

Hydrogen

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

R&D GREET problem solving

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

Answer here

Hydrogen scenarios

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

Answer here

List the primary tabs involved in hydrogen pathways.

Answer here

Hydrogen in R&D GREET

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

Gaseous hydrogen: steam methane reforming (SMR)

Determine the WTG GHG emissions of gaseous hydrogen produced from SMR with 95% carbon capture and sequestration (CCS) and steam export of 0.15 mmBtu/mmBtu H₂. All other settings should be set as default.





What percentage of carbon is sequestered by default in central NG-to H₂ plants?

Answer here

What are the well-to-gate (WTG) GHG emissions in g CO₂e/mmBtu?

WTG GHG emissions =

Gaseous hydrogen: PEM electrolysis

Determine the WTG GHG emissions of gaseous hydrogen produced from PEM electrolysis using the U.S. average grid electricity mix while exporting all O₂ produced. All other settings should be set as default.

What is the default electricity source for H₂ production via PEM electrolysis?

Answer here

What are the well-to-gate (WTG) GHG emissions in g CO₂e/mmBtu?

WTG GHG emissions =

Nuclear-powered PEM electrolysis

Determine the WTG GHG emissions of **liquefied** hydrogen produced from PEM electrolysis using nuclear energy that will be transported 200 miles via tube truck. All other settings should be set as default.

What is the default transportation mode for liquefied H₂ production?

Answer here





What are the well-to-pump (WTP) GHG emissions in g CO₂e/mMBtu?

WTP GHG emissions =

Ammonia production

Determine the emissions of carbon dioxide associated with ammonia production utilizing H₂ production produced from PEM electrolysis. Change the operating efficiency of the electrolyzer to 60 kWh/kg H₂ and assume the power source is hydropower. All other settings should be set as default.

What is the efficiency (in %) of the electrolysis unit operating at 60 kWh/kg H₂ using the LHV basis of H₂?

Answer here

How many grams of carbon dioxide are emitted from the ammonia production?

Answer here

FCEV fueled by two forms of H₂ production

Model a fuel-cell electric vehicle (FCEV) fueled equally using gaseous hydrogen from wind-powered SMR (w/ 95% CCS) and PEM electrolysis that had to be transported 200 miles to the refueling station via a tube trailer. All other settings should be set as default.

What are the well-to-wheels (WTW) GHG emissions in g CO₂e/MJ and g CO₂e/mile?

WTW GHG emissions =

