolution" -** The Green Revolution was a period introducing new technology to agriculture that greatly increased crop yields This involved mechanization, new varieties of seeds, the widespread use of chemical fertilizers, pesticides, and irrigation. The Green Revolution contributed to less poverty, and averted hunger for millions

### **The Future of Agriculture 2025?**

Agricultural lands of the future will not necessarily be same lands as used today because of desertification. This is mainly due to farming of arid and semi arid environments, combined with droughts, climate change, and intensive agriculture land degradation. With the elimination of fossil fuels there will be massive demand for biomass - will there be enough biomass, will it be sustainable, will its distribution be equitable?

### **Canada is Moving to Phase Out Fossil Fuels by 2050**

Canada is moving to phase out fossil fuels by 2050. By 2050 the **world population will grow** by billions - there will be greater **demand for food**, but also **fibre for clothing, non-fossil fuel-based plastic and fuel**. Cars will likely go electric, and aircraft will likely switch to biomass and eventually to hydrogen but in the transition, there will be a massive demand for biomass. Air travel is forecast to double by 2050.



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<https://theconversation.com/theres-a-buzz-about-sustainable-fuels-but-they-cannot-solve-aviations-colossal-climate-woes-205484>

## **There's a buzz about 'sustainable' fuels – but they cannot solve aviation's colossal climate woes**

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David Simon Lee receives funding from the UK Department for Transport, the UKRI (Aerospace Technology Institute) and the EU H2020 research scheme. He is a member of the UK Jet Zero Council and a co-rapporteur of the International Civil Aviation Organization's Impacts and Science Group, and a Member of the UK Civil Aviation Authority's Environmental Sustainability Panel.

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### Partners

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The global airline industry is fast recovering from the unprecedented pause to flying imposed by COVID-19. In some parts of the world, such as the Middle East, airlines are even expanding rapidly – well beyond pre-pandemic levels.

But how will the industry continue to grow while doing its fair share on climate change? Unless global aviation changes tack, its greenhouse gas emissions are projected to cause about 0.1°C of total global warming by 2050.

So-called “sustainable aviation fuels” are being promoted by the aviation and energy industries as the preferred solution. These fuels can be made from organic matter such as plants (also known as biomass), waste such as used cooking oil, and synthetic kerosene.

However, as our new research shows, sustainable aviation fuel is not a silver bullet. Even if the industry could make the shift, there's not enough land or renewable energy potential on Earth to produce all the sustainable fuels airlines need.

### **A tough ask**

In 2021, the International Air Transport Association released a plan for airlines to achieve net-zero carbon by 2050.

Individual airlines have made similar commitments, including American Airlines, Qantas and Air New Zealand.

But there are very few low-carbon alternatives to traditional fossil jet fuel. That makes reducing emissions from the aviation sector extremely difficult.

Two options - batteries and liquid hydrogen - face significant challenges. For example, neither are suitable for long-haul flights. That's why industry is turning to sustainable aviation fuels.

These fuels effectively perform in the same way as their fossil fuel-derived counterparts. They are suitable for long flights and can be used in existing planes so airlines wouldn't have to replace whole fleets.

But at the moment, very little sustainable aviation fuel is being produced - and it's much more expensive than fossil jet fuel.

Sustainable aviation fuel also raises serious environmental concerns. So is the transition actually feasible? Our new research set out to answer this question.

### **What we found**

Our study involved analysing 12 "roadmaps" or plans for decarbonising the global aviation industry. They were published by the industry, outside organisations and academics.

We found the plans rely heavily on biofuels in the medium-term and synthetic e-kerosene in the longer term.

Currently, all sustainable aviation fuels used commercially are produced from food waste such as cooking oil or animal fat. Energy crops (such as soy and willow), agricultural residues (husks, bagasse), and forest biomass (such as logging residue and manufacturing waste) provide larger volumes of raw materials, but chemical engineering processes to turn them into fuel are still developing.

If e-kerosene is to be produced cleanly, it requires electricity produced from renewable energy sources to "split" the water (a process called electrolysis) and produce hydrogen. This hydrogen is then combined with carbon dioxide.

Our research found the roadmaps largely omitted a number of fundamental problems with sustainable aviation fuels.

The first is the huge amount of biomass and clean energy needed. On average across the roadmaps, producing sustainable aviation fuels would require about 9% of global renewable electricity and 30% of available biomass in 2050. Even then, about 30% of fuel used by airlines in 2050 would be fossil-derived.

Other industries also use biomass resources. For example, the cosmetics industry uses tallow in skincare products. Bagasse – the pulp left after sugar cane juice is extracted – is used for heat in sugar mills. So demand for sustainable aviation fuels risks displacing other industries.

Second, the process of converting raw materials into sustainable aviation fuels leads to a major loss of energy, in the form of heat. In the case of e-kerosene, only about 15% of the primary renewable electricity remains to power the aircraft.

Not only is this inefficient, it leaves less clean energy for other industries wanting to decarbonise.

Third, producing sustainable aviation fuels creates greenhouse gas emissions. Growing bio-crops, for instance, requires the use of emissions-intensive fertiliser, harvest machinery and transport.

And already, vast tracts of rainforest are being razed to make way for crops used in biofuels. If sustainable aviation fuels were produced in this way, they'd be considerably worse for the climate than fossil fuels.

Finally, carbon dioxide is not the only aviation emission that contributes to climate change. Others include nitrogen oxides, water vapour and soot. Research to date is inconclusive about whether sustainable aviation fuels will improve this problem.

### **'Unrealistic and irresponsible'**

The above is not an exhaustive list of the potential climate damage caused by sustainable aviation fuels. But clearly, while the fuels will play a useful role to some extent, the industry's growth plans are unrealistic and irresponsible.

Private and government investment should instead be directed to lower-carbon forms of transport, such as rail. And for the travelling public, a shift in mindset is required, involving how often and how far we need to travel.

Aviation is not the only industry that must rapidly decarbonise in coming decades. The whole global energy system needs to transition.

That means airlines must not take more than their fair share of finite resources to claim the label of "sustainable".

## Become a member



Your annual membership fee will provide a base budget for work of CAFC and demonstrate the commitment of local partners working towards a common goal. A strong diverse group is an essential component in meeting the goals of the Central Algoma Region.

Support us at <https://www.centralalgomafreshwatercoalition.ca>