

# Biofuels

Let's learn about the R&D GREET model's capability to model biofuels. This worksheet will help you harness the R&D GREET model in cases related to biofuels.

## R&D GREET problem solving

When running a biofuels simulation, where would you find the major outputs for the simulation?

Answer here

## Ethanol scenarios

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

Answer here

## List the primary tabs involved in ethanol pathways.

Answer here

## Biodiesel and renewable diesel scenarios

Where would you find the general settings for altering biodiesel and renewable diesel pathways?

Answer here

## List the primary tabs involved in biodiesel and renewable diesel pathways.

Answer here



## Renewable natural gas scenarios

Where would you find the general settings for altering renewable natural gas pathways?

Answer here

## List primary tabs involved in renewable natural gas pathways.

Answer here

## Ethanol in R&D GREET

Explore the major worksheets related to ethanol pathways in R&D GREET.

## 100% ethanol

Model a dedicated ethanol (EtOH) spark-ignition internal combustion engine (SI-ICE) light-duty car fueled by 100% ethanol. All other settings should be set as default.

## What is the agricultural feedstock for blended ethanol as a default in R&D GREET?

Answer here

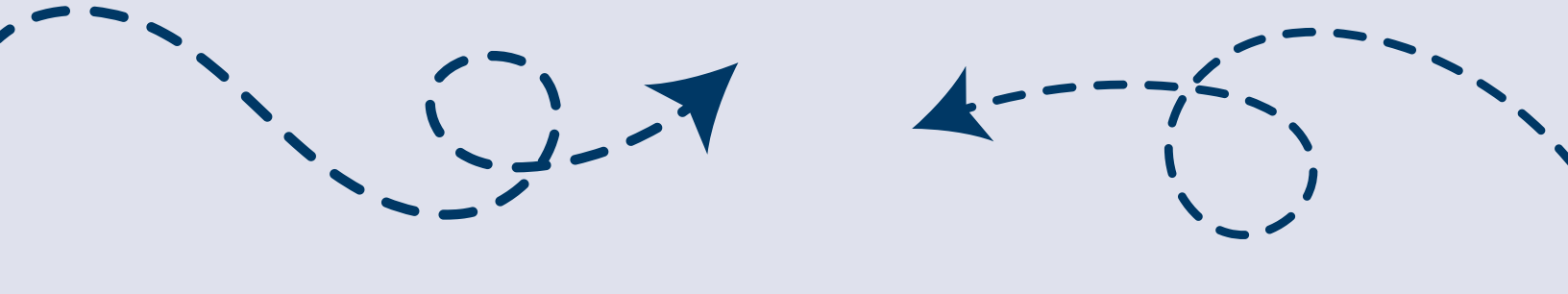
## What are the well-to-wheels (WTW) GHG emissions in g CO<sub>2</sub>e/MJ and g CO<sub>2</sub>e/mile?

WTW GHG emissions =

## E80 in an FFV

Model a flex fuel vehicle (FFV) spark-ignition internal combustion engine (SI-ICE) light-duty car fueled by E80. All other settings should be set as default.





**What are the well-to-wheels (WTW) GHG emissions in g CO<sub>2</sub>e/MJ and g CO<sub>2</sub>e/mile?**

WTW GHG emissions =

### **Biodiesel and renewable diesel in R&D GREET**

Explore the major worksheets related to biodiesel and renewable diesel pathways in R&D GREET.

### **Conventional diesel**

Model a compression-ignition direct-injection internal combustion engine (CIDI-ICE) light-duty car fueled by conventional diesel. All other settings should be set as default.

**What are the well-to-wheels (WTW) GHG emissions in g CO<sub>2</sub>e/MJ and g CO<sub>2</sub>e/mile?**

WTW GHG emissions =

### **Soybean biodiesel**

Model a compression-ignition direct-injection internal combustion engine (CIDI-ICE) light-duty car fueled by biodiesel produced from soybeans. All other settings should be set as default.

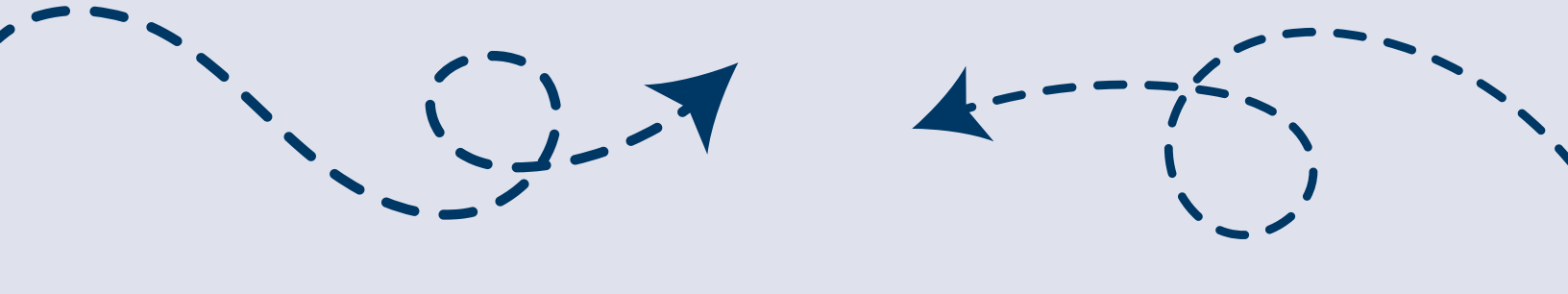
**What is the default content (%) of biodiesel used in CIDI fuel in R&D GREET?**

Default biodiesel content =

**What is the agricultural feedstock for biodiesel as a default in R&D GREET?**

Answer here





### Induced land use emissions

What are the default greenhouse gas (GHG) emissions from domestic and international induced land use changes in grams/gal of biodiesel produced?

- 1 Induced domestic land use change GHG emissions =
- 2 Induced international land use change GHG emissions =

### What are the well-to-wheels (WTW) GHG emissions in g CO<sub>2</sub>e/MJ and g CO<sub>2</sub>e/mile?

WTW GHG emissions =

### Soybean renewable diesel

Model a compression-ignition direct injection internal combustion engine (CIDI-ICE) light-duty car fueled by renewable diesel produced from soybeans. All other settings should be set as default.

### What is the default content (%) of renewable diesel used as fuel in R&D GREET?

Default renewable diesel content =


### What is the agricultural feedstock for renewable diesel as a default in R&D GREET?

Answer here

### What are the well-to-wheels (WTW) GHG emissions in g CO<sub>2</sub>e/MJ and g CO<sub>2</sub>e/mile?

WTW GHG emissions =





**Compare the WTW GHG emissions from the soybean biodiesel and soybean renewable diesel scenarios?**

Answer here

### **35% soybean biodiesel**

Model a compression-ignition direct injection internal combustion engine (CIDI-ICE) light-duty car fueled by 35% biodiesel produced from soybeans. All other settings should be set as default.

**What is the energy content of soy oil used by default in R&D GREET?**

Answer here

**What are the well-to-wheels (WTW) GHG emissions in g CO<sub>2</sub>e/MJ and g CO<sub>2</sub>e/mile?**

WTW GHG emissions =

### **Challenge**

Are the biogenic CO<sub>2</sub> emissions credits (i.e. the uptake of CO<sub>2</sub> from the atmosphere during soybean growth) accounted for in the Feedstock, Fuel, or Vehicle Operation stages?

Answer here

### **Renewable natural gas in R&D GREET**

Explore the major worksheets related to renewable natural gas pathways in R&D GREET.





### **RNG from landfill gas**

Model a heavy-duty refuse truck fueled by liquified natural gas produced from renewable natural gas (RNG) from landfill gas. All other settings should be set as default.

### **What are the well-to-wheels (WTW) GHG emissions in g CO<sub>2</sub>e/mile?**

WTW GHG emissions =

### **RNG from AD**

Model a heavy-duty refuse truck fueled by liquified natural gas produced from renewable natural gas (RNG) from anaerobic digestion (AD) from animal manure. All other settings should be set as default.

### **What is the livestock assumed to produce the animal waste used in anaerobic digestion (AD) by default?**

Answer here

### **What are the well-to-wheels (WTW) GHG emissions in g CO<sub>2</sub>e/mile?**

WTW GHG emissions =

### **Compare the WTW GHG emissions from the two renewable natural gas pathways (RNG from landfill gas and RNG from anaerobic digestion).**

Answer here

