

Missouri

Missouri is well situated to become a national leader in the development of advanced biofuels. The Bioenergy Technologies Office enables the development of novel technologies that Missouri can use to leverage its existing bioenergy infrastructure and biomass resources.

In 2013, Missouri consumed more than 512 times more petroleum than it produced. Biofuels offer a sustainable strategy to narrow the gap between energy consumption and production.



Economy

Missouri spent **\$14.8 billion** on petroleum-based fuels for transportation in 2013. Additional production of domestic biofuels could **keep more of those dollars within the state** to stimulate economic growth and add to the **68,500+ jobs** in green goods and services in Missouri.



Energy

In 2012, the energy content of **Missouri-produced biofuels** exceeded that of the 3.3 million barrels of jet fuel consumed in the state. **Drop-in** biofuels can help meet the state's energy needs, and **bio-based jet fuel** produced in Missouri could advance **sustainable aviation** in the heart of the country.



Environment

In 2011, petroleum use in the Missouri transportation sector released **35 million metric tonnes of CO₂**. On a life-cycle basis, advanced biofuels can **reduce greenhouse gas emissions by ≥50%** compared to petroleum—helping to reduce environmental impacts.



Feedstocks

Residues from the state's **14 million acres of forest** could provide sustainable biomass resources. The state's first-generation biofuel production facilities could be upgraded to process Missouri's **2 million metric tonnes of agricultural residues** (produced annually) into advanced biofuels.

Strategic policies and investments help *bridge the gap* between promising research and large-scale production of advanced biofuels.

Missouri's **Alternative Fueling Infrastructure Tax Credit** provides an incentive for the development of alternative fueling stations.

Missouri biomass resources can be used to produce advanced biofuels for use in these alternative fueling stations. Biofuels help to reduce greenhouse gas emissions and support energy security.

The U.S. Department of Energy (DOE) has awarded **more than \$120 million** to university and industrial partners in Missouri to research, develop, and deploy sustainable bio-based fuels and products since 2005.

Missouri's Pilot-Scale Integrated Biorefinery

Operated by ————— ICM, Inc. (2010–2015)

Location ————— St. Joseph, Missouri

Job creation ————— 21 permanent, 50 temporary

Primary products ————— Cellulosic ethanol

Environmental benefit — 60% greenhouse gas reduction vs. gasoline

Feedstock ————— Switchgrass, corn fiber, and sorghum

Commercial capacity — 260,000 gallons of ethanol per year

Why Missouri?



Crop waste can be recycled into fuel to improve sustainability and boost farm revenue.



Missouri forests and pulp and paper industry could provide 2.3 million metric tonnes of wood waste annually for biofuel production.



Existing non-cellulosic ethanol facilities can be upgraded to utilize non-food based feedstocks and contribute to advanced biofuels production.*



Developing in-state resources reduces dependence on imported petroleum products.

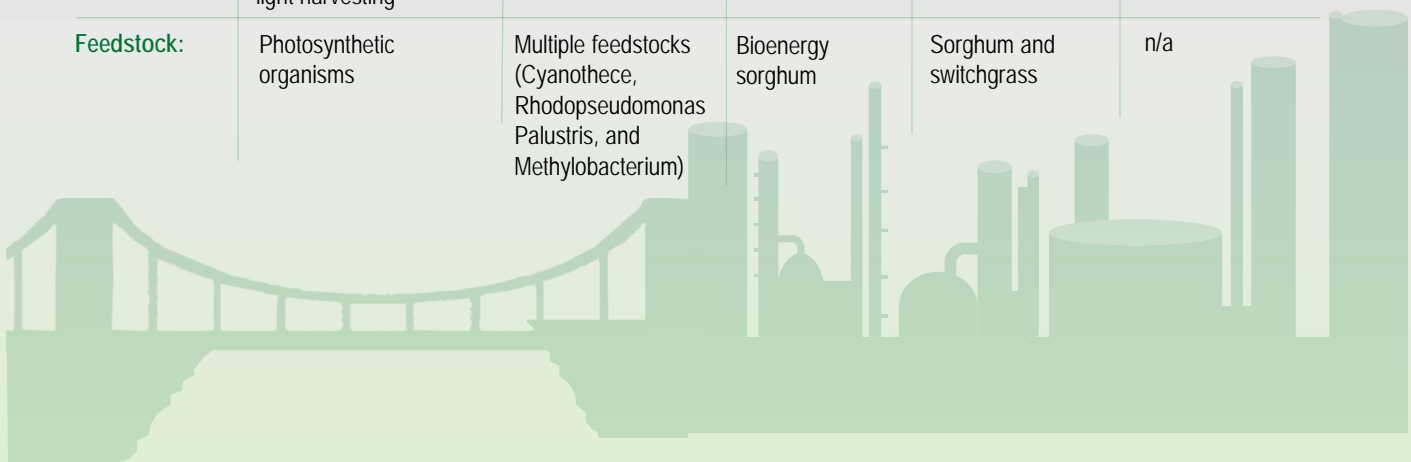


* Missouri ranks 12th (254 million gallons/year) among 25 ethanol producing states in the U.S.

The U.S. Department of Energy (DOE), often in partnership with the U.S. Department of Agriculture, has supported **basic research and development (R&D) in Missouri universities**. This basic research improves the productivity of bioenergy feedstocks and maximizes benefits of biofuels and bioproducts while minimizing negative impacts. DOE seeks to promote promising biofuel and biotechnologies research with the greatest chance of impact on commercial biofuel and bioproducts production.

DOE Bioenergy Technologies Office Projects with Universities

Participant:	Washington University		University of Missouri		
Research area:	Establishing an energy frontier research center—Photosynthetic Antenna Research Center	Chemistry of candidates microbes for biofuel or bioenergy production	Functional genomics of sugar content in sweet sorghum stems	Study of non-food biofuel crops grown on marginal lands	Water and temperature impacts on nutrients uptake by energy crops
Stage:	R&D	R&D	R&D	R&D	R&D
Primary product:	Biohybrid and bioinspired systems for light harvesting	n/a	n/a	Liquid biofuels	n/a
Feedstock:	Photosynthetic organisms	Multiple feedstocks (Cyanothece, Rhodospseudomonas Palustris, and Methylobacterium)	Bioenergy sorghum	Sorghum and switchgrass	n/a



For more information on the economic benefits of biofuels for Missouri, visit: eia.gov/state/analysis.cfm?sid=MO
energy.gov/eere/bioenergy/about-bioenergy-technologies-office-growing-americas-energy-future-replacing-whole
acore.org/files/pdfs/states/Missouri.pdf (based on 2011 survey by the Bureau of Labor Statistics)
 For more information on Missouri biomass resources and environmental benefits, visit:
epa.gov/otaq/fuels/renewablefuels/documents/420f12078.pdf
eia.gov/environment/emissions/state/state_emissions.cfm
eere.energy.gov/bioenergy/pdfs/billion_ton_update.pdf, maps.nrel.gov/biofuels-atlas

For more information on Missouri clean energy initiatives and DOE partnerships, visit:
afdc.energy.gov/laws/all?state=MO
energy.gov/eere/bioenergy/financial-opportunities
energy.gov/eere/bioenergy/articles/farm-fly-20-energy-department-joins-initiative-bring-biofuels-skies
eere.energy.gov/bioenergy/pdfs/libr_arra_icm.pdf
 U.S. ethanol production: eia.gov/state/seds/sep_prod/pdf/P4.pdf, eia.gov/petroleum/ethanolcapacity/