

Sustainable Sourcing: Decarbonizing Transportation

Transportation emits more greenhouse gases than any other sector. Thanks to biotechnology, however, we can **decarbonize all modes of transportation—air, land and sea**—using sustainable sources like plants and waste.



No-till crops allow farmers to store carbon in the ground.



Carbon-rich gases from manufacturing are used as feedstocks to develop sustainable aviation fuels.



Biotech allows us to use previously underutilized forms of biomass, such as slash and rice straw.

Because the lifecycle for developing sustainable fuels starts and ends in rural communities, the advancement of low carbon fuels strengthens rural economies.



\$2B in Impacts Prevented

According to the Natural Resources Defense Council, the use of sustainable fuels through a low carbon fuel standard—and other carbon limits—prevented nearly \$2 billion in public health impacts in California.



Biofuels Reduce Emissions

USDA found that GHG from ethanol is 39% to 43% lower than gasoline. DOE found biodiesel reduced emissions by up to 72% and new technologies from energy crops can reduce emissions by 101% to 115%.



80% Reduction in emissions

Sustainable aviation fuels have been shown to reduce carbon emissions by 80% over their lifecycle.



7.43 Million cars off the road

Sustainable fuels emit 43% less emissions than gasoline – the equivalent of taking 7,430,998 cars off the road for one year.



30% Blended fuels for ships

Low carbon fuels, such as hydrocarbon biofuels, can also be used to lower emissions in sea transportation. Shipping companies are beginning to use 30% blended fuels.

Sourcing the Next Generation of Biofuels

Low carbon fuels can be made from unlikely sources like industrial waste gases. Every day researchers are harnessing biotechnology to identify new feedstocks to develop more low carbon fuels.



Algae and Aquatic Biomass

Technologies are being developed to **convert improved strains of algae and aquatic vegetation, including seaweed and invasive aquatic plants, into biofuels** for land, sea and air transportation.



Used Oils from Crops like Canola and Soybeans

Cooking oils, such as those from canola or soybeans, used at your local restaurants **can be converted into clean-burning biofuels**. By harnessing used oil, biotech is expanding a circular economy.



Municipal Solid Waste

Solid waste from landfills can be used as a feedstock to make jet fuel. By repurposing municipal solid waste in the form of biofuels, **we can reduce the volume of waste in landfills and the amount of harmful gases released into the atmosphere.**



Crop and Cellulosic Feedstocks

Ethanol from corn has become widely used in transportation fuels. However, researchers are also able to convert the corn stalk and agricultural residues to cellulosic biomass, as opposed to just the corn starch-rich kernels. Additionally, non-food crops like carinata, forestry residue, switchgrass, wood shavings, and agriculture waste, such as rice straw and wheat straw, **are being used as feedstocks to make transportation fuels.**



Waste gases

Innovative technologies are redirecting gases that would typically pollute the air into feedstocks to make sustainable fuels. Waste gases, such as off-gases from steel mills and CO2 from plants, can be biologically converted into low carbon fuels **including jet fuels to lower overall emissions from aviation.**

POLICIES DRIVING INNOVATION IN BIOFUELS

BIO continues to advocate for state and federal policies that establish certainty and promote the development of low carbon fuels to reduce the transportation sector's impact on the environment.



Low Carbon Fuel Standards

Several states are turning to low carbon fuel standards (LCFS) to lower greenhouse gas (GHG) emissions.

Currently, California and Oregon are the only states to have an LCFS, but other states, such as Washington and New York, are exploring such policies to decarbonize their transportation.



Renewable Fuel Standard

Renewable Fuel Standard (RFS) continues to be a critical policy by requiring that renewable fuel be blended into transportation fuel at the pump in increasing amounts each year.

A strong RFS that allows feedstock innovation to thrive will reduce greenhouse gas emissions and ignite investment in low carbon fuels, from farm to road.



Long-Term Tax Incentives

Tax credits are critical to biofuel producers for financing construction of facilities to support investment in new technologies. New, long-term tax incentives are needed to drive new green energy breakthroughs and enable alternatives such as sustainable aviation fuels to become fully established.