

Sustainable Aviation Fuel: Taking the Midwest Economy to New Heights

Background: At a time when corn production is rising faster than demand and corn prices took their largest drop in a decade, a large potential new market is emerging: sustainable aviation fuel (SAF). SAF holds the promise for the largest rural transformation since the introduction of corn hybrids. However, large challenges remain to be overcome in order to unlock the full potential of SAF, including long-term, stable public policy, proper carbon accounting metrics, and carbon capture and sequestration opportunities for ethanol producers.

Scenario: The Iowa Renewable Fuels Association commissioned Decision Innovation Solutions (DIS) to conduct a study of the economic impact on the Midwest if the Sustainable Aviation Fuel Grand Challenge goal of 35 billion gallons by 2050 was met. In this scenario, we do not attempt to judge the policies or incentives that would be necessary to achieve the goal, but rather to outline what the Midwest would gain if the challenge was fulfilled.

Top Line Results: The study determined that SAF from fats, oils and greases (HEFA-SAF) would be the first adopted, supporting soybean and livestock producers. Next in line as SAF demand grows would be ethanol-to-jet (ETJ-SAF), supporting corn growers. HEFA-SAF is projected to grow to 3.7 billion gallons by 2050 while ETJ-SAF will hit 5.59 billion gallons.

Achieving the SAF Grand Challenge will require building:

- 63 new 200-million-gallon-per-year ethanol plants
- 30 new ethanol-to-jet SAF production facilities
- 6 new HEFA-SAF production facilities.

Building and operating these facilities will generate an unprecedented boost to the Midwest economy over the next 25 years.

Midwest Construction Impact Summary				
Event	Employment	Labor Income (\$M)	Value Added (\$M)	Output (\$M)
New Ethanol Production	139,066	\$ 9,513.6	\$ 13,493.0	\$ 25,600.3
SAF from ETJ	64,960	\$ 4,505.4	\$ 6,424.6	\$ 12,070.0
SAF from HEFA	21,456	\$ 1,490.2	\$ 2,127.8	\$ 3,990.4
Total	225,482	\$ 15,509.2	\$ 22,045.4	\$ 41,660.6

Midwest Operations Impact Summary				
Event	Employment	Labor Income (\$M)	Value Added (\$M)	Output (\$M)
New Ethanol Production	184,115	\$ 7,339.6	\$ 15,692.2	\$ 56,403.0
SAF from ETJ	22,610	\$ 1,140.9	\$ 724.3	\$ 4,289.3
SAF from HEFA	17,716	\$ 840.6	\$ 3,277.8	\$ 10,449.7
Total	224,440	\$ 9,321.1	\$ 19,694.2	\$ 71,142.0

To reach the 2050 goal of 35 billion gallons, the study found that other sources of SAF would be required. Of note to the Midwest, power-to-fuel SAF (PTF-SAF) would likely be made from CO₂ captured at ethanol plants, providing another long-term benefit from current carbon capture projects.

Carbon Capture and Sequestration: DIS found that the potential of ETJ-SAF cannot be fully unlocked without carbon capture and sequestration (CCS) pipelines. Without CCS, most ethanol plants will be unable to cost-effectively lower their carbon intensity (CI) scores to a level eligible for SAF production. On the other hand, building and operating CCS pipelines in the Midwest will create thousands of jobs and millions of dollars of new household income.

Farm Income at a Crossroads: Increases in annual corn production are outstripping the growth in non-ethanol corn demand. As a result, without a new market like SAF, overproduction will lead to falling prices (corn lost roughly \$2 per bushel over the last year), and eventually reduced acres. DIS determined that without SAF, by 2050 corn acreage would drop to 68 million acres **resulting in a loss of farm income totaling \$259 billion, or nearly \$10 billion per year.**

- \$10 billion per year equates to a loss of \$120 per acre of corn.
- For a typical 1000-acre farm with 50/50 corn-soybeans, **revenue would drop \$60,240.**

However, with SAF, corn production on traditional acres will increase enough to supply growth in non-ethanol demand as well as enough excess corn to produce an additional 13 billion gallons of ethanol over the needs for light duty vehicles. This ethanol would be available for conversion to SAF. As ethanol plants pay a premium for corn, corn growers would realize about **\$427 million in additional revenue** with SAF.

- For a typical 1000-acre farm with 50/50 corn-soybeans, **revenue would increase \$11,670.**

DIS Key Conclusion: “Sustainable Aviation Fuel (SAF) production provides a substantial opportunity for Midwestern states, Midwestern farmers, and Midwestern renewable fuel producers to prosper in the coming years if the SAF Grand Challenge comes to fruition and the Midwestern states take steps to be active participants in making the Roadmap come to life. The pathway that DIS estimates most likely to be realized has HEFA-based SAF and ethanol-to-jet (ETJ) being the two most prominent pathways for SAF production at least for the next 20 years. But, this potential cannot be fully realized without Carbon Capture and Sequestration (CCS) for ethanol. And, without the potential new use for corn for ETJ-SAF, the U.S. corn supply is and will continue to grow at a pace that outstrips demand. Either stocks will build, and prices will decline, or a significant amount of corn acreage will need to be pulled out of production. Time is of the essence and the clock is ticking.”

Report Author: Decision Innovation Solutions (DIS) is the premier economic research and analysis firm for agriculture in Iowa. The leading author was David Miller, Consulting Chief Economist at DIS and former long-time chief economist and researcher for the Iowa Farm Bureau Federation.

The full report can be found [here](#).