

## **AgriSource Commentary on SAF, CI, GREET, and 45Z tax credits**

**March 27, 2024**

### **SUSTAINABLE AVIATION FUEL RECAP (SAF)**

There has been a lot of talk and articles in recent weeks on Carbon Intensity (CI), 45Z tax credits, GREET, and Sustainable Aviation Fuel (SAF). We've done a recap below to bring everyone up to speed on what all the acronyms mean, and it's easy to see that getting access to the airline industry and SAF market could be HUGE for farmers and the grain industry. Everyone is waiting for a final decision on the biofuel tax credits from our leaders in Washington DC.

The National Corn Growers Association and 26 organizations from 13 states put out a letter on March 21<sup>st</sup> to the Biden administration and to Secretary of the Treasury Janet Yellen to resolve their March 1 deadline on the updated GREET model for the production of sustainable aviation fuel (SAF). GREET is a model that enables ethanol based SAF to qualify for more tax credits under the Inflation Reduction Act since it is based as a feedstock. Some say ethanol would be the clear winner if the previous planned details were to happen. The better scoring scheme would also benefit edible oil demand.

### **Below is the news article from the NCGA website**

A multi-state coalition of biofuel and farm advocates, including the National Corn Growers Association (NCGA) and many state corn advocates, called on President Biden's Treasury Department to swiftly resolve any questions standing in the way of efforts to scale up U.S. production of Sustainable Aviation Fuel.

Specifically, they urged the administration to quickly adopt the U.S. Department of Energy's GREET model for the calculation of SAF tax credits (40B) under the Inflation Reduction Act – completing a process that was originally scheduled to conclude by March 1.

“We are disappointed that the administration did not fulfill its commitment to release a modified GREET model by March 1, but we appreciate the importance of getting the modeling right,” wrote 26 organizations across 13 states, including Clean Fuels Alliance America, Growth Energy, National Corn Growers Association, National Farmers Union, National Oilseed Processors Association, and the Renewable Fuels Association. “At the same time, we caution against contradictory changes to GREET that would stack unwarranted penalties on agricultural feedstocks, cut rural America out of a promising green energy market, and undermine any realistic path to achieving U.S. SAF goals.”

SAF advocates emphasized the availability of well-established methodologies for certifying climate smart agriculture practices, in contrast to speculative and unverifiable penalties for indirect land use change favored by opponents of U.S. agriculture.

“Failing to value regenerative and CSA advancements, as well as the full suite of biorefining innovations cited in guidance to date, would leave substantial carbon emissions reductions on the table and represent a missed opportunity to energize these promising sectors,” they wrote. “A consistent approach to ILUC and CSA is a vital part of giving farmers and SAF producers a credible, durable, and predictable framework for making the commitments necessary to effectuate IRA and the SAF Grand Challenge.”

## Click Link Below for NCGA Letter

<https://agwizard.com/blog/wp-content/uploads/2024/03/SAF-Letter-MAR-21-Final-002.pdf>

Here is a quick refresher on SAF (Sustainable Aviation Fuel) and how big the potential market could be for grain farmers to get access to the airline industry fuel market.

- The difference in ethanol and biodiesel vs. aviation fuel and renewable diesel is that it's not an additive. **SAF is a 100% fuel instead of a 10, 15 or 85% blend**
- In 2023 we produced approximately 15.6 billion gallons of ethanol from 5.4 bln bushels of corn
- 1 bushel of corn produces approximately 2.88 gallons of ethanol
- In 2022, **the US used 134.55 bln gallons of finished motor gasoline** (EIA website)
- The 10% Ethanol “Blend Wall” is approximately 13.45 bln gallons based on 2022 data
- The potential for E15 ethanol will help expand blending past the "Blend Wall"
- The U.S. exported 1.3 bln gallons of ethanol in 2022 per EIA data (About 8-10% of US Ethanol Production)

**Here are the statistics provided by Statista for the U.S. Airline Industry Fuel Use (Chart Below)**

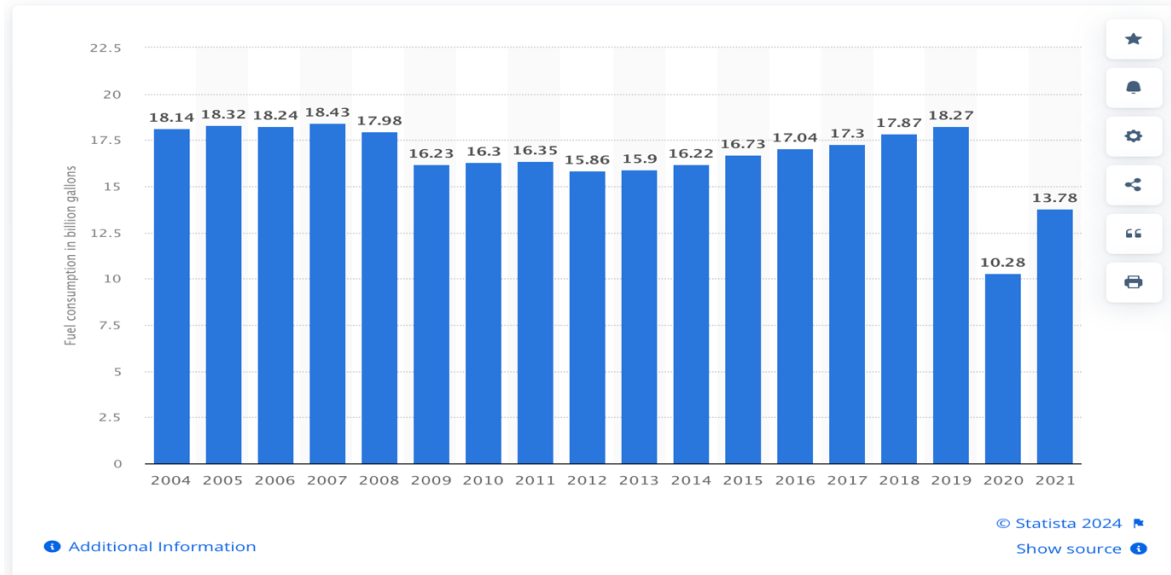
- From 2004 to 2018, the U.S. airline industry used 15.9 to 18.4 billion gallons of jet fuel each year
- In 2019, the U.S. airline industry used 18.2 billion gallons of jet fuel
- In 2020, the U.S. airline industry used only 10.2 billion gallons of jet fuel (COVID YR)
- In 2021, the U.S. airline industry used 13.8 billion gallons of jet fuel
- **The White House “Grand Challenge” aims to increase SAF production to 3 bln gallons a year by 2030, with goal to have 100% SAF commercial domestic jet fuel demand of 35 bln gallons by 2050**

**CLICK Below For the Sustainable Aviation Fuel Grand Challenge Website Link**

<https://biomassboard.gov/sustainable-aviation-fuel-grand-challenge>

## Total fuel consumption of U.S. airlines from 2004 to 2021

(in billion gallons)

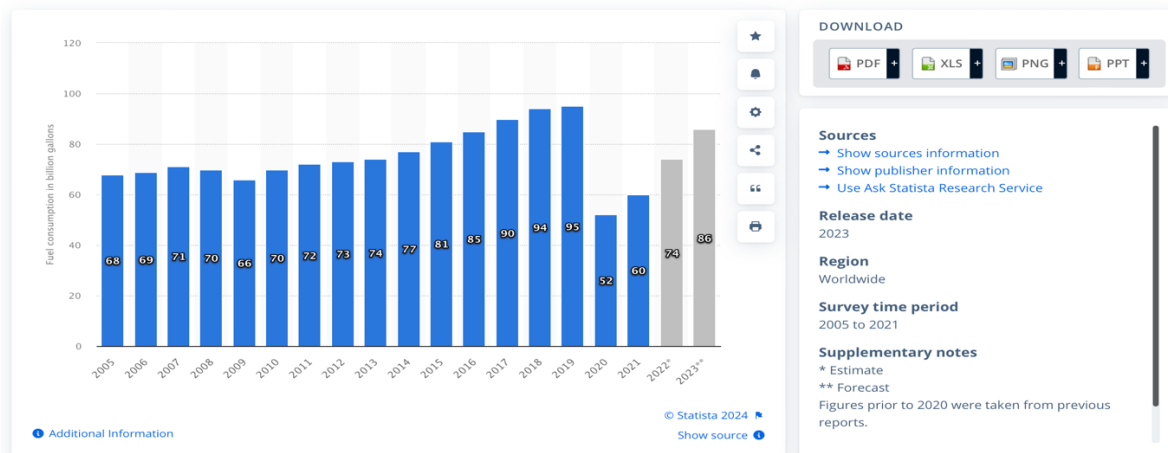


## Here are the statistics provided by Statista for Global Airline Industry Fuel Use (Chart Below)

- In 2019, the global airline industry used 95 bln gallons of jet fuel
- In 2020, the global airline industry used **52** bln gallons of jet fuel (COVID YR)
- In 2021, the global airline industry used 60 bln gallons of jet fuel
- In 2022, the global airline industry used 74 bln gallons of jet fuel (est)
- In 2023, the global airline industry used 86 bln gallons of jet fuel (est)

## Total fuel consumption of commercial airlines worldwide between 2005 and 2021, with a forecast until 2023

(in billion gallons)



# GREET

- Stands for: Greenhouse gases, Regulated Emissions, and Energy Use in Technologies
- The Department of Energy (DOE) Argonne National Laboratory began developing the GREET life cycle analysis (LCA) suite models in 1994
- GREET model was developed to evaluate energy and environmental performance of technologies to access research, development, and deployment, and inform performance goals set by governments, corporations, and other stakeholders.
- GREET is a tool that assesses a range of life cycle energy, emissions, and environmental impact challenges and that can be used to guide decision making, research and development and regulations related to transportation and the energy sector.
- For any given energy and vehicle system, GREET can calculate:
  - Total energy consumption (non-renewable and renewable)
  - Fossil fuel energy use
  - Greenhouse gas emissions
  - Air Pollutant emissions
  - Water consumption
- GREET is the global-gold standard for transportation fuel and technology lifecycle analysis and Congress specified the use of GREET by the Treasury Department in setting emission rates for the 45Z tax credit
- According to [Continuum Ag](https://continuum.ag/carbon-intensity/) <https://continuum.ag/carbon-intensity/> the 45E tax credit value to an ethanol plant is estimated to be \$0.054 cents per CI point below the industry estimated standard CI score of 29.1. The credit equates to about 76 cents per bushel or \$131/acre on a 173 bpa yield

**For more information on GREET Click Below**

**<https://www.energy.gov/eere/greet>**

## Corn Ethanol Carbon Intensity (CI)

Definition from ethanol.org

**CI:** Carbon Intensity - The amount of CO<sub>2</sub> (equivalent) GHGs by weight (grams) emitted during feedstock and fuel production, per unit of energy (Megajoules) produced. In the context of clean fuel or low carbon fuel policy, the term refers to the overall greenhouse gas emissions of various transportation fuels, with lower carbon intensity fuels being better for the environment.

- California GREET Midwest Average is 72.4 Grams CO<sub>2</sub> equivalent GHGs per megajoule
- 2021 US Dept of Energy GREET Midwest Average is 55.2 Grams CO<sub>2</sub> equivalent GHGs per megajoule
- The CI Score for corn is 29.44 to 32.89
- A CI Score of 0.0 means that a bushel of corn is net carbon neutral

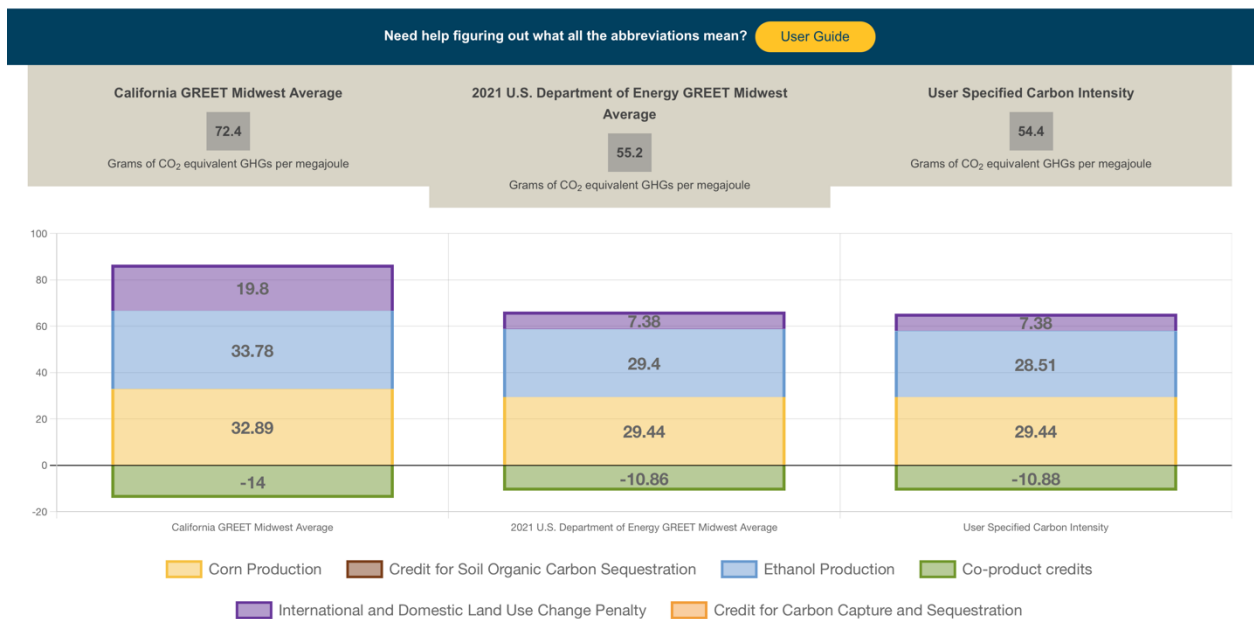
- Farmers who can reduce and prove that their CI score is below 29 are being sought after and paid for their low carbon crop

### Components of the CI score

- Corn Production
- Domestic Land use Change Penalty
- Ethanol Production
- CREDIT – Soil Organic Carbon Sequestration
- CREDIT – Carbon Capture
- CREDIT - Co- Products (Wet & Dry DDG’s, Corn Oil, Etc)



### Corn Ethanol Carbon Intensity Calculator



Here is the American Coalition for Ethanol Carbon Intensity Calculator

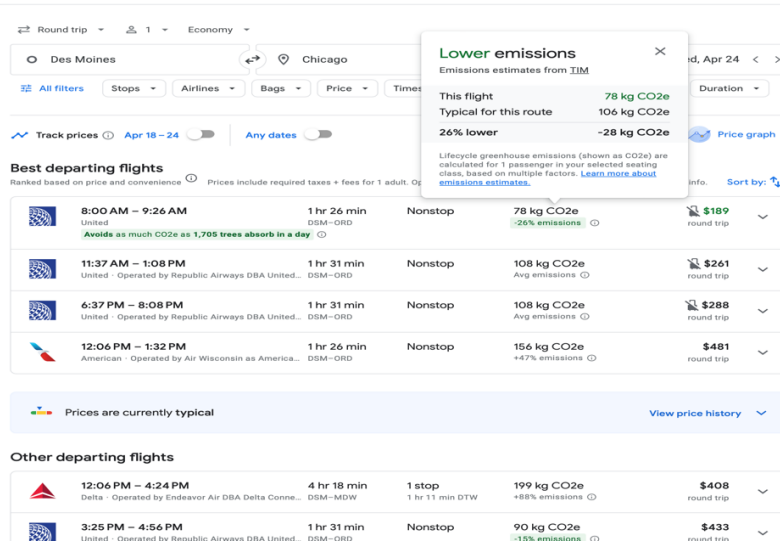
<https://ethanol.org/calculate-ci#top>

The American Coalition for Ethanol is working on a RCPP program, which stands for Regional Conservation Partnership Program to pay farmers who use conservation practices to benefit soil health, improve productivity, and sequester carbon and greenhouse gases (GHGs)

Here are some highlights from their website:

- The RCPP partners will leverage USDA resources to secure access for farmers and ethanol companies to new clean fuel markets and tax credits.
- There is renewed focus on lowering the carbon intensity (CI) of US transportation fuels, which account for nearly 30% of annual US GHG (greenhouse gas) emissions.
- Expanding low carbon ethanol usage is one of the best ways to make meaningful gains quickly.
- Researchers at MIT and Harvard verify that **average corn ethanol reduces GHGs by about 50% compared to gasoline**, the report found corn ethanol's CI will continue to get better thanks to innovations on the farm and in ethanol facilities.
- **USDA estimates US farmers currently store over 20 mmt of carbon per year and that they can store an additional 180 mmt tons/year representing 12-14% of US carbon emissions through the adoption of conservation practices**
- Argonne National Laboratory has found that specific crop rotation systems in the upper Great Plain would result in increased carbon sequestration and generate hundreds of dollars per acre in revenue if credited in state low carbon fuel market.

We know we have just touched the surface on CI, GREET, 45Z, and SAF, and will continue to expand on our initial analysis in future commentaries. If you haven't flown recently or booked any airline flights, did you know that CO2 and greenhouse emissions PER SEAT are now shown along with ticket prices? Times are changing in the airline industry, and it appears SAF could be the next best thing for US ag!



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