

Sustainable Aviation Fuel

Let's learn about the R&D GREET model's capability to model sustainable aviation fuels (SAF). This worksheet will help you harness the R&D GREET model in cases related to SAF.

R&D GREET problem solving

When running a SAF simulation, where would you find the main outputs for a simulation?

- 1 Aircraft-specific results =
- 2 Weighted-average aircraft results =

SAF scenarios

Where would you find the general settings for altering SAF pathways?

Answer here

List the primary tabs involved in SAF calculations.

Answer here

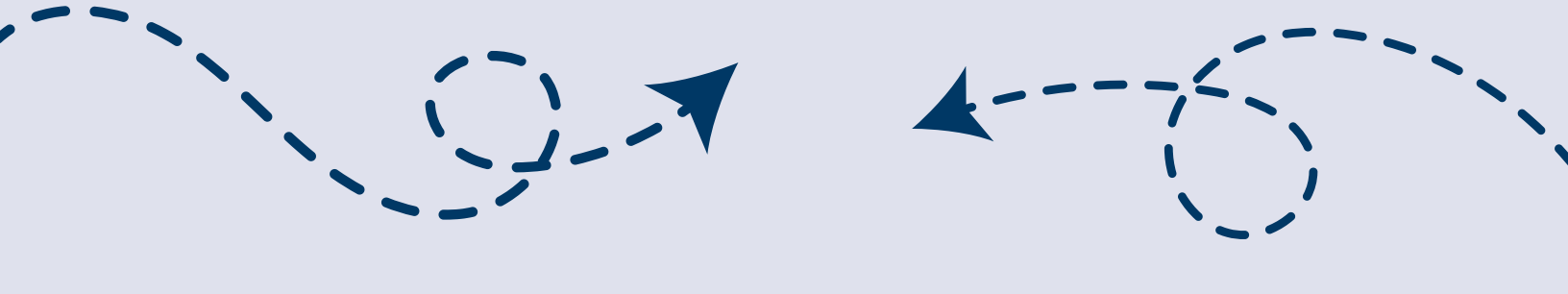
Corn-ATJ SAF pathways in R&D GREET

For this section, we will be focusing on the corn alcohol-to-jet (ATJ) SAF pathway in R&D GREET.

Dry corn milling with extraction

Model the default weighted-average aircraft fueled by corn alcohol-to-jet (ATJ) SAF using dry corn milling with extraction. All other settings should be set as default.





What are the well-to-wake (WTWa) GHG emissions in g CO₂e/MJ?

WTWa GHG emissions =

Exclude induced land use changes

Model the default weighted-average aircraft fueled by corn alcohol-to-jet (ATJ) SAF using dry corn milling with extraction and excluding induced land use changes (ILUC). All other settings should be set as default.

What are the well-to-wake (WTWa) GHG emissions in g CO₂e/MJ?

WTWa GHG emissions =

Less efficient SAF production

Model the default weighted-average aircraft fueled by corn alcohol-to-jet (ATJ) SAF using dry corn milling with extraction that requires 5% more ethanol and twice as much natural gas for SAF production compared to the R&D GREET default. All other settings should be set as default.

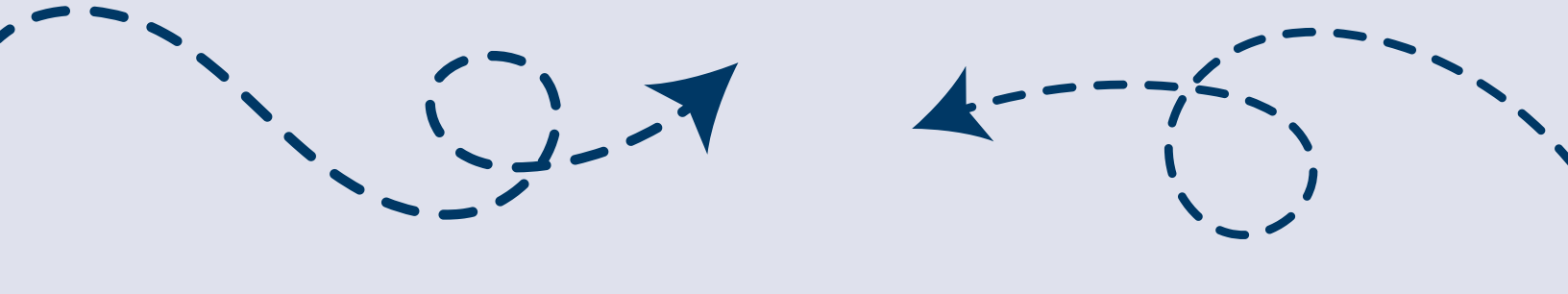
What is the increased ethanol amount required for SAF production in kg/MJ of total liquid SAF produced?

Answer here

What are the well-to-wake (WTWa) GHG emissions in g CO₂e/MJ?

WTWa GHG emissions =





How do these results compare to the results of the default SAF production efficiency?

Answer here

Improved farming inputs

Model the default weighted-average aircraft fueled by corn alcohol-to-jet (ATJ) SAF using dry corn milling with extraction, 50% less nitrogen fertilizer, 50% less energy inputs, and including on-farm carbon capture and sequestration (CCS). All other settings should be set as default.

What is the reduced nitrogen fertilizer amount?

Answer here

What are the well-to-wake (WTWa) GHG emissions in g CO₂e/MJ?

WTWa GHG emissions =

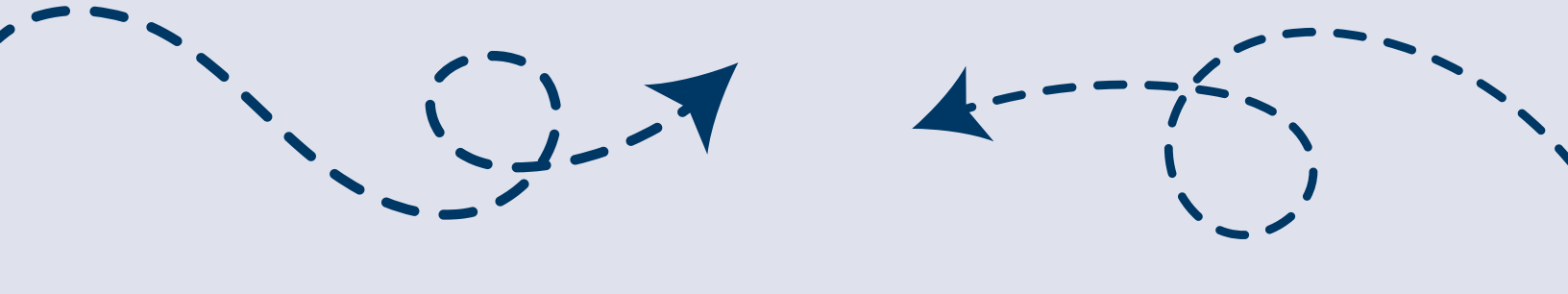
Soy oil HEFA SAF pathways in R&D GREET

For this section, we will be focusing on the soy oil hydroprocessed esters and fatty acids (HEFA) sustainable aviation fuel (SAF) pathway in R&D GREET.

Soy oil HEFA

Model the default weighted-average aircraft fueled by soy oil hydroprocessed esters and fatty acids (HEFA) sustainable aviation fuel (SAF). All other settings should be set as default.





What are the well-to-wake (WTWa) GHG emissions in g CO₂e/MJ?

WTWa GHG emissions =

System-level energy-based co-product allocation
Model the default weighted-average aircraft fueled by soy oil hydroprocessed esters and fatty acids (HEFA) sustainable aviation fuel (SAF) with system-level energy-based co-product allocation for SAF production. All other settings should be set as default.

What is the default co-product allocation method of the HEFA process?

Answer here

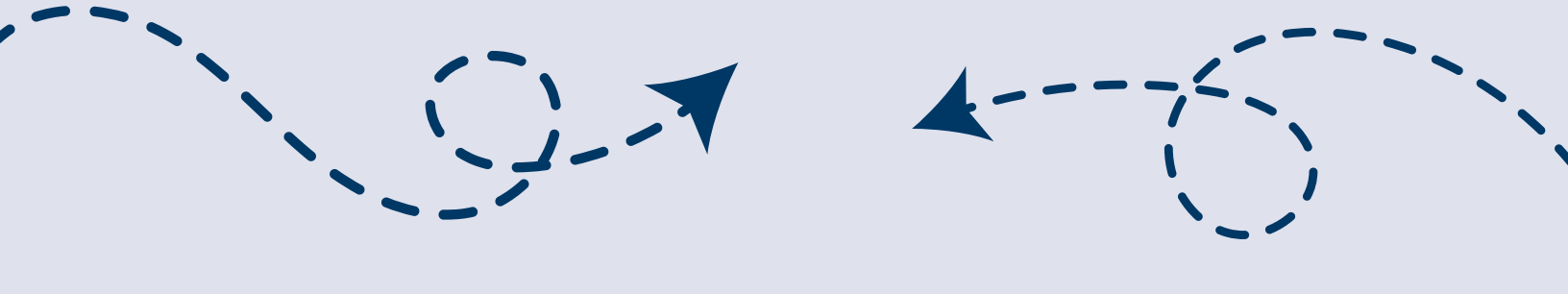
What is the default system-level yield of biofuel from soybeans in the HEFA process in lb biofuel/bushel soybean?

Answer here

What are the well-to-wake (WTWa) GHG emissions in g CO₂e/MJ?

WTWa GHG emissions =

Impact of soy oil extraction
Determine the impact of soy oil extraction on the soy oil hydroprocessed esters and fatty acids (HEFA) sustainable aviation fuel (SAF) pathway in R&D GREET. All other settings should be set as default.



What are the well-to-wake (WTWa) GHG emissions before and after the removal of soy oil extraction from the modeled pathway?

- 1 WTWa GHG emissions including soy oil extraction emissions =
- 2 WTWa GHG emissions excluding soy oil extraction emissions =

What is the impact of soy oil extraction on the soy oil HEFA SAF pathway?

Answer here

Business jet passenger aircraft

Model a business jet passenger aircraft aircraft fueled by soy oil hydroprocessed esters and fatty acids (HEFA) sustainable aviation fuel (SAF) with an improved oil input of 1.14 MJ/MJ total fuel and an improved energy use for jet fuel production by 20% compared to R&D GREET default. All other settings should be set as default.

What are the well-to-wake (WTWa) GHG emissions in g CO₂e/MJ?

WTWa GHG emissions =

